Building
VEA

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INDEX.

CARPENTRY AND BUILDING

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THE BUILDERS' EXCHANGE.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
96-102 READE STREET, NEW YORK.

JANUARY, 1896.

Lessons for the New Year.

At no season of the year is the mind of the careless business man more fully stored with information than at present. Those who do not make it a point to keep a correct record of the time and material expended on a given work and have no original estimate of the cost with which to compare it, can at this time of the year draw from their memory information which has been stamped upon it forcibly by circumstances, and can, if they will, systematize this information so that they can readily see where they have been their own worst competitor. It is well known that when some contractors are to bid on work they inquire against whom they are to bid, and in some cases they have refused to bid, with the remark that some of the bidders do not estimate cost, but simply guess. In other cases, where contractors have met in going over specifications, they recognized that while the competition would be sharp, they did not fear it, but enjoyed the prospect of bidding in competition with men who were known to be most careful in computing the cost of all details and making a careful estimate of the amount of labor required before submitting their bid. Some contractors report that in the early part of the year they were doing a very small business, because the ruling prices for their work were below what they considered a safe business figure, and they declined to enter the field, believing that later they could be well occupied at good figures. It takes no little courage to make such a stand, but they found that later in the season, when the inconsiderate bidders had all the business they could handle, there was yet sufficient business to be given out to afford them a very satisfactory trade, and at prices which were profitable. Those men who have not had as profitable a year as they had hoped for can lay a very sure foundation for success in beignning the new year by calculating carefully the cost of all work which they are called upon to do, and if they cannot figure a profit for themselves it is useless to fill their shop with work.

New York State Association.

The first State Association of Builders was recently established in New York, the meeting for permanent organization being held in this city on December 11, delegates being present from exchanges in Batavia, Brooklyn, Buffalo, New York City, Rochester and Utica. The objects of the association have already been stated in these columns, and the intelligent and enthusiastic appreciation shown by the delegates of the value of the work possible to such an organization, augurs well for the results to be accomplished. The advantages for efficient service in a delegate body of this character, whose voice is the expression of the united opinion of business men in various parts of the State, are manifest, and will inevitably bear the weight and dignity desired not only because of its nature, but because the administration of its affairs has been placed in the hands of the best representatives of the craft in the State. The builders of New York State are deserving of credit for the effective manner in which they have grasped the situation, and for the excellent example they have set their brethren in other States

Building Strikes.

About the middle of the month, an abrupt period was put to the strike of the housesmiths, employed by two large firms engaged in iron construction in New York City. It ended in complete failure of the men, who returned to work without gaining any important advantage, while, on the other hand, they lost several weeks' wages. The men went out against their wills, it was said, because they were ordered to do so by the officers of the Housesmiths'Union. These men took the serious step of ordering a strike and crippling a large amount of important building work solely with the view of coercing the employers into a recognition of their union. The workmen were forced to give up employment with which they were satisfied and lose the wages which they needed for themselves and their families, with the added risk of being without employment throughout the winter, in order to satisfy the impulse of the union officials. The men, however, tiring of inaction and seeing the futility of the strike, went back voluntarily to their work, choosing rather the risk of sacrificing their union than of being kept out of work at a time when they had special need of the money which employment brought them.

Portable Electric Motors in the Shop.

The employment of electric motors, so arranged that they may be readily moved from point to point in the shop, as occasion may demand their services, is spreading with considerable rapidity. By this method the power is conveyed without trouble to any desired locality, the necessary connections are quickly made, and, what is most essential, the results are eminently satisfactory in every respect. The plan is equally advantageous when viewed from the standpoint of economy, since there is an outlay only when the motor is in operation and is, presumably, performing some service. There are no idle parts to be kept in motion merely that they may be ready to operate a tool when the work requires it. In a very large carpenter shop there is practically no limit to the range of application of the motor to duty of this character. The conductors carrying the electric current can be placed permanently wherever this motor may possibly be needed and the devices for making the connections be installed. We recently found the motor used in this way in an establishment engaged in the building of heavy special and standard tools. The main shop is about 500 feet long by 70 feet wide, and at each side, extending the entire length, is a bay about 25 feet wide. The entire length of the central portion of the building is traversed by electric cranes. The electric conductors feeding the crane motors are tapped at the columns, where the necessary connecting devices are put in. Four portable electric motors ranging from 2 to 8 horse-power are in use. The smallest is arranged for drilling and tapping, and is provided with all the attachments needed for securing it in working position on the piece to be drilled. This motor can be carried about the shop by hand. The larger motors are mounted upon heavy bases, and are geared down so as to drive a pulley at the speed of the main driving shaft. They also have, in the upper part of their frame, rings by means of which they may be lifted and moved by the traveling cranes, as required. The motors are what we may term self contained machines in every respect, and are furnished with all the electrical devices necessary for their control and operation. For all work of an ordinary character the large motors are heavy enough to keep the driving belt sufficiently tight without their being secured to the floor; but when the maximum power is needed and they might slip, they are held in position by suitable braces. After a motor has been placed in position for driving any particular machine the conducting wires are led to the nearest column, where connection is made with the wires leading from the conductors supplying the cranes. After this the motor is within most convenient reach of the operator, who always has it under perfect and easy control. It is placed near the machine it drives, and occupies, in most cases, a floor space not valuable for other purposes. In some instances the motors are employed for driving countershafts, whichinturn operate the machine. This is done only in those tools which, by reason of their design, could not be driven from the floor. The convenience of this equipment, and the ease and rapidity with which the motors can be moved and connected for working, can be best illustrated by the statement that in one day one of the large motors was used on three different machines in as many different locations. The time required to move and set up a motor is a very unimportant item in comparison with the advantages arising from its use in this way.

The American Federation of Labor.

The convention of the American Federation of Labor which recently closed a prolonged session in this city was remarkable for the judicious and moderate tone which, on the whole, characterized its deliberations, and for the conservative action taken in regard to the various matters discussed. There was an unusual absence of the sensational and spectacular features which have too often marked previous large gatherings of the representatives of labor. Efforts made by the socialistic element of the Federation to intrude their peculiar political and economic theories were effectually suppressed and a resolution was adopted, by a vote of 1460 to 158, adding a declaration to the constitution that party politics should have no place in the Federation of Labor. Similarly, the discussions of the questions which came before the convention were carried on in a temperate and dignified manner. The internal affairs of the Federation occupied much of the attention of the convention. Measures were taken to strengthen the union of its affiliated bodies and to solidify the alliance of labor. The movement for an eight-hour work day was approved and steps were taken looking to the organization of a national union to take in all unskilled labor. A recommendation for the submission of all important questions to a direct vote of the people was the only quasi-political measure passed. Good sense and sound judgment were found in the speeches of most of the prominent labor leaders, and the proceedings of the convention generally were such as to command the respectful interest of the friends of labor of every class.

A well-known electrical authority has pointed out that it is now as easy and cheap to have an electric elevator in a private house as in a large office building. Stairs are literally a barbarism, he says, to which women frequently owe ill health and to which many delicate persons may attribute the deprivation of the full enjoyment of their homes. The cost of operating an electrical elevator in, say, a five-story house, making 50 or 60 trips every day, will not exceed $3 or $4 per month. The devices for operating these elevators have been so improved that an invalid or a child can manage them. The old lever arrangement can be dispensed with, and the elevator ascends or descends on the pressure of a button. It will stop only at each floor and will start only when the elevator door is closed.

Perfect Ventilation.

A writer in the Syracuse *Post* makes the following observation on the subject of ventilation:

"There are many fairly well educated persons who cannot understand that ventilation does not necessarily mean an open window or a draft of wind, and who would fancy themselves ill-provided with pure air even in the best ventilated rooms wherein these objectionable features were not certain evidence to eye and feeling that some pure outside air was entering. 'The two ideas of wind and coolness form the whole of the public care or knowledge in regard to ventilation. There is also the incidental belief that foul air rises, and that there must be some means provided for letting it out. This idea takes concrete form in the little whirligigs seen in so many office windows and in the tendency toward opening windows at the top on "general principles."' The general belief and tradition is to make a hole somewhere in the upper part of the room, and then all foul odors, bad air and other improper things in the atmosphere will quietly and of their own accord and free will let themselves out.

"In these crude ideas we have practically all that the public knows or cares about ventilation. In the actual practice of the individual there is no intelligent appreciation of pure air, nor can most people tell whether the air they breathe is fit for respiration. Even people belonging to the educated classes do not use the evidence of their senses in regard to the quality of the air in their houses.

"It is the duty of sanitary and ventilating engineers to educate the public up to a higher plane as regards ventilation; and in order to do this 'there must be more general appreciation of the difference between pure and foul air from their own characteristics rather than from circumstances which have nothing to do with the case.' This means, of course, that attention must be given to methods for testing the quality of air in and of itself, without reference to visible means of supplying it, or to its sensible effects upon the surface of the human body. 'When this educational work has been accomplished the field of the engineer who devotes himself exclusively to ventilation will be the widest of any belonging to the engineering profession.'"

Egyptian Bricks.

Egyptian bricks were generally crude, mixed with straw and dried in the sun; kiln burnt bricks were occasionally used in foundations, quays, the raised terraces on which the towns were built, or in any situation where they would be exposed to frequent contact with water. The crude bricks were about 15 inches in length, 7 inches in breadth, and a little more than 5 inches in thickness. This simple material, says an English contemporary, was found to be peculiarly suitable to that dry, hot climate, where rain scarcely ever fell, and was further recommended by the ease and rapidity with which the brick could be made. The brick fields afforded abundant occupation for numerous laborers, and the demand was so great and the trade so profitable that the Egyptian Government took it into their own hands and considerably increased the revenue by this monopoly. In order to prevent unauthorized persons from engaging in this manufacture, a seal containing the name of the king or some other privileged person was stamped upon the bricks before they were dried; numerous bricks, thus stamped, have been found at Thebes and elsewhere. According to Vitruvius, crude bricks should only be manfuactured in spring or autumn, in order that they may dry slowly; those which are made in the heat of summer speedily dry outside, while the inside remains moist; the brick thus becomes defective and easily gives way. He further observes that bricks ought to have been dried five years before they can be considered fit for use, and that their having been so should be certified by a magistrate. If these rules originated with the ancient Egyptians, it is probable that the stamp before mentioned may also have been a warrant of the solidity of the bricks.

RESIDENCE OF MR. LEWIS WILLIAMS, AT JOHNSTOWN, PENN.

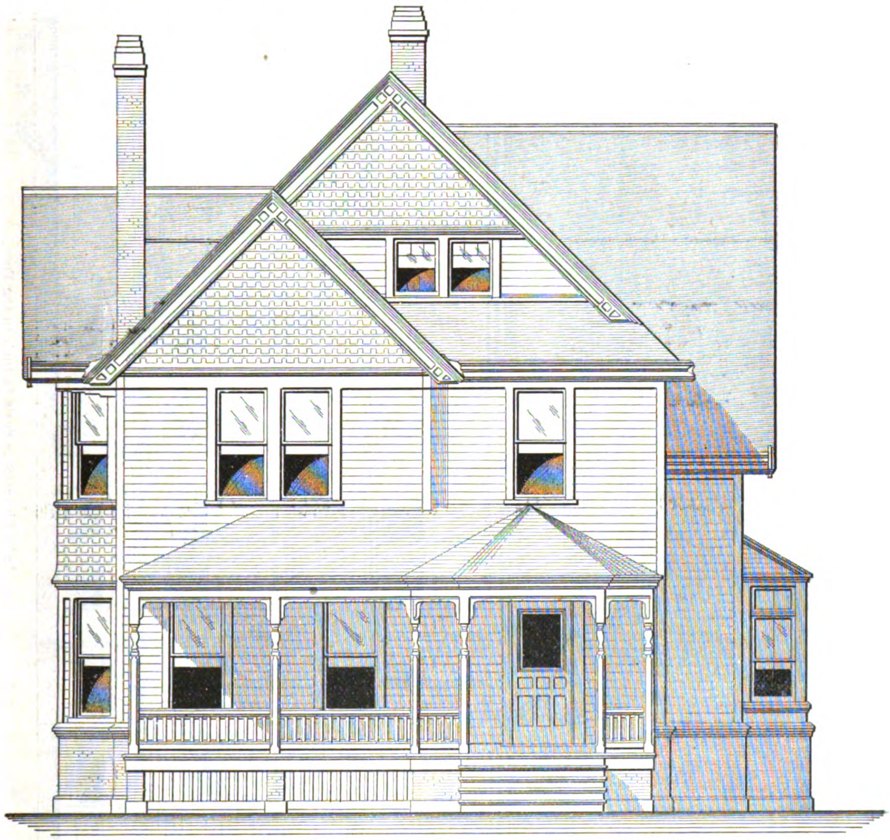
GRODAVENT BROS., ARCHITECTS, DENVER, COLO.

SUPPLEMENT CARPENTRY AND BUILDING, JANUARY, 1896.

COTTAGE AT JOHNSTOWN, PA.

THE residence of Mr. Lewis Williams, which we illustrate by means of one of the supplement plates and the engravings presented upon this and the pages which follow, was built at Johnstown, Pa., during the years 1891 and 1892, taking the place of a home washed away by the great flood. The house has a frontage of 28 feet and a depth of 40 feet. There is under the entire building a cellar 7 feet 6 inches in the clear, the bottom of which, with the exception of the laundry and hall, is covered with 3 inches of concrete. The laundry and hall have wood floors. The foundation walls to the top of the base course are of stone, 18 inches thick, above which to the top of the first floor timbers they are of brick, 17 inches thick, continuing 9 inches thick to the wood sills. Iron bolts are built into the brick work to the bottom of the first floor joists for securing the 4 x 8 inch sills, which are bedded and bolted to the walls, the exterior of which are faced with pressed brick.

In the cellar are storerooms, fuel and heater room, laundry and the necessary closets. In the laundry are two Yorkshire brown glazed washtubs provided with hot and cold water. On the first floor are staircase hall, parlor, dining room and kitchen. A large pantry connects with dining room and kitchen, and at the end of the pantry is a storeroom in which space is left for the refrigerator. A small china closet in dining room has communication with the storeroom, and drawers are placed below the china closet, on the dining room side. In the rear hall is a closet for coats, &c., and the stairways leading to the basement and to the second story. The latter stairs join the main stairs from the front hall on a common platform, and continue as a single flight to the second story. In the second story, which is 9 feet in the clear, are four good bedrooms, with closets, and two closets in main hall. The bathroom is provided with 14-ounce copper tub and 14 x 17 inch oval wash bowl. The water closet, one of Henry Huber's Unique square top, is placed in a separate room. There are three bedrooms and closets finished off in the third story, which has ceilings 8 feet in the clear. The third story is reached by a flight of box stairs placed over the main stairway. All stairways are built of clear white pine and with red oak railings. It will be noticed that all stairs have platforms and no straight flights or winders are used.

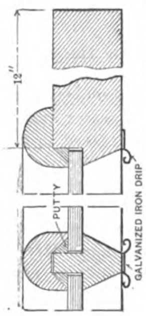


Front Elevation.—Scale, ¼ Inch to the Foot.

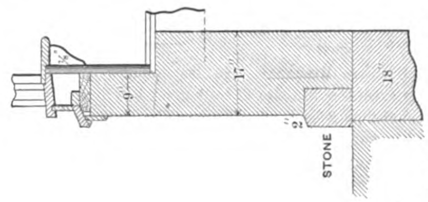
Cottage at Johnstown, Pa.—Grodavent Brothers, Architects, Denver, Colo.

There is a broad porch across the front of the house, and a rear porch which forms the covering to the outside cellar entrance. There is a second story balcony, reached from the second story hall at the rear, the hall being lighted by a sash door.

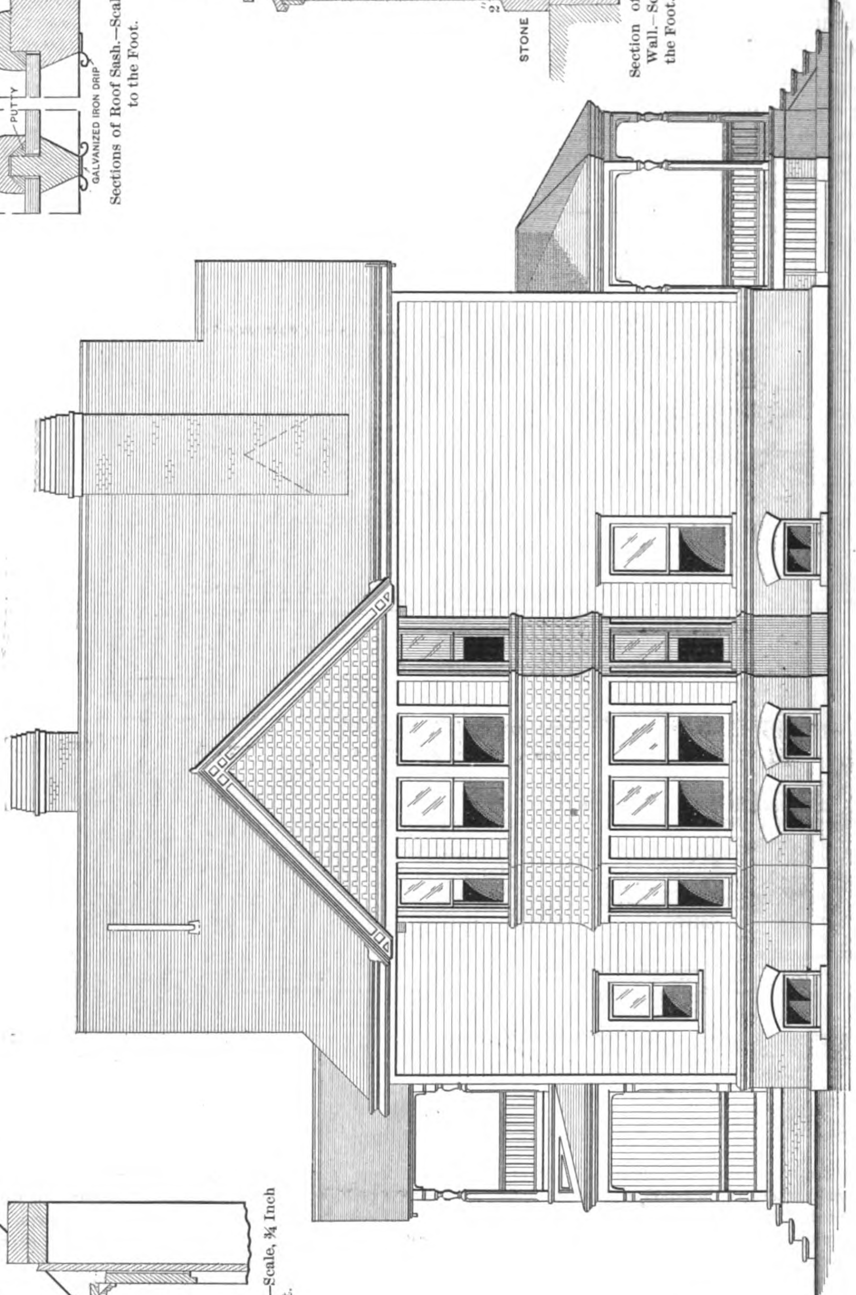
The building is frame and constructed upon the wood sills, which are bolted to the foundation walls. The corner posts are 6 x 8 inches; studs, 2 x 6 inches; first and second floor joists, 2 x 10 inches, and attic joists, 2 x 8 inches, all placed 16 inches on centers. The posts and outside studding are full length from sills to wall plates. The common rafters are 2 x 6 inches, and the hips and valleys 2 x 8 inches. Inside studding is 2 x 4 inches, placed 16 inches on centers. All inside and outside studding are doubled at the openings. Joists are doubled for headers and trimmers and under partitions. The front porch roof is covered with paper and tin, and all valleys and gutters are lined with tin, the latter being painted on the underside before it is laid. Down spouts are of corrugated galvanized iron. The outside walls, including gables, are



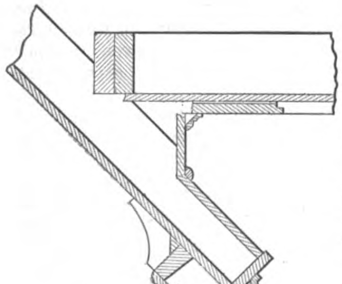
Sections of Roof Sash.—Scale, 3 Inches to the Foot.

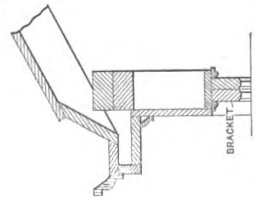


Section of Conservatory Wall.—Scale, ¾ Inch to the Foot.

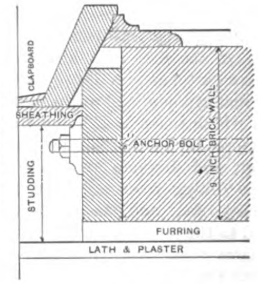

Side (Left) Elevation.—Scale ⅛ Inch to the Foot.

Cottage at Johnstown, Pa.—Miscellaneous Details and Side Elevation.


Detail of Main Cornice.—Scale, ¾ Inch to the Foot.



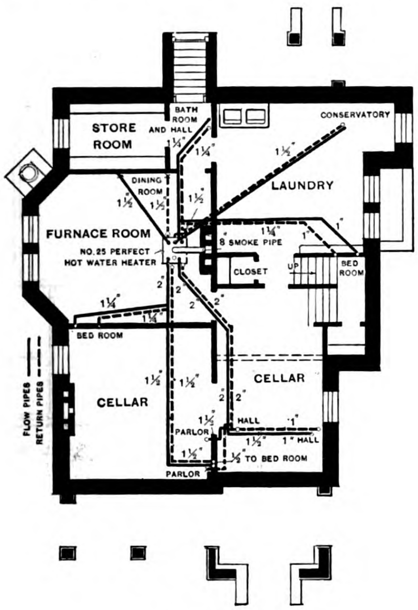
Detail of Porch Cornice.—Scale, ¾ Inch to the Foot.



Detail at Water Table.—Scale, 1½ Inches to the Foot.

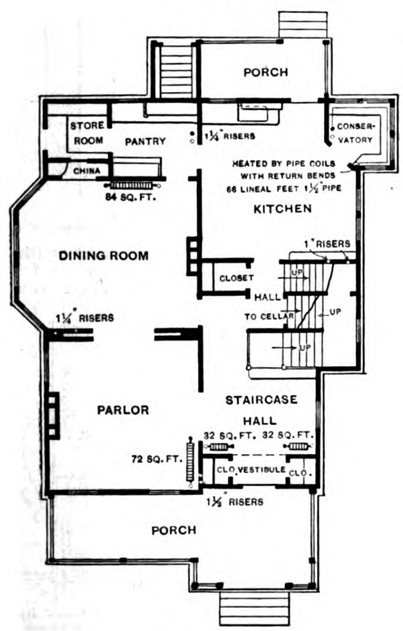
covered with square edge surfaced boards, and main walls with white pine clapboard, laid 4 inches to the weather. The window belts and gables are covered with white pine shingles, laid 4½ inches to the weather, and with cut shingle belts. The main roof and rear balcony roof are covered with similar shingles.

The first and second stories have double floors, the top wood and varnished. The front door is grained to represent oak. The exterior is painted three coats, and all shingles are dipped in Cabot's shingle stain. There is an electric bell at the front door and a speaking tube from the second story to kitchen. The house is piped for gas. Russell & Erwin's bronze hardware is used for first and second stories. Bevel plate glass is used in the front door

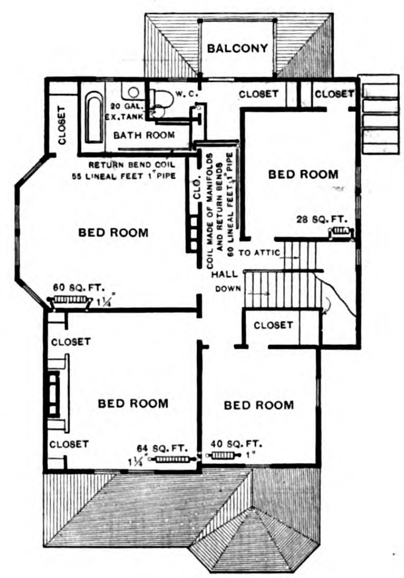


Foundation.

Attic.



First Floor.



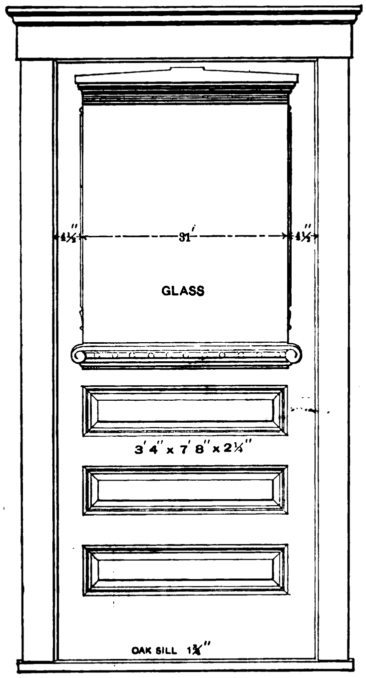
Second Floor.

Cottage at Johnstown, Pa.—Floor Plans.—Scale, 1 16 Inch to the Foot.

one being of narrow white pine, which was not laid until the plastering was done. Georgia hard pine floors, quarter sawed, were laid in the kitchen, conservatory, pantry, storeroom and in the basement. The finish in the basement and attic is in white pine and painted. The finish in the first and second stories is of select clear white poplar, including all doors, and Durstine's sliding blinds, which are on all sliding windows.

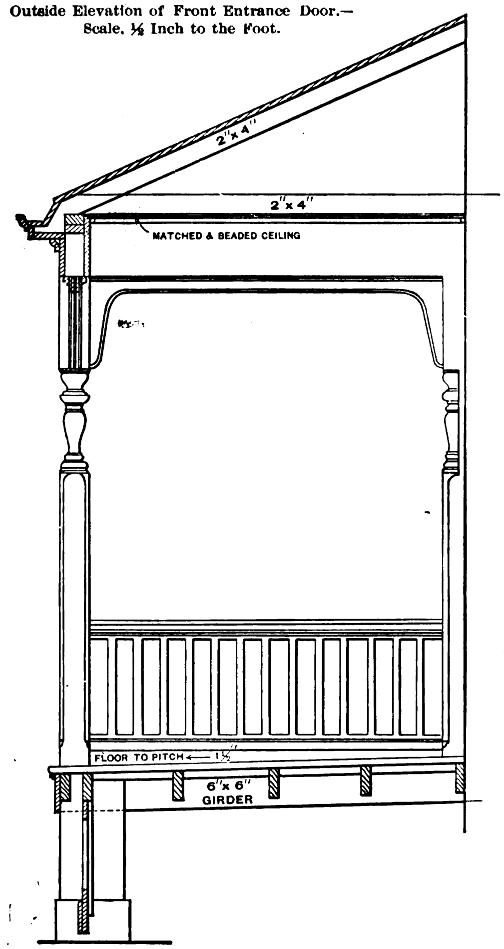
The wood work is stained to represent different kinds of and double strength glass in windows. Screens are placed on all doors and windows at outside openings.

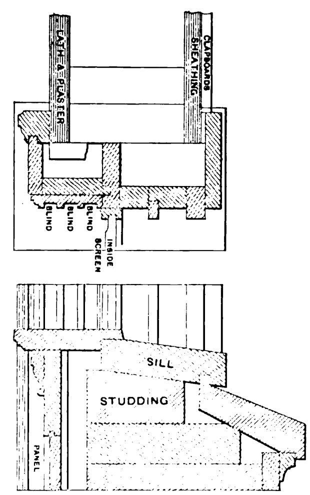
The building is heated by low pressure hot water, a No. 25 Richardson & Boynton Perfect heater being used. The Perfection radiators are employed, except in conservatory, second story hall and bathroom, where pipe coils are placed. The amount of radiation for each room is marked on the plans. The cellar plan shows the location of heater and run of pipes, separate runs being used for first and



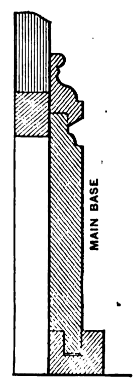
Outside Elevation of Front Entrance Door.—Scale, ½ Inch to the Foot.

Section and Elevation in Pantry, as Seen From the Dining Room.—Scale, ⅜ Inch to the Foot.

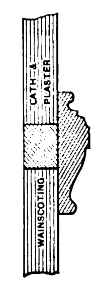




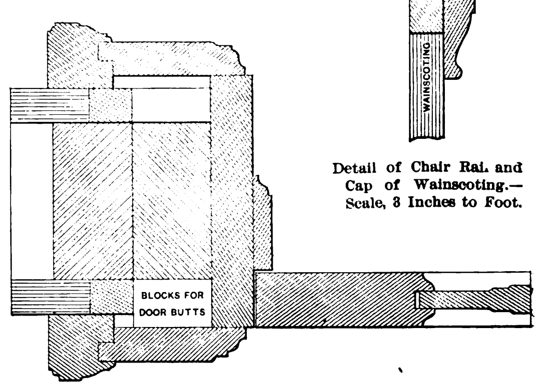
Details of Window Frames.—Scale, 1½ Inches to the Foot.



Detail of Base.—Scale, 3 Inches to the Foot.



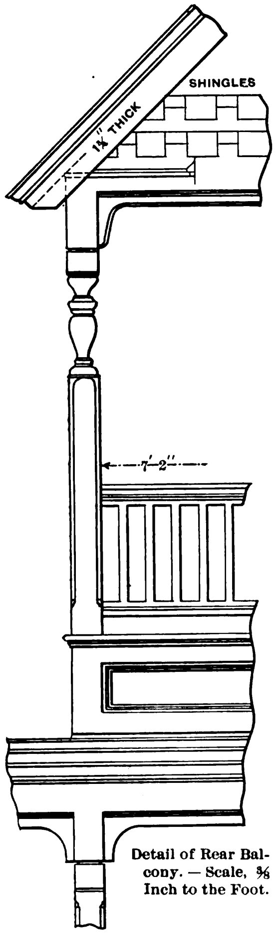
Detail of Chair Rail and Cap of Wainscoting.—Scale, 3 Inches to Foot.



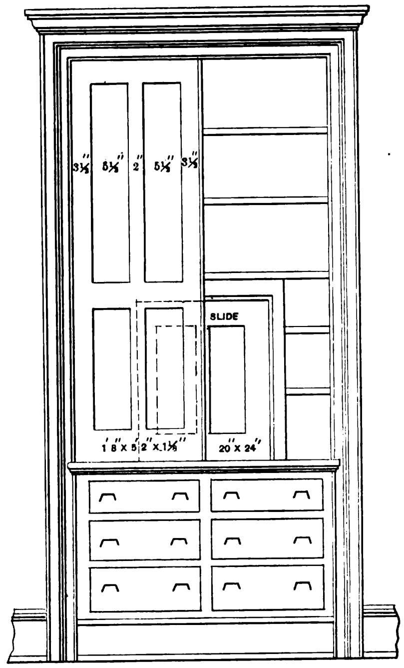
Detail of Porch.—Scale, ⅜ Inch to the Foot.

Detail of Trim.—Scale, 3 Inches to the Foot.

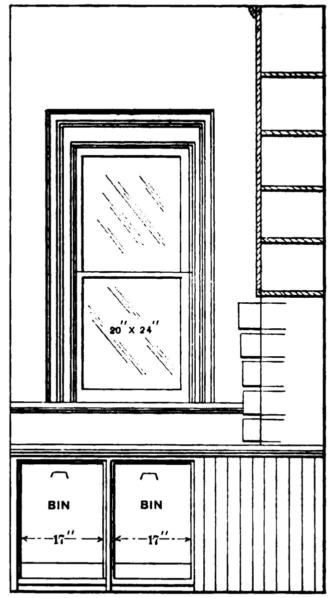
Miscellaneous Details of Cottage at Johnstown, Pa.



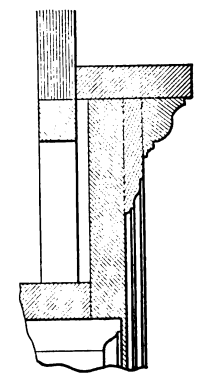
Detail of Rear Balcony. — Scale, ⅜ Inch to the Foot.



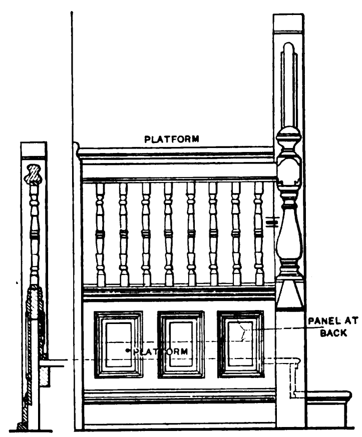
Detail of Dining-Room Side of China Closet.— Scale, ½ Inch to the Foot.



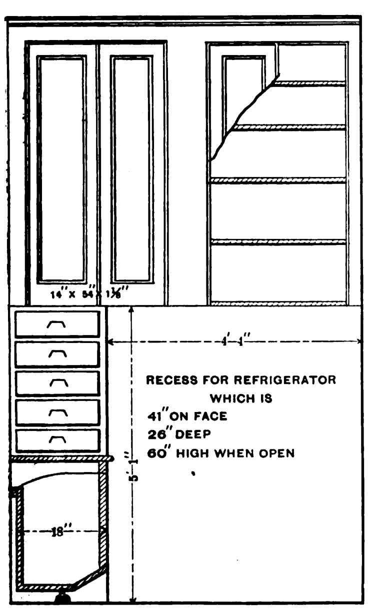
Elevation in Storeroom, as seen from the Pantry.—Scale, ⅜ inch to the Foot.



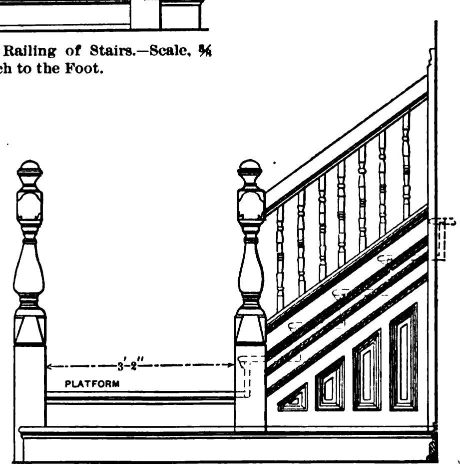
Detail of Head Casing on First Floor. — Scale, 3 Inches to the Foot.



Elevation of End Railing of Stairs.—Scale, ⅜ Inch to the Foot.



Elevation in Storeroom.—Scale, ⅜ Inch to the Foot.



Elevation of Main Stairs.—Scale, ⅜ Inch to the Foot.

Miscellaneous Details of Cottage at Johnstown, Pa.

second stories. The pipes in the cellar are wrapped with hair felt and canvas. Air and quick opening controlling valves are placed on all radiators, the coils and radiators being bronze finished. A 20-gallon expansion tank is placed in the water closet room and with its circulation warms that room. A thermometer is placed on one of the flow mains near the heater. The system is connected with city water. The city water supply is also connected to the different plumbing fixtures and to the hot water kitchen boiler, hot water being supplied to the various fixtures requiring it. There are two 1¼-inch pipes which pass through the pantry warming it, and these with the heat from the kitchen fill all requirements.

The drawings were prepared by Grodavent Brothers, architects, Denver, Colo., and the work was done under contracts, at the following prices, viz.: Construction, $4312, by Lloyd & Jones, Johnstown, Pa., and plumbing, $410.84, and water heating, $460, by John H. Waters & Bro., also of Johnstown, Pa.

Peril to High Buildings in Chicago.

A seven-story building in West Jackson street, Chicago, was recently condemned as dangerous on account of its gradual "settling." Commenting on this, William Sooy Smith, one of the leading civil engineers of the West, remarks that unless their foundations are strengthened a number of the Chicago sky-scraping buildings will eventually become wrecks. "The material underlying the surface," he says, "is clay, varying in consistency from firm to very soft at different points and different depths, these variations occurring often within the area covered by a single building. Its sustaining power during a short period of time, as determined by many tests that I have made, with actual loads, is 2500 pounds to 4000 pounds per square foot. It is the common practice of Chicago architects to load the soil at the rate of 3000 pounds per square foot. Experience with heavy buildings shows that the initial settlement continues even where the pressure does not exceed the limits stated. Experience shows also that while initial settlements under a given load may be uniform throughout the area covered by a building the progressive ones may so differ eventually as to cause demoralization to the structure.

"Levels carefully taken on the Chicago Board ot Trade Building at short intervals during six years show that the average settlement was at the rate of $\frac{3}{16}$ inch per month. The maximum total settlement was 16 inches and the minimum 8½ inches. The difference, 7½ inches, causes serious cracks and demoralization of the building, necessitating the repairs which have recently been made. The same difficulty is apparent to many of the tall, heavy buildings of Chicago, and at their present rate of settlement many of them, if their foundations are not strengthened, will, within a few years, be like the Government Building —total wrecks."

Gigantic Chandelier.

The great chandelier dome of the German Parliament Building, in Berlin, says an exchange, has recently been completed, and will now be put up in the place it is intended for. Artistically, as well as technically, it is of astonishing perfection, and represents the best efforts of the architect, sculptor, electrician and metal worker. It is constructed in the mediæval ring shape, of which we still find examples from the eleventh and twelfth centuries in some of the great monuments of that time. The ring candelabra, representing the ring of the walls of Jerusalem, the Heavenly City, with gates and towers as described in the Apocalypse, which can still be seen at the cathedral in Aix-la-Chapelle, is the nearest approach to a large ornamental candelabra, although it was placed there more than 700 years ago.

From these models Architect Dedreaux has designed the great ornamental candelabra for the Parliament, which is not less than 26 feet in diameter. Its circumference is so large that a good sized dancing floor could be erected within the space covered by it. The colossal ring shows a wall crowned by turrets and porticos, with original ornaments, 12 massive gates piercing the wall. Within the doorway of each gate some famous German is represented by a life like statue.

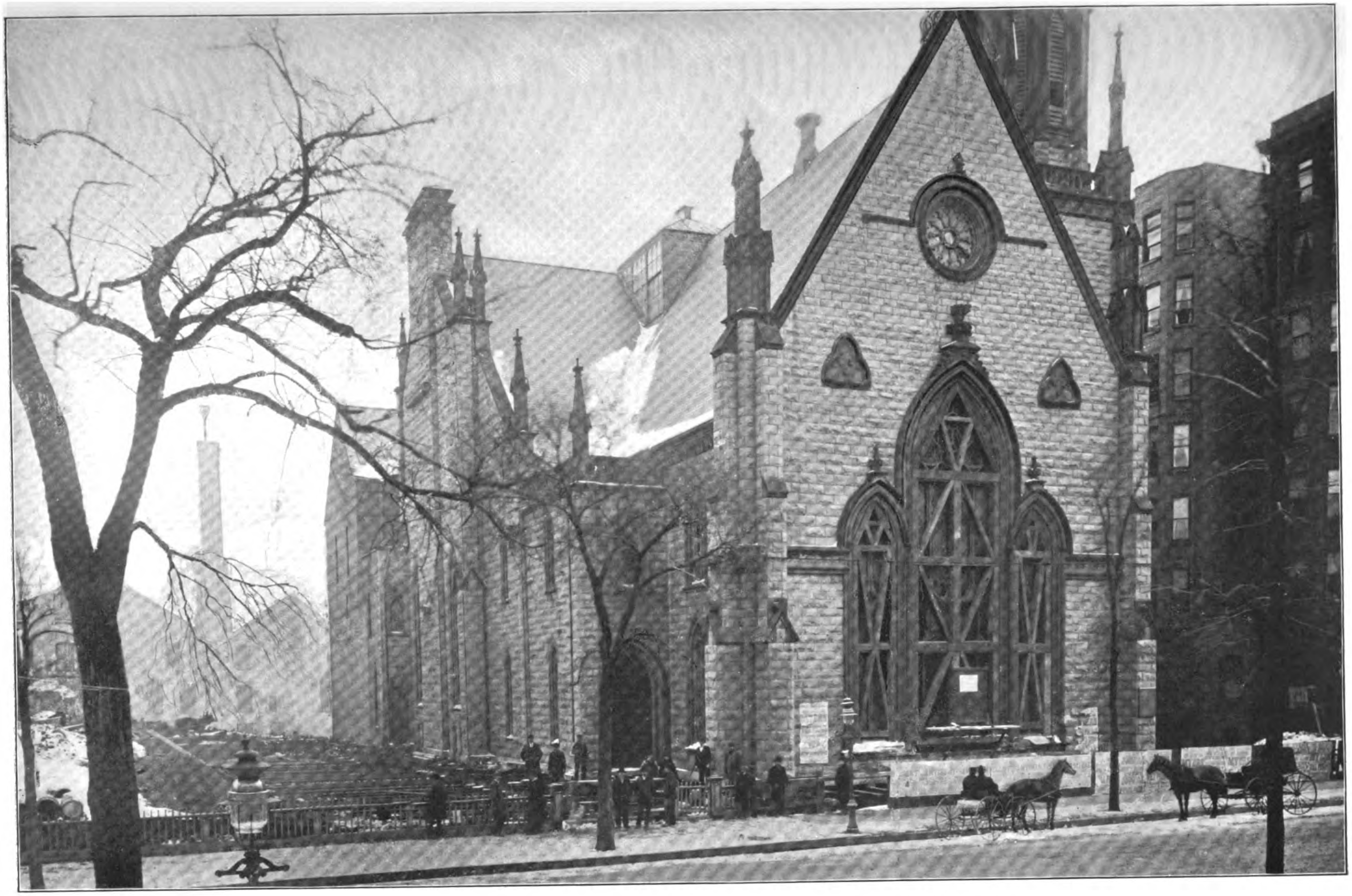
Around these walls and below them 120 incandescent lamps and 12 arc lights, mounted in suitable ornaments, furnish enough light for the great hall underneath. The roof is supported by four lateral girders, uniting under an ornamental canopy, which in turn is crowned by a colossal crown of the German Empire. The weight of the whole candelabra is 36,000 pounds.

A good deal of criticism has been excited by a recent decision of the managers of the Sheffield Technical School, Sheffield, England, to admit to that school only students of British origin. It is understood that the decision was arrived at owing to the Japanese Government having made an application for the admission of some students of that nationality to the school. The action of the managers is said to have been caused by a feeling which is abroad in Sheffield, that it would be inimical to the interests of the various trades to give away too many trade secrets and the knowledge of certain processes to foreigners. The decision, however, appears to indicate a somewhat narrow-minded and illiberal spirit, which it is hoped will not be followed by similiar schools in other quarters.

A NOTABLE CHURCH MOVING OPERATION.

THE most remarkable feat of house moving ever attempted, so far as now known, has recently been successfully accomplished in Chicago, Ill., where a large stone church with a high tower, all of the most massive construction, has been raised from its foundations and moved fifty feet, for the purpose of admitting more light into the rooms of an adjoining hotel. The Metropole Hotel stands on the corner of Michigan avenue and Twenty-third street, while the Immanuel Baptist Church formerly occupied an adjoining lot on Michigan avenue, but is now fifty feet distant, the owners of the hotel paying for the entire cost of the removal and purchasing the intervening lot.

In the removal of this structure a new system especially devised for the purpose, was used in order to meet the peculiar difficulties to be overcome. It has been the custom hitherto in house moving to raise a structure from its foundations and then to displace the screws by the rollers and their necessary track. The reverse of this operation was followed in the case of Immanuel Church. Openings were made in the foundation and supporting beams were inserted, rails for the track were put in place, the rollers were put in position and the whole structure was then lifted by means of screws which were cut in under everything. The accompanying engravings show the manner in which the cribbing, supporting beams and the railroad tracks were arranged prior to making any attempt either to hoist the building from its foundation or to starting toward its destination. Fig. 1 represents a plan view of the tower loading showing arrangement of the track; Fig. 2 a section through tower loading, looking toward the destination, while Fig. 3 gives a view of the tower loading and entrance bracing. One of the supplemental plates forming a feature of this issue is a direct reproduction of a photograph of the church taken during the progress of the work. When the structure was put in motion it moved on a system of railroad tracks so arranged as to be perfectly level. In raising the structure with the supporting tracks about 1800 common screws were used and 250 36-ton screws. When the building had been



MOVING THE IMMANUEL BAPTIST CHURCH, MICHIGAN AVENUE, CHICAGO, ILL.

FROM A PHOTOGRAPH TAKEN DURING THE PROGRESS OF THE WORK.

HOLABIRD & ROCHE, ARCHITECTS. HARVEY SHEELER, MOVING CONTRACTOR.

raised from the foundation, timbers were built in around the screws so as to support the entire structure on a solid basis and prevent any rocking of the screws, which were thus left in position until after the removal was accomplished.

The size of the structure over all is 93 x 161 feet, and the hight is about 100 feet to the most elevated points of the gable. The approximate weight of the building is 6650 tons, including the tower. The latter has a base 24 feet square, is 225 feet high and weighs approximately 1420 tons. The most careful preparations were made in advance to guard against any spreading of the walls under an irregular strain, and also to prevent any crushing of the arches over large windows and doors. Heavy timber braces were put in to support the large arches, and the main portions of the building were tied together by large rods connected with turn buckles. These rods varied in size according to their position. The largest used were 1½ inches in diameter and the smallest 1⅛ inches. The care taken in even the smallest detail is shown in the construction of these rods. The threaded ends were upset before the threads were cut, so that the thickness of the metal after being threaded was as great as in the body of the rods. Braces were put in around all the pillars supporting the galleries in the audience chamber of the church and also in the Sunday school room supporting movable partitions. No chances were taken by the contractor in permitting any part of the building to shake or sway.

About ten days were occupied in making the necessary preparations, bracing the church, putting in new foundation stones on the new location and arranging the cribbing and the work under the church. The quantity of material used for this purpose was very large. Enough 60-pound steel rails were placed under the church to lay a railroad track 1¼ miles long. These rails were placed with from three to five on a track according to the load to be carried. On this track 1600 steel rollers were used, each 25 inches long and 2 inches in diameter, these being made of special temper, corresponding in temper to that of the rails. They were rolled with a common iron finish in order to give them the necessary friction. These rollers moved under linings made of Bessemer steel ½-inch thick by 12 inches wide, cut in 2-foot lengths. They were forged with a taper 2 inches long so as to permit the feeding in of the rollers. The linings were cushioned or bedded with heavy cardboard paper, the same as that used in making car wheels, so as to adjust themselves to any irregularity in the lining or the beams. The beams on which the structure directly rested were partly 10-inch, weighing up to 40 pounds per foot, and partly 15-inch, weighing up to 80 pounds per foot, all specially rolled. The total quantity of steel placed under the building amounted to fourteen 25-ton cars.

The method of moving the building was by the application of power to the rear, so that the structure was pushed forward in the direction in which it was to go. This was effected in the following manner. Heavy chains were fastened under the building to the cribbing on which the whole structure rested. The chains were fastened at their other ends to heavy timbers laid parallel with the building. These timbers thus made a heel for the application of a screw. Five-ton screws were then placed between the ends of two timbers, one timber resting against the heel timber and the other resting against the beams immediately under the building. Sixty of these screws being placed in position, at a given signal a man at each screw gave a quarter turn with a crowbar, each quarter turn advancing the building about ¼ of an inch. After the screw was spent the heel timber was then moved up toward the building, the chains were fastened in a new place to take another hitch and the work proceeded as before. In this way the same cribbing blocks which supported the building were used with which to push. The pressure required to shove the building is estimated at 300 tons. No sliding was done, but the structure was rolled exclusively.

The first movement of the church on the tracks was effected on the 20th of November; and the whole work was completed on the 27th. When the work was begun the tower stood 7 inches out of plumb, owing to the settlement of the foundations on the north side of the church. In the removal of the building the tower was straightened,

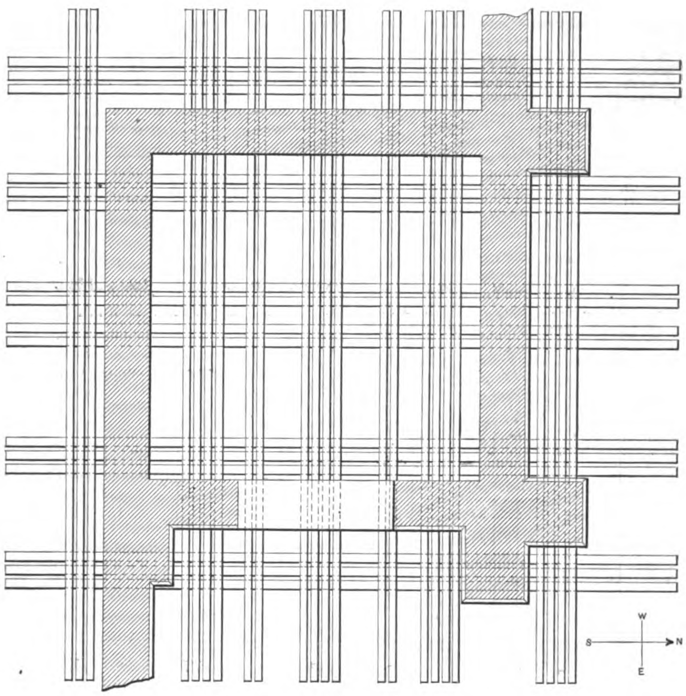


Fig. 1.—Plan of Tower Loading, Showing Arrangement of Track.

A Notable Church Moving Operation.—Holabird & Roche, Architects; Harvey Sheeler, Contractor, Chicago, Ill.

so that in this respect a decided improvement was accomplished in the appearance as well as the stability of the structure. The contractor was under heavy bonds not to injure any part of the building and also to replace any part of it, if by accident some of the masonry should have fallen. The removal was accomplished without the cracking of any portion of the ceiling or walls, and the only repairing necessary was to restore the openings made for the passage of the tie rods. The method adopted worked so satisfactorily that it is believed to have established a who accomplished the real work of moving was Harvey Sheeler of 83 Washington street. The plans for removing the building and the general engineering work, which proved so highly successful and rendered this undertaking so great an achievement, were made by C. H. Rector, who is connected with Mr. Sheeler. The successful accomplishment of this feat reflects the highest credit on all who were connected with the undertaking. By it two important questions in house moving have been settled. One is that it has been demonstrated practicably to move a large

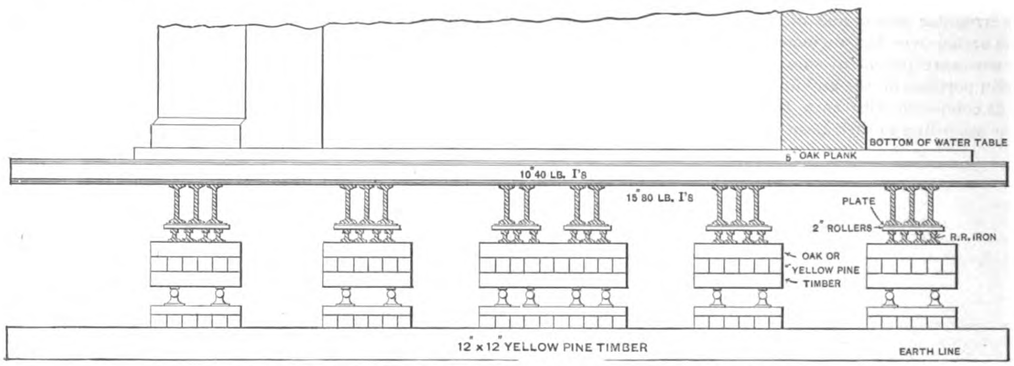


Fig. 2.—Section Through Tower Loading, Looking South or Toward Destination.

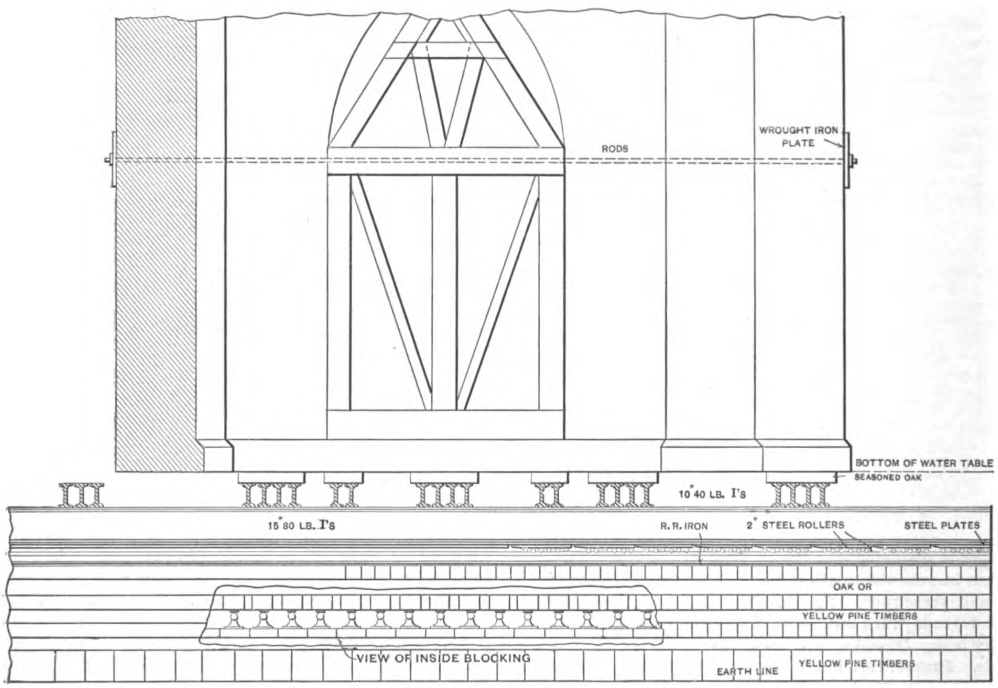


Fig. 3.—View of Tower Loading and Entrance Bracing, Looking West.

A Notable Church Moving Operation.

new system for the removal of very large buildings. On this plan the removal of any edifice would be attempted by the same contractor, no matter how large. The assertion is made that even the removal of the great Auditorium in Chicago could be accomplished without a particle of damage. This system has not been practicable until recent years, owing to the very high cost of material, especially the iron and steel required.

The architects under whose supervision this work was done are Holabird & Roche, Monadnock Block, Chicago, Ill. The general work, such as excavation, building foundations and underpinning, was done by W. A. & A. E. Wells, Chamber of Commerce Building. The contractor open building with virtually no cross walls or heavy partitions to bind the parts together. The other is that a concentrated load, as in the case of the tower weighing 1420 tons on a 24-foot base, can be successfully handled. Immediately after the removal was accomplished the church authorities were so well pleased with the manner in which it had been done that they made another contract with Mr. Sheeler to raise the whole structure 5 feet 6 inches to permit a full-sized basement to be built under it, requiring no bond for the satisfactory execution of the work. In thus raising the structure 150 men were employed, using the screws already in position, and accomplishing one foot per day.

WHAT BUILDERS ARE DOING.

THE outlook for building in 1896 grows steadily more hopeful. Present indications point to a full resumption of the activity which prevailed prior to 1893 in nearly all localities. Estimated statements from 17 large cities, not including New York City or Boston, show a total increase in amount of estimated investment of nearly 50 per cent over 1894.

No serious disturbance among the workmen in the building trades of the country has occurred during the past month and reports from various localities contain little that is menacing to future tranquility.

Appleton, Wis.

The first annual banquet of the Master Builders and Traders' Exchange was given at their rooms on the evening of Saturday, December 14, more than 40 members and invited guests being present. The master of ceremonies was President William Wilson, who after justice had been done to the many good things provided made a short speech outlining the object and work of the exchange. Numerous toasts were proposed, among the speakers being Mayor Thomas H. W. Meyer, Henry Schneider, T. Pearson, August Knueppel, A. H. Weickert, Ralph Pomeroy, Otto P. Schlafer, W. H. Patterson and the Rev. John Faville, who as toast master contributed much to the general enjoyment of the evening.

The Master Builders and Traders' Exchange is a new organization in Appleton, being something less than a year old. The membership of the exchange at present numbers 47, the officers being: President, William Wilson; vice-president, W. S. Patterson; secretary, S. B. Belding, and treasurer, August Knueppel.

Baltimore, Md.

It is expected that the report of the Department of Building will show a decrease in the amount of work done in Baltimore in 1895 as compared with 1894. Competiton has been unusually keen among the builders, and it is believed that the profits have been less in proportion to the work done than for a number of years past. The outlook for 1896 is still more or less uncertain and at present does not warrant the conclusion that the early spring will show much improvement; although the complexion of affairs may alter between now and then. Relations between employers and workmen are harmonious, with no indication of an unpleasant change.

The Builders' Exchange reports a prosperous year, and is in good financial condition, much better than that which existed at the time of its last annual report. But one failure in business among the members is reported, and the total membership has increased during the year. The erection of a building on one of the most desirable business sites in the city has proved a profitable move, and has greatly strengthened the exchange, both among the members and in the eyes of the business men of Baltimore.

Boston, Mass.

In spite of the lateness of the season a large amount of work is under way, and contractors generally are busy. The total amount of building done in 1895 is believed to have been considerably in excess of the amount done in 1894. The volume now under way exceeds that which usually prevails at this season.

There is considerable agitation among the labor unions on the question of a universal work day of eight hours among all the building trades. A league has been established to extend the effort beyond the city, and to secure a uniform attempt throughout the State. The advisability of a general strike on May 1, in favor of an eight-hour day, in all branches of the business, is being considered.

The history of the Master Builders' Association of Boston during the past year has not been marked with occurrences of great importance. The financial condition of the association has continued to improve as in former years. The exhibit of the treasurer at the annual meeting shows that the net result of the year's business had increased the surplus of the association from $51,000, as shown by the previous annual exhibit, to $57,000, a gain of $6000. The membership has been maintained at the same average that has existed during the past two or three years, and the usual number of applicants for admittance are on the waiting list. Relations between employers and workmen have been unusually free from disturbance, and there have been no strikes of serious importance during the past year. Early in 1895 the association extended to the Central Labor Union of Boston an invitation to discuss questions of mutual concern, and at a meeting held for the purpose, in the rooms of the exchange, Harry Lloyd presented the side of the workman and the secretary spoke for the employer. The meeting was most interesting and is the only case on record in Boston where such a meeting was held at the instance of the employers.

During the year the association has formulated for the use of its members two forms of estimate, one for use between the contractor and the owner, and the other for use between general and subcontractor. Both are demonstrating their practicability by their steadily increasing use by the members. The association has taken active part with other commercial bodies in many efforts to improve the general welfare of the community.

Buffalo, N. Y.

Secretary J. C. Almendinger of the Buffalo Builders' Association Exchange, speaking of the condition of the building interests in his city, says: "The amount of building done in Buffalo for the year 1895, estimating December, will be about $9,500,000, as compared with $5,300,000 for 1894. As far as class of buildings are concerned, residences and ordinary business places, the value of those constructed in 1895, was about the same as for 1894. The principal increase for 1895 comes from four large office buildings, the cost of which ranges from $500,000 to $1,500,000 each. I do not think Buffalo contractors did any more business in 1895 than in 1894, but the result for the year has been a large improvement by the erection of these large buildings in the business center of the city. As a consequence, Buffalo can this year for the first time be said to be up to date in office buildings. The outlook for 1896, I think, is good, and I believe that the building trades will have a prosperous season. As to strikes, the only serious one for the year was that of the plumbers and steamfitters. This lasted through the entire summer; it was for an increase of 50 cents per day in wages, and eight hours to constitute a day's work. A few of the masters finally conceded this, but the large majority held out and the strikers finally went back to work on the same conditions as existed at the time the strike began. There have been several small strikes on account of various causes, such as the discharging of a union man, or the employment of a non-union laborer or mechanic, but none of them lasted over a day or two. There is more or less agitation among the unions in regard to the matter of eight hours a day, and I should not be surprised if between now and spring the matter will take some definite shape toward that end."

The Builders' Association Exchange has had an active year and has taken part in movements looking to public improvement. The condition of membership is reported as follows: Corporate members, 137; non-corporate, 63. Total membership, 200. Elected, 39; resigned and dropped, 29; net gain, 10; rejected, 2. The daily attendance of members on 'change averaged 56; an increase of 9.

The Bureau of Building reports the estimated cost of buildings erected in 1894 to be $5,302,933, the number of permits being 2172. From January 1, 1895, to September 1, 1895, the estimated cost of buildings erected as per records of the Building Depratment was $7,289,125; being an increase of $2,000,000, for the first eight months of 1895, over the entire year 1894.

Chicago, Ill.

Reports from Chicago indicate that the building business is improving and that the coming spring will see a greater activity than has existed for several years past. Building operations, instead of falling off at the approach of winter, seemed to get more active as the cold season approached. It may be that they are hurrying up to get as much as possible done before the cold weather sets in, but as a matter of fact there are more buildings being started and more work being done than there was six weeks ago.

The Builders and Traders' Exchange, in the best attended business meeting ever held, took action recently in regard to the proposed manner of letting contracts for school houses to be erected in the future by the Board of Education, and the following resolution was passed:

Whereas, The Board of Education of the city of Chicago is considering the propriety of letting contracts for building school houses to a general contractor in one contract, for the entire building; and,

Whereas, The letting of contracts in the entirety is, in our judgment, detrimental to the individual interest of every member of this exchange; and,

Whereas, The contractors and dealers in material feel that it is injurious to the interests of all concerned in this exchange to ignore the individual trades in the interest of the general contractor; therefore, be it

Resolved, That the Builders and Traders' Exchange of Chicago respectfully recommend to the Board of Education that the letting of contracts for school buildings and all contracts under their supervision should, in equity, be let to the various building trades in detail.

Another resolution presented, in which the Board of Education were petitioned that they still continue to take bids for their new school houses for the separate parts of the work, even if they also take them from general contractors for the entire building, and that they then let the contract to the lowest responsible bidder or combination of bidders, was after argument withdrawn as not being the sense of the meeting.

A committee composed of Henry Ebertshauser, John C. Thompson, James A. Miller, James A. Hogan and John Rawle was appointed to present the action of the Builders and Traders' Exchange to the Board of Education.

The present condition of affairs among the workmen as regards their relations with the employers is fairly tranquil, such disturbances as do exist being of little general importance. Agitation on the subject of a consolidation is going steadily on and promises to be in shape for action before long.

Cincinnati, Ohio.

The feeling among the Cincinnati contractors, architects and builders is decidedly hopeful. Without exception there is a well defined movement of activity in all lines. There is a certainty of several large business blocks going up in the spring. Suburban dwellings are going up all the time in Clifton, Mt. Auburn, Avondale and Walnut Hills. The city has done herself proud in a building way, and altogether the outlook is bright. In an interview on the situation, H. E. Hannaford, one of the representative city architects, said: "The people of Cincinnati are conservative in their habits of living and in their business as well. They are not prone to rush into a scheme of any kind without first carefully weighing the cost and the probable outcome; hence speculative building, the art of erecting great structures with nothing more substantial than wind to back them, has never obtained in this city. As a consequence we have not built in advance of our wants. We have simply kept pace with our needs, and the improvements made are substantial in character, ample for all requirements, and, what is still better, they are paid for, and are all earning a fair dividend upon the investment.

"To-day Cincinnati is suffering less from over building than any other city in the country. The builders of the city are, as a class, substantial business men who take a pride in their work, and it is safe to say that there is no better building done in this country than is done in Cincinnati. The Buddensieck is unknown among them, and the substantial structures erected by them bear evidence, both in construction and finish, to their skill and honesty.

"During the three years just past the building business, along with all others, has felt the general depression, and very little large work has been undertaken. As a consequence the cost of building has been low. Many persons have taken advantage of this state of affairs and built homes for themselves, and a great many small houses have been erected in the suburbs. The outlook for the future is full of promise. Projects that have been slumbering are now being revived, and the coming year will doubtless see many of them carried out. There will be no 'boom,' because Cincinnati does not approve of the word, but there will be a steady and healthy demand upon the time and talents of our architects and builders."

Lowell, Mass.

The present condition of the building business in Lowell is reported as being good. The total amount of work done in 1895 is estimated to greatly exceed that of 1894, and in certain branches there was more work done than in any preceding year in the history of the city. Builders are looking forward to a busy year in 1896, and present indications point to an unusual amount of work at the beginning of the season.

The relations between employers and workmen are very amicable and there is every prospect of an undisturbed year in 1896.

The Master Builders' Exchange reports a satisfactory year and that never before has it been held in such high esteem by the members, as an institution for their benefit and protection. Efforts to improve the conduct of the building business have met with good support by the most of the members, with the purpose of bringing it to a high standard, both as to probity and skill, and the results have been that the public recognize the fact that to obtain superior work they must employ some member of the exchange. The uniform contract has been adopted by the leading architects of the city. Arbitration, trade schools, apprenticeship system, ownership of building, have received their share of attention and must in time result to the benefit of the exchange. The latter has always had a 'change hour, and the most of the members strictly adhere to that time. One or two separate trades are connected with the exchange, and the results have been such that it is likely that all branches of building business will have separate organization within the exchange in the near future.

Milwaukee, Wis.

The situation among the building interests of Milwaukee has improved greatly during the past few months; and it is now estimated by competent authorities that the total amount of work done in 1895 will exceed that of 1894 by nearly one-fourth. The following list comprises the most of the large work now on hand, in addition to which the usual amount of small building is being carried on; and from which it will be seen that, together with new work projected, the outlook for 1896 is very promising:

Uhlein Bros	$350,000
Schlitz, Palm Garden	75,000
Pabst Brew. Company, elevator	70,000
Library and Museum Building	500,000
Kieckhefer Bros., factory	125,000
The Government Building	1,000,000
Masonic Temple	65,000
Ivanhoe Commandry Building	50,000
Fred. Andræ, flats	40,000
O'Donnell, flats	25,000
Roundy & Peckam Building	65,000
West Side High School Building	80,000
Tenth Ward School	40,000
Plankington Building	300,000
Ninth Ward School	40,000
Thirteenth Ward School	25,000
E. H. Cawker, Estate	85,000
Bohemian Turn Hall	30,000

As a comparison of the amount of building done in the city during the past five years, the following totals are given:

1890	$3,552,095	1893	$4,150,436
1891	5,084,381	1894	3,653,932
1892	5,319,457	1895 (approximately)	4,235,289

The present relations between employers and workmen are such as to lead to the belief that there will be little or no trouble in this direction during the coming season; at least in the earlier part of the year.

The Builders and Traders' Exchange reports that it has held its own during the year, and has been active in furthering projects for the benefit of its members and the building interests of the city generally.

During the summer the City Council, the Building Inspector and a committee from the exchange formulated a new building ordinance, which is well approved by all. Several cases of difference between builders, in various relationships of their business have been settled by the Arbitration Committee of the exchange, and the wisdom of such a course is being constantly and more widely recognized.

Last January the exchange decided to open a permanent exhibit of builders' supplies and material, and for that purpose set apart the second floor in their fire proof building. The cost for wall, floor or platform space is $2.50 per square foot per annum. At the present time there are 35 exhibits in place. The exchange has adopted the following recommendations made by the National Association of Builders: Code of practice, arbitration, uniform contract, ownership of building, uniform form of proposal; and they have come into general use.

New York City, N. Y.

The strike of the housesmiths noted in the last issue continued for about three weeks, during which time several attempts were made to bring about negotiations for a settlement between the employers and the strikers, but without success. After a time the architectural iron concerns against whom the strike was inaugurated succeeded in securing men to take the places of the strikers so that, eventually, work went on with about the normal force. On the evening of December 12 the Executive Committee of the House smiths and Bridgemen's Union held a meeting at which the following information was sent out:

The strike of the Housesmiths and Bridgemen's Union has been settled satisfactorily. All union men on strike are ordered to report for work on or after 12 o'clock Friday, December 13.

J. B. & J. M. Cornell's employees are to report at the office of the company, Twenty-sixth street and Eleventh avenue. Milliken Brothers' employees are to report at the jobs from which they came.

By order of the Executive Committee.

During the month there were minor disturbances of a sympathetic character, but they were not important in their results. The long strike of the Amalgamated Society of Plumbers and Gas Fitters was settled on December 7, through the efforts of a committee of three appointed by the Master Builders' Association. The settlement provides that 11 men in the employ of Rossman & Bracken, master plumbers, pay a fine of $50 each and two others a fine of $100 each, and all the men employed by the firm join the union. There were sympathetic strikes against the firm, but on the settlement of the difficulty all the men involved returned to work. The strikes against the firm were the outcome of the general strike of the Electrical Workers a year ago, and the sympathetic strikes which followed it. The employees fined were plumbers who worked on buildings on which strikes were ordered.

About the middle of the month a meeting was held under the direction of the District Council of the United Brotherhood of Carpenters, for the purpose of harmonizing interests among the rival carpenters' unions in the city.

The principal unions besides the Brotherhood are the Progressive Carpenters, the Amalgamated Society of Carpenters and Joiners, and the United Order of American Carpenters and Joiners.

The strike of 1000 steam fitters and helpers belonging to the Enterprise Association of Steam Fitters and the Progress Association of Steam Fitters' Helpers, which began over a month ago, was settled on December 19, after conferences, which lasted the greater part of two days, had been held between representatives of the men and of the employers. Mutual concessions were made, and it was decided by representatives of both sides in the controversy that the details of the settlement should not be made public.

Omaha, Neb.

The almost total failure of crops and continued financial depression are the causes to which the dullness of building interests in Omaha is attributed. Building is reported as being at a standstill, when compared with some of the more prosperous years of the past. Union wages are asked by the workmen in all cases, but work has been so scarce that the men have been glad to work for what they could get. The desire for work has been so great that the eight-hour law has been practically a dead letter for some time; the men working as many hours as the employers desired. The only ones holding out for time and money have been the brick masons, who, if they work in Omaha, insist on getting eight hours' work and 50 cents per hour, but should they go out of the city, they are willing to take less, and work ten hours.

Local contractors have had to compete with bidders from out of the city, who are able to underestimate them and have been doing work at a price that would leave no profit for an exchange contractor. Many small contractors also take work at prices that leave them barely wages, and frequently their bondsmen are called on to complete their contracts. Members of the Bricklayers' Union have taken work as contractors and have been permitted to pay less than the union wages. When these latter complete their jobs they are received back into the union, and the contractors have therefore been unable to prevent unfair discrimination by the union, which forces them to pay the union scale of wages in all cases, while permitting the conditions cited.

The Builders and Traders' Exchange is making a steady fight in behalf of better conditions, and is with difficulty holding its own against adverse circumstances.

Philadelphia, Pa.

The past year has been one of unusual prosperity in the building trades in Philadelphia. The total estimated cost of buildings for which permits were granted from January 1 to October 1 reached very nearly $24,000,000, the figures exceeding those of the full years 1893 and 1894, and giving promise, with three full months to be reported of rivaling 1890, when the figures reached $26,000,000, which is regarded in building circles as the "boom" year.

There has been almost entire freedom from labor disturbances during the year and no change in the present relations between employers and workmen is indicated.

The Board of Directors of the Master Builders' Exchange recently appointed John S. Stevens, Stacy Reeves, William B. Irvine, John R. Wiggins and William Harkness a committee to take into consideration the expediency of forming a State association, as recommended by the National Association of Master Builders, at its session in Baltimore. There are local societies in Pittsburgh, Harrisburg, Scranton, Wilkes-Barre and possibly other places and it is thought that if these smaller societies were brought into affiliation with the exchange of Philadelphia, and thus with the national body, the influence of all would be largely increased and much good would result to the building trade and its allied interests, as well as to the individuals of the State and local organizations. The committee will look into the whole question from every standpoint, and report what societies are in the State and the prospects of getting their affiliation with the State and National exchanges.

The exchange held a special meeting on November 26 to consider the needs of Philadelphia harbor and the water ways between it and the deep sea. The subject was discussed by several members and a set of resolutions adopted favoring the appropriation by Congress of money enough to meet the needs of Philadelphia's commerce and shipping. A special committee of five consisting of Murrell Dobbins, Franklin M. Harris, John S. Stevens, W. S. P. Shields and J. J. Ryan was appointed with instructions to urge the Pennsylvania Representatives in Congress to take action in the matter.

Pittsburgh, Pa.

The following from the Pittsburgh *Telegraph* shows the condition of building interests in that city. Building Inspector Hoffman, in speaking of the boom, said: "The Twenty-second Ward seems to be the Mecca for builders now. Since that territory has been opened up by the electric roads there has been a boom in building, and there is no telling where it will end. There is no better evidence of returning prosperity than the number of building permits being taken out. I have noticed that in the past few months most of the permits have been taken out by business men, which shows that business is picking up all over the city. When business s good the merchants start to build. The building boom is on now, and there is no telling where it will end. There should be lots of work for the mechanics the coming year. Already enough permits have been taken out to demonstrate that there will be plenty of work next year for all kinds of workmen. The past few years the building business has practically been at a standstill. There were a number of large office buildings erected, but very few dwellings. When the business in dwellings increases it is a sure sign of returning prosperity. From present indications it looks as if next year will be one of great prosperity in this city."

At the last monthly meeting of the Builders' Exchange, the following nominations of officers for 1896 were made: President, Samuel A. Steel; vice-presidents (two to elect), R. C. Miller, W. T. Powell, Matt Mawhinney; directors (twelve to elect), Adam Wilson, Samuel Francies, W. R. Stoughton, R. C. Miller, H. K. Barnes, R. M. Morris, G. S. Fulmer, T. J. Hamilton, John S. Elliot, E. R. Cluley, James Hay, J. J. Munn, S. C. Martin, Tom Marshall, A. Rasner, J. F. Bruggeman, J. P. Knox, A. A. Hersperger, A. Stehley, H. L. Krensler, M. Mawhinney. The election occurs January 2.

Providence, R. I.

Secretary Wm. F. Cady of the Builders and Traders' Exchange of Providence reports that the building business in his city has never been in better condition than it is at present. The past year has been one of unusual activity and in spite of close competition it is generally conceded that the season has not been unprofitable to the builders. The majority of the contractors have been busy during the entire season, and are still at work closing in for the winter. The new buildings erected during the year comprise a number of fine business buildings, public buildings, manufactories, tenements and residences and the whole make a material improvement in the growth of the city. Many of the larger contracts are still under way and will, together with new work in sight, assure plenty to do in the early spring. The Inspector of Buildings is authority for the estimated statement that the total of work done in 1895 will exceed that in 1893, which up to that time was the banner year in the history of the city's building.

The condition of affairs between employers and employees has been pleasant throughout the year. Hours and wages have been satisfactory and little evidence of discontent has appeared. A good class of workmen have been given steady employment throughout the year.

The Builders and Traders' Exchange remains in about the same condition as at last report, the membership varying but little: a few vacancies caused by death, removal and resignation being speedily filled by new members and the work goes quietly on. The exchange is highly prized by its members, who take advantage of the facilities offered, and is of invaluable benefit to the builders and contractors and to the general public in the furtherance of the building business. It holds a firm place in the interests of the city and has its influence in molding public opinion. The standard of membership is sustained by watching well the entrance door. Any one wishing to become a member must sign a proposition for membership on which is a recommendation which must be signed by some reputable person known to the committee; the name is then posted in a conspicuous place in the exchange room for at least five days before presenting to the committee, who elect by a close ballot, a majority electing. This method brings the candidate before the whole exchange for canvass, and any one who knows anything about the person is expected to communicate the same to the secretary, who in turn presents the same to the committee. This plan has worked well and the membership has been kept at a good standard, the exchange being composed at the present time of the best element in the building trades.

The apprenticeship system is much the same as has prevailed for some years, the carpenters, masons, plumbers, painters and plasterers taking boys, paying them small wages for the first year, with an increase from year to year, for say three years, no papers being passed to bind them. If the parties are honest this works well, but the fact is, many after working for a time get uneasy and imagine they have learned it all, so they leave their employer and seek new fields and let themselves for journeymen.

Rochester, N. Y.

The year 1895 among the builders of Rochester has been fairly satisfactory in point of work done, and present indications seem to promise a good year in 1896. There has been an almost entire freedom of friction between employers and workmen, and nothing appears at present to indicate a change.

The Builders and Building Supply Dealers' Exchange is in good condition and is steadily gaining ground as one of the solid institutions of the city. The exchange was represented at the formation of the New York State Association of Builders in New York City by J. J. L. Friederich, John Luther and F. P. Stallman.

St. Louis, Mo.

From Secretary Richard Walsh of the Builders' Exchange of St. Louis comes the statement that the amount of building done in St. Louis in 1895 will greatly exceed the amount done in 1894. The present condition of the building business is remarkably good for this season of the year, many of the large contracts undertaken in the early part of the season being far from completed.

The present state of affairs between employers is harmonious and promises to remain unchanged for some time.

The Builders' Exchange is reported as being in excellent condition and has, during the past year, taken an active part in commercial and industrial interests, having on all occasions been represented in conventions and other places where matters were being brought forward to advance the business interests of the community, and in this way the exchange has been brought to the front, and now stands both by national reputation as well as locally one of the leading industrial exchanges in the country. In his annual report the secretary says: "Our president attended the launching of the new steamship 'St. Louis' in Philadelphia last November, he being one of the committee from this city to be present on that occasion. The social features of our exchange for 1894 and 1895 were a grand success. In the first place our annual dinner on election day has been the occasion of a reunion of our members, bringing them together socially to enjoy a pleasant repast and a good smoke and to cast their ballot for their favorite candidates. Then again our annual steamboat excursion has been a grand success, bringing the members, their friends and families together to spend a pleasant day on the river free from the cares and turmoils of a busy life. The money appropriated by the exchange for occasions of this kind for our members, in my estimation, is money well spent. During the past year we have had many prominent and distinguished visitors on the floor of the exchange."

Wilmington, Del.

The builders of Wilmington have passed a quiet year and are now looking forward to 1896 with a more hopeful view. There has been little or no disturbance between employers and workmen, and everything is quiet as regards their present relations.

The Builders' Exchange reports that it has felt the general depression of the year, but that it is improving as an organization and is being increasingly recognized as an association capable of dealing intelligently and effectively with the important questions arising in the building business of the city. The exchange has succeeded during the year in preventing unjust legislation in relation to the plumbing laws of the State; and in securing the election of one of its members as Building Inspector of the city.

The past three years have shown a steady decrease in the amount of building done in Wilmington. In 1893 a total of 663 permits showed a valuation of $848,372, which was a marked decrease from 1892. In 1894 there were 411 permits representing an expenditure of $693,275, and it is believed that the showing for 1895 will be still smaller.

Worcester, Mass.

Building interests in Worcester are reported by Secretary Chas. C. Brown of the Builders' Exchange as being in only fair condition. Permits from the Inspector's office show an increase for new buildings of 18 over 1894, and for repairs, alterations, &c., an increase of 66. The estimated total expenditure for building during 1895 is $1,300,000, an increase of $1,000,000 over the total of 1894. The outlook for 1896 is good, many new buildings being already projected and a large number of repairs to the fronts of buildings on the principal streets being proposed.

Everything is reported quiet and harmonious among employers and workmen.

The Builders' Exchange is in good financial condition, and has made a small gain in membership, now numbering 82, with one application on the table. In admitting members, the character and general habits of the applicant are taken into consideration, and it is hoped in this way to increase the numbers and maintain the required standard of quality at the same time. Every member is requested to act as a soliciting committee, and many applications are secured in this manner. The outlook at the present time is for a further gain in membership the coming year. The exchange, during the summer, has offered to supply the local architects with uniform contract blanks, free of cost, and in this way has greatly increased the use of the form.

CORRESPONDENCE.

Building a Tool Chest.

From A. G. P., *Winchendon, Mass.*—I have taken *Carpentry and Building* for the last three years, and although I am not a carpenter I feel that I obtain my money's worth out of it every year. I have been interested in the matter of tool chests and have had the same difficulty which "F. A. B." mentions in the March number. I could find nothing which was just what I wanted. I inclose sketches of a chest which I have just built for my own use. It is 30 inches long, 19 inches wide and 18 inches deep, inside measurement. In Fig. 1, which represents an end section, A is a saw tray 6½ inches deep and 4¾ inches wide extending the full length of the chest. It is made to hold three saws and a level. The square is placed on the back side of the chest in the saw till, the tongue running through into the lower portion of the chest, as indicated by the dotted lines in Fig. 2. The drawer B is divided into 16 compartments for nails. Two small trays slide into this large drawer, each being about 1¾ inches deep and containing eight compartments each. This drawer might be placed at the bottom of the chest, occupying the position of drawer D. The drawers C and D are intended for small tools such as bits, scratch gauges and any other tools not over 3 inches in hight. These drawers slide on strips fastened securely to the end of the chest, the lower strip being 1 inch thick, the second strip ¾ inch thick and the last strip ½ inch thick. Referring again to Fig. 1, E is a space for chisels extending the length of the chest on the front side; F is a space for planes, while G can be used for any tools which are not hurt by mixing them up. The chest was made for a person who likes to have a place in which to keep everything for a small job.

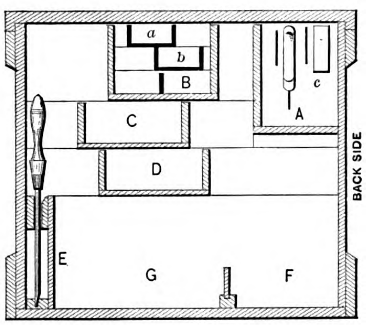


Fig. 1.—Vertical Cross Section of "A. G. P.'s" Tool Chest.

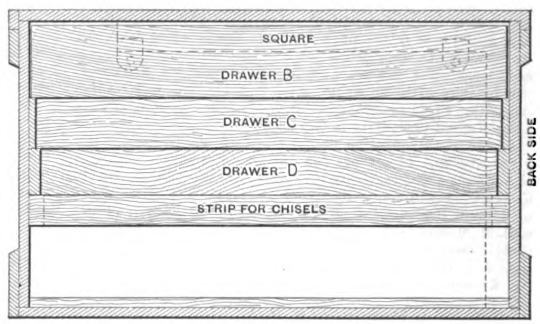


Fig. 2.—Vertical Longitudinal Section of Chest.

Building a Tool Chest.—Sectional Views of Chest Made by "A. G. P."

Proportions of Cupolas.

From J. D., *Chester, Conn.*—Will some reader of the paper give me a rule for determining the proportions of a cupola to a building so as to give a good appearance?

Design for a Sectional Photograph Gallery.

From G. O. G., *Lorain, Ohio.*—I would like to ask some of the readers of the paper for a floor plan and elevation showing the location of the skylight in one of those photograph galleries which are built in sections to be taken apart and moved from one place to another without much trouble. If some of my brother chips who have had experience in this direction will kindly contribute the plans with a brief description, I am sure that the matter will prove interesting to many others as well as myself.

Strength of Beams.

From C. A. P., *Omaha, Neb.*—Replying to the questions of "C. B.," Norfolk, Va., in the December issue, page 313, in reference to the strength of beams in the two positions shown, I wish to say it makes no difference whether the beam is supported on its side, as represented in Fig. 2, or with one of its diagonals vertical, as represented in Fig. 1, provided the beam is square. If in the position shown in Fig. 1 there will be a tendency to split the post at A, and in order to prevent this a bolt should be inserted an inch or two below that point. With regard to the second question, I may say that two plates on each side of the center will prove stronger than a single center plate, and for maximum carrying capacity the two plates should divide the span into three equal parts.

The Wooden Truss Discussion.

From H. D., *New York City.*—In the December issue of the paper I notice a communication from "C. A. P." of Omaha, Neb., to which I feel called upon to reply, as his remarks allude to a certain truss, a sketch of which I contributed to the May issue of the paper. My critic charges that a singular error has been made in the design; that no mention of it has appeared in the Correspondence department, and that the error would prove fatal if it occurred in actual practice. He also refers to the inclined members as counter braces and as being powerless without main braces. To support his criticism he sends a corrected sketch. With the editor's permission, I will reply to the correspondent's remarks, after which I should like to hear from other readers as to their opinions in this matter. In the first place, no mention was made of an error because none existed, unless the correspondent considers it an error to mark the verticals as "rods." I would ask if there is any rational objection to using a vertical as a tension member? I have never heard of any. The correspondent states that if the rods are tension members the diagonals must be intended for compression. In this I agree with him perfectly; for who ever heard of a rod being used for any other purpose than a tie and a strut for anything else than compression. In regard to the struts being inclined the wrong way I would state that there is no rule, of which I am aware, which says that the struts shall be inclined only in a certain direction. When the design was made special care was taken to arrange the members to the best advantage both in regard to strength and economy of construction. By inclining the struts, as shown, I obtain a very substantial connection at B—in fact, a more rigid connection, I think, than is shown in the sketch of "C. A. P.," as that joint is one of the most important in the entire structure. By inclining the struts as I have shown them they are much shorter than if inclined the other way, and this in compression members is very desirable, as the shorter a timber the greater the weight it will bear. If my braces are only counter braces and are powerless without main braces, what shall we call the braces introduced in the sketch of the correspondent named? If they are main braces, where are the counnter braces? With the exception of the braces the two trusses are identical in all respects. The truss, being intended for a roof support, is loaded on top. By inclining the members as shown in the May issue I place them nearly normal to the main rafter, which, if unsupported, would deflect in that direction. By this means the structure is capable of withstanding distortion far better, in my opinion, than the sketch shown by "C. A. P." A little discussion of this subject would prove beneficial as well as instructive to readers generally, and I hope they will take up the matter and furnish the editor with their views for publication.

Cornice Construction.

From J. C. W., *Pine Hill, Pa.*—As I have been a constant reader of *Carpentry and Building* for some years I take great interest in it, especially the Correspondence department, and I would not like to do without it. I find it is improving and I believe it is our duty to circulate it as much as we can. I know I was the first subscriber from this post office, and now we have a club list from the place, so you will see I have not kept all the good things to myself. I forward herewith for publication some cornice details showing the method of placing the rafters on joists and plates. Now I do not wish it understood that I am finding fault with other details pertaining to the same thing, but the sketches are sent for such interest as they may possess for other readers. In Fig. 1 is represented what we will consider our subject. I think this arrangement is by far the most convenient, for various reasons. One is that it keeps the cornice up where it belongs and away from the window heads. Suppose, for example, we have a window with two panes in each sash, 28 inches, above each other, or 56 inches—that is, 4 feet 8 inches. Now, the outside sill, 2 inches, and the head over all, 8 inches, make 5 feet 6 inches. Now suppose we run a frieze 8 inches and 7 inches for both sashes. This will make 6 feet 9 inches. Now any one can see what would be left for the fall of a porch roof for an 8-foot story—only 15 inches, which would not be too much. Of course this largely depends upon the width of the porch. Some may say that 8 feet is too low for the story. It will also be seen that the estimate for the window is not too large. We will now refer to Fig. 2, and giving an additional foot for the story brings us where? We simply can't get in the window of the size mentioned. Now what follows? We are compelled to flatten the porch roof bringing the window nearer to the floor, and with either shingles or slate we simply get a poor roof. I would refer those interested to the August issue for 1894, where it will be found that the house forming the basis of the supplemental plate has the windows sticking up under the cornice. On page 173 will be found Fig. 2 of my sketches. I have seen cuts like this before. Joists are generally 16 inches on centers and the rafters 2 feet on centers, which certainly cannot make a good job, according to my notion. Again, if the attic is to be floored it cannot be made very tight at the rafters and cornice. In order to make a good job out of this each rafter should be spiked alongside of each joist. Referring again to Fig. 1 I would say that the top joist must be the width of the cornice at each end longer. After the joists are in place line and saw off. After the rafters are up hold a straight edge or square on top of the rafter, mark along the side of the joist, and cut off the corner of the joist the same pitch as the rafter, as indicated by the dotted lines. On large buildings a 2-inch rafter plate can be used and let in 1 inch, as indicated in the sketch by the dotted lines. The rafter can then be placed at will. In Fig. 3 is shown the method I employ on a solid plate such as barns, &c. If a cornice is desired I nail a board alongside of the rafter to which to nail the cornice as indicated by the dotted lines. I would like to see published the opinions of others concerning matters of this kind.

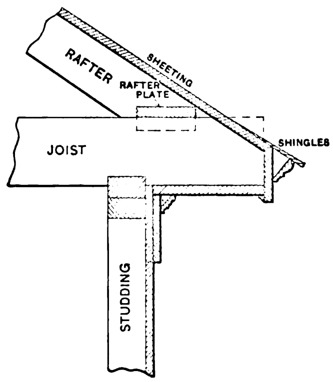


Fig. 1.—Form of Construction Regarded as the Most Convenient by "J. C. W."

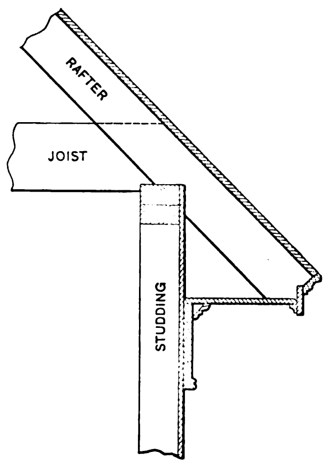


Fig. 2.—A Different Form of Construction.

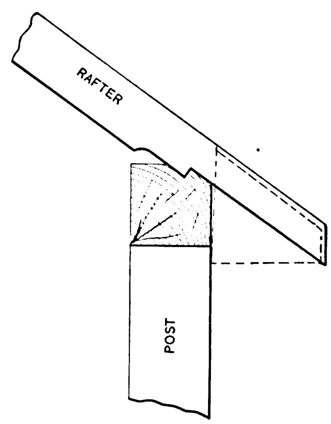


Fig. 3.—Method Employed in Connection With Barns.

Cornice Construction.—Sketches Contributed by "J. C. W."

Finding the Lengths of Belts.

From TRAMP, *Boulder, Col.*—In answer to "J. M. B." of Monroeton, Pa., allow me to offer the following as a method by which to figure the length of a belt. I will assume that the belt makes a straight line from *b* to *c* in the diagram given in connection with his letter in the November issue, and will leave out of consideration the thickness of the belt. Referring to the diagram mentioned, first find the angle *k c b*. Subtract the diameter of the small pulley from that of the large one, which leaves 9 feet; then $\frac{9}{2} = 4.5$ feet. Divide 4.5 feet by the distance $o\,o' = k\,c = 10$ feet, when $\frac{4.5}{10} = 0.45$, which is the sine of the angle *k c b*, and the angle is 26° and 45', nearly. Now take the cosine of this angle and multiply it by the distance *o o'* or *k c*—that is, 10 feet—thus:

Cos. $26° 45' = 0.89298$ and

$0.89298 \times 10 = 8.9298$ feet, the distance *b c* ;

$8.9298 \times 2 = 17.8596$ feet for the total length of the straight belt between the pulleys.

Now the angles *k c b*, *x o b* and *y o' c* are all equal to each other, that is, 26° 45'.

Now on the large pulley the belt is in contact with 180° plus twice 26° 45', or 233½°, which expressed as a fraction of the circumference is $\frac{467}{720}$. The circumference is equal to 31.416 feet and $\frac{31.416 \times 467}{720} = 20.377$, which is the number of feet of belt in contact with the large pulley.

On the small pulley the belt is in contact with 180°

minus twice 26° 45′, or 126½°. This expressed as a fraction of the circumference is $\frac{253}{720}$ and the circumference of the small pulley is 3.1416 feet; then

$$\frac{3.1416 \times 253}{720} = 1.104 \text{ feet, nearly.}$$

Then the straight part of belt......	= 17.8596	feet.
Part in contact with large pulley..	= 20.377	feet.
Part in contact with small pulley..	= 1.104	feet.
Total length of belt	39.3406	feet.

From M. S. A., *Battle Creek, Mich.*—In reply to the correspondent making inquiry, in a recent issue of the paper, with regard to the lengths of belts, I would state that the following rule is given in the pamphlet issued by Jones & Laughlin, Limited. When it is not convenient to measure with the tape line the length required, add together the diameters of the two pulleys; divide the result by 2 and multiply the quotient by 3¼. Then add this product to twice the distance between the centers of the shafts and the result is the length required.

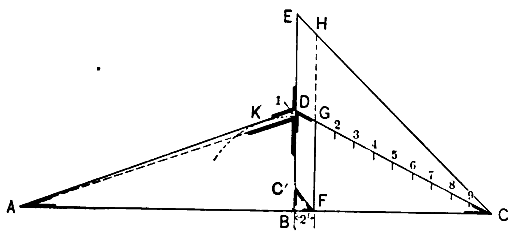
Lines in Framing a Hip Roof

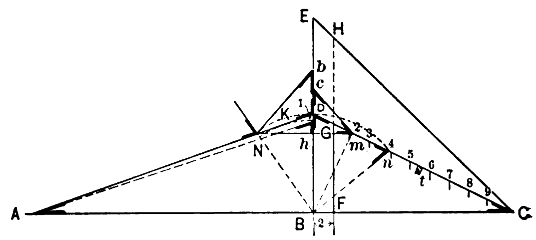
From WILLIAM PEOPLES, *Allegheny City, Pa.*—The correspondent H. V. Swyny, of Butte, Mont., describes in a recent issue of the paper a method for finding, by the use of ten lines, the lengths and cuts of rafters in the framing of a hip roof that is square on plan, and desires that other readers should evince their interest in the subject by discussing the matter in the columns of *Carpentry and Building*. In compliance with his request and for the benefit of those who may be interested, I send for publication another method by which to obtain the length of nine jack rafters, the common and hip rafters and the bevels to cut the same, drawn with eight lines. The curved line I do not count, as it merely carries a point, and this is as fair for one as for the other, for if correctly drawn Mr. Swyny would have to add another line, making a total of 11.

Referring to Fig. 1 of the sketches which I inclose, draw A B and B E indefinitely and at right angles to each other. Make B E and B C each equal to the sides of a square, say 20 feet. Draw E C for the seat of the hip rafter. Make B D equal 10 feet, one-quarter pitch. Draw D C for the length and cuts shown for the common rafter. Make B A equal to E C. Connect A with D for the lengths and cuts shown for the hip rafter. Make B F equal to 2 feet for space in the jack rafters. Draw F G perpendicular to A C, cutting the line D C at the point G. Continue the line to H for the seat of the jack rafters. Now G C gives the length of the jack rafter to stand over the seat line F H. Take D G in the dividers and step off on D C the various spaces as indicated by G 2, 2 3, 3 4, 4 5, &c., establishing the lengths of all the jacks on the common rafter D C. Now make B C′ equal to D G and join C′ F for the miter cut at C′ against the hip. The down cut is shown at D.

For the backing of the hip rafters center the dividers at D and tangent the inclination of the hip which occurs at K, carrying it to 1. Draw 1 A, and in the angle at 1 is found the bevel for backing when the hip is square on the plan. By the way, Mr. Swyny will discover that he is mistaken in the correctness of his bevel for backing as described in his communication. We have now advanced into the subject with Mr. Swyny to the extent he goes and exhibit the length of eight more jack rafters than he has done and all with eight lines. At first sight this may seem a puzzle, but there are more "nuts to crack" yet for all the cuts in hip roof framing.

In Fig. 2 is exhibited the method of finding the lengths of the common hip and nine jack rafters, also the cuts for the same, for a hip roof square on plan, together with the cuts for the purlin shown at *t* against the hip rafter, the backing of the hip and also the miter cut against the ridge plate or a corner post either before or after the hip is backed, as well as the cut of hip or valley rafter at the lower end to line with the common rafters when they project for cornice and the corona is at right angles to the inclination of the common rafter, or for boxing the girts into inclining posts, and all with 13 lines. Referring to the sketch, draw A C and B E indefinitely at right angles to each other. Make B E and B C equal to two sides of a square. Draw the diagonal E C for the seat of hip rafter. Make B D the hight of the roof at the ridge, in this case a one-quarter pitch, and draw D C for the length and cuts shown at D and C of the common rafter. Make B A equal to C E. Join D with A for the length of the hip. The foot and the ridge cuts for it are shown at A and D. Now make B F the centers of jack rafters, say 2 feet. Draw F G at right angles to A C and prolong to H for the seat of the jack rafter. The point of intersection G gives the length of the jack G C, which will, when elevated into position, range over the seat F H. Take G D into the dividers and space off G 2, 2 3, 3 4, &c., for the lengths of the other jacks.





Lines in Framing a Hip Roof.—Figs. 1 and 2, Submitted by Mr. Peoples.

From B and square with D C draw B *m*. Draw *m h* N parallel to A C. Make *h c* equal to D *m*. Connect *c* with *m* and the bevel at *c* will give the miter cut for the jack against the hip, while the bevel at D gives the down cut. Make B *n* equal to B N. Then *n m* must equal *m h*. Connect B *n* for the side cut of the purlin *t* against the hip. The miter cut for the purlin against the hip is shown in the angle at *m*. This last gives the miter cut of sheeting on the line of hip and the other at *n* gives the cut on the edge. Rest the dividers at B and tangent the hip D A. Carry to 1 and draw A 1, the bevel at 1 giving the backing for the hip. The combination of lines to obtain this last bevel is true only when the seat of the hip forms an angle of 45 degrees with the wall. Draw B N for the cut of the hip at the projecting end to line with the common rafters when they are cut square to the inclination for the corona of the cornice. Now make *h b* equal to D N and join *b* N for the miter bevel at *b* to cut the hip at the upper end against the ridge plate before the backing. If the backing is done then the bevels shown at *c* and *m* will give the cut if applied from opposite sides on the plane of backing.

Why a Chimney Leans.

From A. J, *Peotone, Kan.*—In answer to "E. W H." of New York, who asked in the October number the cause of a chimney leaning to the north and east, I would say that mortar in chimneys is subject to change of constituents by the presence of moisture and carbonic gas in the atmosphere. The mortar, which is at first a hydrate of lime and sand, gradually changes to a carbonate in its lime elements, thereby increasing its bulk to a small extent On the storm or wet side of the chimney, subject to repeated variations of temperature by sunshine, the process of the elementary change probably goes on somewhat faster than on the other side, which lifts one side faster than the other, thus producing the cant in the chimney noted.

Glass Paint for Wooden Water Tanks.

From H. W. H., *Unionville, Conn.*—Will some of the readers of the paper tell me something about glass paint for use on the inside of wooden water tanks to keep the water pure? I want to know if the paint is durable and where I can get it.

Pitch Board for Outside Stair Work.

From T. W. B., *Brooklyn, N. Y.*—I should like through some of the readers of the paper to ascertain a workmanlike method of making a pitch board for outside stair work, so as to obtain the tread pitch without the necessity of resorting, in common with most carpenters, to the preparation of a pitch board as for ordinary stairs, and after the work is laid out take off ¼, ⅜ or ½ inch, as the case may be. This method, besides increasing the possibility and probability of errors, contracts the rise just the amount that is taken off.

Problem in Board Measure.

From W. H. F., *Ashland, Ohio.*—In reply to the inquiry of "A. P. McL.," in the November issue of the paper, I beg to state that I solve such questions by geometry. The explanation I shall not attempt by this method at the present time, as I have a rule which I deduced from a geometrical demonstration of the question, and which will solve all similar problems. It is as follows: Divide the entire length of the board in inches by the difference of the two ends in inches and multiply the quotient by the width of the greater end; then subtract one-half the area of the board from the result. Divide the remainder and multiply by the quotient obtained from dividing the length of the board by the difference of the two ends. Extract the square root and subtract it from the result obtained after the first multiplication. This gives the distance, on the center line, from the greater end to the cut.

Now for the application of the rule: A board 8 inches wide at one end, 6 inches wide at the other, and 12 feet long, has in it 1008 square inches; then 504 square inches is the one-half which is to be cut off.

$\overline{144 + (8 - 6)} \times 8 = 576$ inches, the altitude of the triangle formed by the converging lines of the board if extended to a point.

$576 \times (\frac{1}{2} \text{ of } 8) = 2304$ square inches, which is the area of the triangle.

$2304 - 504 = 1800$ square inches. $2 \times 1800 \times (144 + \overline{8 - 6}) = \sqrt{259200} = 509 +$. Then $576 - 509 = 67$ inches, or 5 feet 7 inches, which is the distance from the greater end to cut.

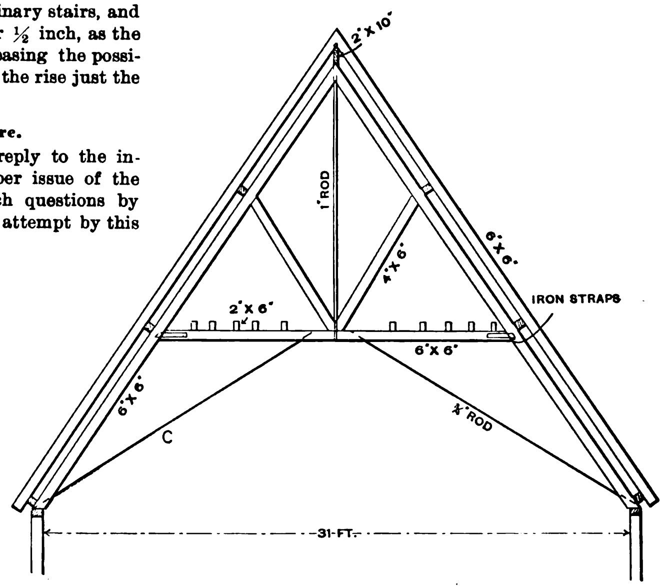
I desire to say that I have been very much interested in every number of *Carpentry and Building* since I began taking it. The paper is a storehouse of knowledge well filled, and no mechanic who wants to make a mark in this world by getting to the front can afford to be without it.

Making a Four-Point Splice in a Billiard Cue.

From YOUNG CHIP, *Montreal, Canada.*—I have been an interested reader of *Carpentry and Building* for nearly four years and during that time have seen a number of puzzles in wood work, but I struck a job the other day that before I had it finished gave me all the puzzle I wanted. Very likely there are other readers of the paper who are better posted than I am on this class of work, and I should like to have them explain to me the proper method of setting out and making a four-point splice in a billiard cue. One-half of the cue was already made and what I had to do was to fit the other half to it. It was, in fact, a harder job than if I had been obliged to make the whole cue.

Design of a Brick Hotel Building.

From G. T. H., *Berryville, Ark.*—I wish some of the readers of the paper would furnish for publication the plans, elevations and details of a brick hotel ranging in cost from $4000 to $6000. I wish the readers would send to the editor more plans of store fronts, shelving and counters. What I specially desire, however, are the details of sash with panels below the glass. In this part of the country we have no architects, and as I have been working at the trade only five years, I am sometimes at a loss how to plan a front in order to make it look just right. We use wooden lintels and columns, and a front with any other kind would be useless to me. I hope some of the readers will give me the information as soon as possible, for if I obtain an early answer to this request they may hear from me again.



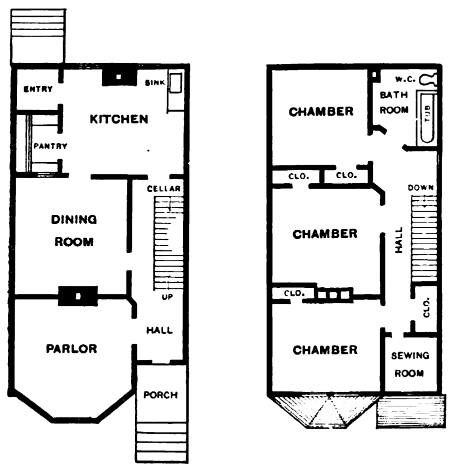
Truss for Church Roof, Submitted by "E. E. C."

Truss for Church Roof.

From E. E. C., *Whitesboro, N. Y.*—I inclose a sketch of a truss I am about to use in a church, the plans being furnished by an architect. The rods C are not called for on the original plans, but I have added them as I was afraid the truss would be faulty without them. I desire to ask if it will hold without these rods, the timber used being Georgia pine?

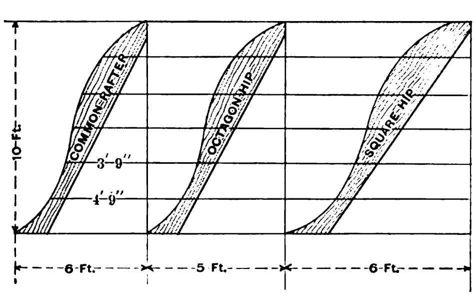
Six-Room Cottage for a City Lot.

From N. H. D., *Newburg, N. Y.*—I am an interested reader of the paper and in studying the plans of workingman's cottages published from time to time I find some very good points, but the fault with the majority of the plans is that there is no stair hall proper for the two-story portion or else it starts in a cramped section of the building. The floor plan submitted by "R. B." of Meriden, Conn., and published in the September issue is, in my opinion, very convenient. The shape of the bathroom as well as its location is exceedingly odd, as it cuts off the square angles of the kitchen and the two bedrooms, but necessitates two doors more than are necessary. The family bedroom is at the rear of the house, and I should like to inquire how the correspondent proposes to warm it. The sink is too far from the stove and the small room marked "entry" at the front of the house is of no use whatever. Another fault is that the cottage takes too much ground for the frontage. This is the fault I find with most of the plans submitted. They cannot be erected on a common city lot of a frontage of 25 feet, and it is well known that in the city a lot 25 feet front will cost anywhere from $200 upward. A house for such a lot is, in my opinion, the best for the workingman. I send herewith the floor plans for a two-story frame cottage, which I consider well adapted for a 25-foot lot. It can be built in a good manner for about $1000 and possibly less. It can, however, be made to cost more, according to the finish inside and out. The frontage is such that by building from 18 inches to 2 feet from the line on one side light



Floor Plans of a Six-Room Cottage for a City Lot.

would be given to the dining room and bedroom over it, and at the same time there would be a nice passageway to reach the rear of the house and yard. Again, no one could block the light and air from that side. The parlor has a bay window with arch and the dining room has two windows. The kitchen, it will be noticed from an inspection of the plans, may be entered from both hall and dining room, this arrangement giving direct communication between the kitchen and the front door. The pantry is conveniently located to both rooms, while the entry tends to keep the cold air from the kitchen in the winter. The sink is placed near the stove and is convenient for hot and cold water. On the second floor are three good sized sleeping rooms, a sewing room, four closets and a bathroom. The arrangement is such that the sleeping rooms and bathroom can be heated by stoves or other means as may be most convenient. The bathroom is so located that a direct connection is had for water and waste pipes from the sink in the kitchen. The plans show the position of the closets with regard to the

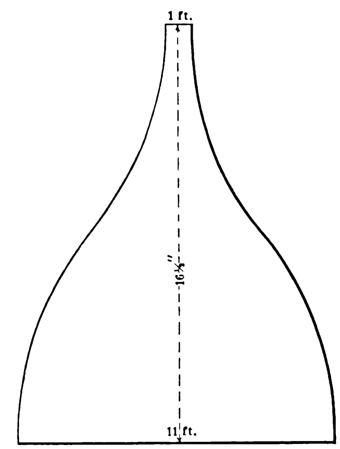


Development of Ogee Rafters.—Diagram Submitted by "H. W. N."

sleeping rooms, and it will be seen that there is but little waste room. The whole can be covered by one roof, or it can be cut up as desired. In my opinion the arrangement is very neat and the effect cozy. I would like, however, to hear the opinions of others on this question.

Development of Ogee Rafters.

From H. W. N., *Salt Lake City, Utah.*—It has been very interesting to me to see so many problems on the development of ogee or curved rafters for octagon or square roofing. The method of "Jere" in the September issue of the paper seems to me to be original and a novel way of producing the curve. I have recently obtained a patent on a simple device for roof construction, and as a matter of necessity have a scale 13 inches in length for octagon roofing and a scale 17 inches for the square roofing, each divided into 12 parts. This scale can be produced on a strip of wood in a few minutes. I inclose herewith a diagram showing how simply the development of hip rafters may be obtained by the use of these scales, and I am confident that "Jere," Mr. Hicks and others who have submitted problems on the subject will admit that it is a most simple method and as correct as any which have yet appeared. Referring to the sketch which I send, lay out the common rafter to any shape required, say ogee, as shown in the cut, 6 feet on plan by 10 feet in hight ; space off 6 feet on line with the foot of the rafter.



Sketch Contributed by "M. L." of Warren, Ohio.

and from this erect a plumb line 10 feet in hight, which is the upper cut for the rafter. Now divide the hight into as many parts as desired, say six, as in the sketch, parallel with the base line, so as to cut the plumb and the curve in the rafter. For the hip rafter of an octagon space off 6 feet on the base with the octagon scale and erect the plumb line. Extend the horizontal lines, as shown, and set off the distance on each line from the plumb line to the curve by transferring the same distance and using the same number of feet and inches, but using the octagon scale, in this case the base line being 6 feet, the second line 4 feet 9 inches, the third line 3 feet 9 inches, and so on until the top is reached ; now trace through these points, which will give the octagon hip. For a square roof hip proceed in the same manner by using the hip rafter scale, which is 17 inches to the foot, divided into 12 parts or inches.

Framing a Round Tower.

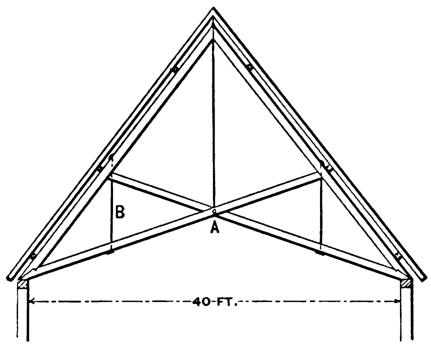
From M. L., *Warren, Ohio.*—I shall be glad to have some of the correspondents of this department furnish a plan showing the manner of framing the rafters for the roof of a round tower and putting on the sheeting ready for a slate roof.

Use of Oak for Interior Finish.

From G. S. B., *Huntsville, Ohio.*— I am a constant reader of the paper, and it is with interest that I peruse the different articles presented in its columns. Just now I am an inquirer and come for information from those who from experience or close observation possess the requisite knowledge. I wish to know if oak lumber which has been sawed and piled for 18 months may be used in finish work provided it is steamed and kiln dried. Would it give entire satisfaction, and is steaming and kiln drying a good way to dry lumber ; if so, how long should it be steamed and dried ?

Truss for a Gothic Roof.

From E. E. C., *Whitesboro, N. Y.*—I have in my possession a copy of "Carpentry Made Easy," by William E. Bell, and in it I find three trusses for gothic roofs of 40



Sketch of Truss for Gothic Roof.

feet span. I inclose a drawing of the one the author says is the best, and I would like to have some of the readers explain it, as I fail to comprehend the good points. It seems to me that all the strain comes on the braces where they are halved together at A, and that is all that seems to hold the roof from spreading. I would like to ask if the side rods B do anything more than hold up the ceiling. In constructing a truss of this kind what size lumber should be used ?

Design of a Carpenters' Bench.

From G. W. D., *Path, Maine.*—I inclose drawings of a small carpenters' bench which I have built and which perhaps may prove of interest to some of the readers of the paper. Possibly if enlarged to 12 feet long by 3 feet wide it might meet the requirements of "J. D. R.," whose letter appears in the June issue. In such a case, however, I would recommend three sets of legs with the top at least 2 inches thick. The dimensions and material used in this bench are as follows: The top and sides are of white pine 1¼ inches thick, the posts are of yellow pine 3 x 4 inches, while all other parts are of ash. The top boards are held in position by stub tenons on top of the post and rabbet for the sides. The bench can be easily taken apart for storing if necessary. To do this remove the top and vise and knock out the wedges W. The correspondent "J. D. R." wishes to know the hight. I think that depends entirely on the hight of the person using the bench, although it seems to me no one would require a bench over 3 feet high.

Design for a Workingman's House.

From W. R., *New York City.*—I would like very much to have some of the readers furnish for publication drawings of a house suitable for a workingman, the size to be, say, 20 feet front and 28 to 30 feet deep. I believe this is a subject which will interest others as well as myself, as lots around here are usually 25 x 100 feet.

Engineers' Scale.

From E. FORSTER, *Jamaica, W. I.*—The scale shown in *Carpentry and Building* for November, with inquiries from "Benem," Washington, D. C., is an ordinary rectangular protractor. On the face of the protractor are set off the degrees of a circle, following which is the line of chords marked C, and then the scales ¼, ½, ¾ and 1 inch to the foot. On the back of the instrument, Fig. 2 of the correspondent's sketch, we have scales 50, 60, &c., which may be 60 chains or 60 feet to an inch, being divided into tenths and twelfths. The letter C on this scale also means a line of chords. We next come to the diagonal scale and the following, quoted from "Stanley's Mathematical Drawing Instruments," may not be without interest. "The diagonal scale, now nearly obsolete, was formerly one of the most universal mathematical scales. It is still placed as a matter of form on the protractor supplied with most cases of mathematical drawing instruments. Theoretically it is a most ingenious scale ; practically it is an almost useless one, the only purpose to which it is now applied being to a scale for the beam of the compasses, which to be of any use has to be divided upon metal. The purpose of the diagonal scale is to divide any given quantity into some number of equal parts, mostly 100 parts." Further information can be supplied to "Benem" as to principal uses of the diagonal scale if required.

Ventilating by Furnace Chimney.

From A. M. K., *Pennsylvania.*—I have a furnace in the cellar of a house connected with a chimney running up to the roof. I would like to ventilate the rooms and wish to ask if it would be possible to put in wall registers connected with this chimney for the purpose of ventilation. Will the gas from the furnace coming up the chimney interfere with the ventilation of the rooms ? I want to ventilate four rooms in this manner if it is feasible.

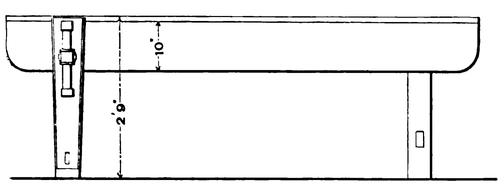


Fig. 1.—Elevation of Bench.

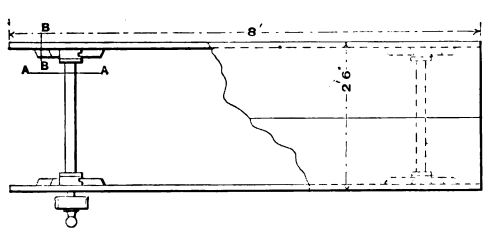


Fig. 2.—Plan View.

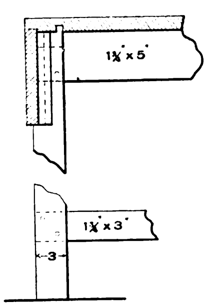


Fig. 3.—Section Taken on Line B B of the Plan.

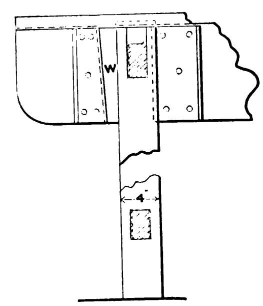


Fig. 4.—Section Taken on Line A A of the Plan.

Design of a Carpenters' Bench.—Illustrations Accompanying Letter of "G. W. D."

Answer.—The plan proposed by our correspondent of cutting registers through the wall and opening direct into the chimney is not to be recommended. If the flue is of sufficient size to stand it, it would be better to run a pipe up the middle to carry off the furnace gases, and then in the remainder of the space, in the corners of the square flue, there would be a heated current of air which could be utilized for drawing the foul air from the rooms in question. By cutting direct openings into the flue there will not be much danger of the gas from the furnace escaping into the rooms, provided the length of chimney above the registers was considerable. The registers would, however, very seriously affect the draft of the furnace, and would, in fact, act as so many check dampers.

ARCHITECTURAL DRAWING FOR MECHANICS.*

By I. P. HICKS.

THE framing of the right side elevation of the building is shown in Fig. 48 of the illustrations. The particular part to which attention is invited is the starting and stopping of the lines at just the right points in drawing the plates and rafters. As previously stated, the first thing is to pencil sketch all work; then with well guarded movements one can tell just where to start and stop the pen. Suppose, for instance, Fig. 48 is pencil sketched, and we are to ink it. First take the sill lines, then the top ridge line, and after that the outside rafter and post lines. This will give the outline of the entire figure. As the rafters are joined by means of a ridge board and rest on top of the purlin and main plates, while at the same time extending below the main plate, it is necessary to next draw the rafters. First draw the ends, then the length lines, after omitted. The purlin girt is left out because it would be in the way of operating a hay fork if one was desired. As this bent is the one directly in front of the horses and next to the barn floor it is necessary that it should be boarded up about 3 feet high. For this purpose tie girts are put in and studded underneath, as shown.

It would now appear that the subject of architectural drawing had been considered with sufficient clearness to enable the student to proceed understandingly in ordinary practice and make the working plans so often required in the building trade.

In conclusion it may be well to say to those who wish to improve themselves in this subject, study the plans, elevations and details of the buildings that appear from time to time in architectural journals. Many of them

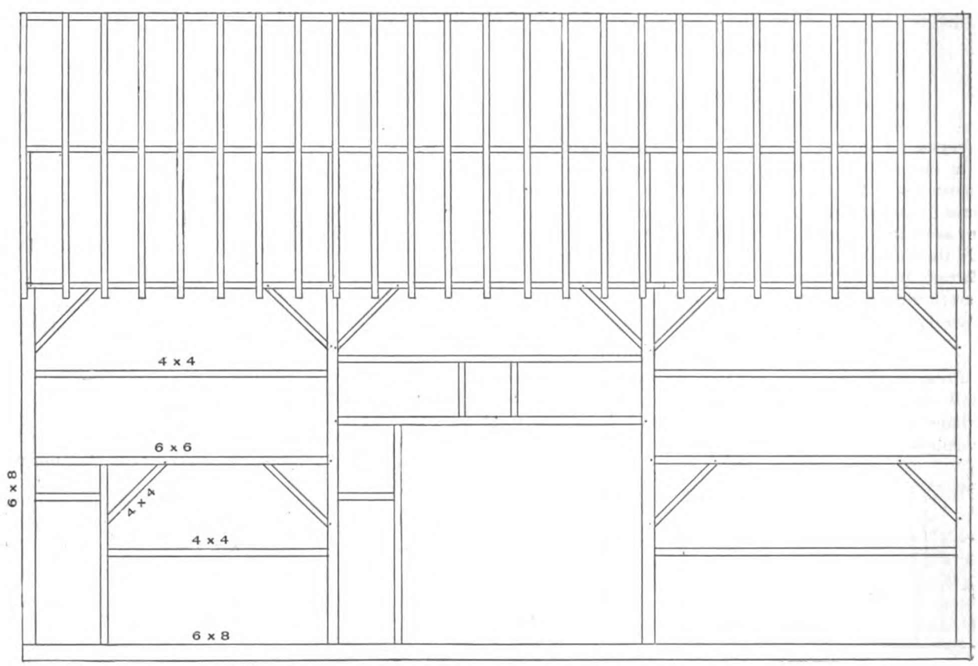


Fig 48.—Method of Drawing the Right Side Elevation of Frame.—Scale, ⅛ Inch to the Foot.

Architectural Drawing for Mechanics.—Barn Framing.

which the roof can be finished by drawing the lower lines of the ridge board and the plate lines as they would appear between the rafters, thus showing just where to start and stop the short lines. The short lines running perpendicularly from the main plate to the purlin plate show the portion of the purlin posts exposed to view at the side of the rafters on account of the posts being thicker. Next draw the main post lines, girt lines, door posts, headers and braces in the order named. A little practice in this kind of work is the best experience, and as the work progresses step by step the best ways and means of accomplishing certain results will come to light and appear plainer and plainer as the draftsman gains in the knowledge of his profession.

The elevation of the left end bent is shown in Fig. 49, which is self explanatory. A few figures are included to give an idea of marking sizes of timber used. The elevation of the next bent, which shows some changes in the framing, is represented in Fig. 50. This being an inside bent, it is not necessary that the tie girts, to which it is usual to nail the siding, should be in the frame; in fact they would only be in the way, so for this reason they are

* Copyrighted, 1894, by I. P. Hicks.

show specimens of the finest architectural work, which will serve as the very best of lessons for study and practice. Study the work; study how to improve upon it; study the best manner to proceed, and then try a hand at executing the work by making a few drawings for practice.

Very small curves, scrolls and ornaments can be best made with a very fine writing pen, as the drawing pen is not adapted to the short and crooked lines forming the curves of molded surfaces, brackets and small ornaments appearing in elevations.

(To be continued.)

Tests of a Concrete and Wire Flooring.

Concrete and wire flooring is being laid in several of the new business blocks now in course of erection in Providence, R. I., the object being to allow of greater span between the floor beams than is practicable with brick jack arches. Across the floor beams are stretched small wire cables, each composed of two galvanized wires twisted together. Round bars are then laid across the cables parallel with the beams and half way between them. Forms or centers are placed under the cables, and a composition consisting principally of plaster of paris and wood chips is poured on, the cables, thus being imbedded in the concrete mixture, which solidifies in a few minutes. The vertical part of the concrete inclosing the floor beams is supported by wire netting passed around the flanges of the beam. If a flat ceiling is required, iron bars are laid across the bottom flanges of the beams, over which wire netting is placed, and a thinner layer of the composition is poured over this, leaving an air space between the floor and the ceiling.

The strength of this material was recently tested. Fifteen-inch I beams, 7 feet apart, had their flanges protected by a composition coating 1 inch thick. The composition filling between the beams was 5½ inches in thickness. The cables, made of two strands of No. 12 wire, were continuous over six spans, and were secured at the ends to loops of heavy wire hooked over the top flanges of the beams. The cables were spaced 1½ inch apart, and their deflection in each was regulated by an iron bar half an inch square. The weight of the floor was 24 pounds to the square foot, and it was designed to carry a live load of 170 pounds to the square foot. The length of the piece of floor tested was 12 feet parallel with the floor beams, and parts were cut out, leaving four sections 7 x 5 feet in adjacent spans to sustain the weight.

The weight of 155 pounds, falling 6 feet, went through the floor at the eleventh blow. The same weight, falling 10 feet, went through at the fourth blow. No. 2 section was tested by loading the half span up to 100 pounds to the square foot, giving an eccentric loading, but when the weight was removed the floor returned to about its original position. Section No. 3 was tested by a uniform loading up to 700 pounds per square foot; the floor deflected $\frac{9}{16}$ inch at the center, but returned $\frac{7}{16}$ inch when the load was removed. Then the section was reloaded to 1500 pounds per square foot—nearly 27 tons, on an area of 7 x 5 feet—and some of the filling was destroyed, but none of the pig iron weights were forced through the floor, and none of the wires broke. A hot fire was kept under section 4 for an hour. The temperature of the beams was increased 2 degrees, and water from the fire hose was turned on the top and bottom of the filling, none breaking loose. Next morning this section was uninjured by a load of 1000 pounds per square foot.

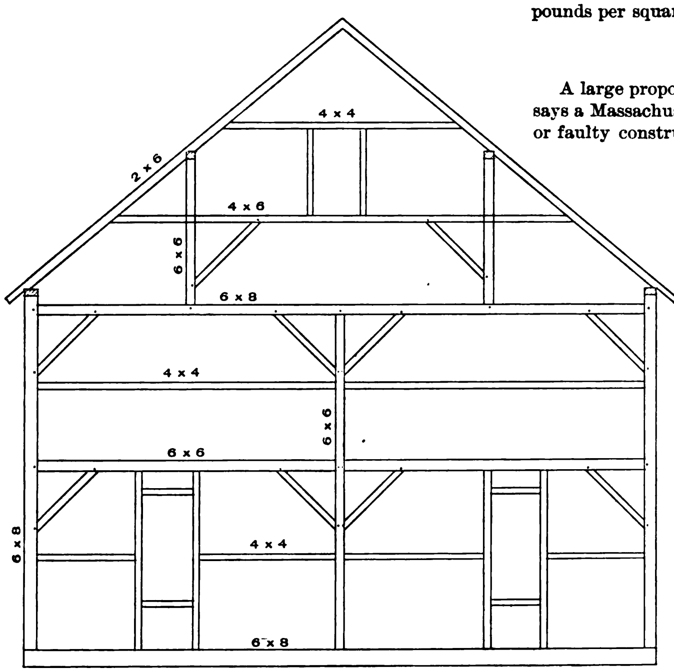


Fig. 49.—Method of Framing Left End Bent.

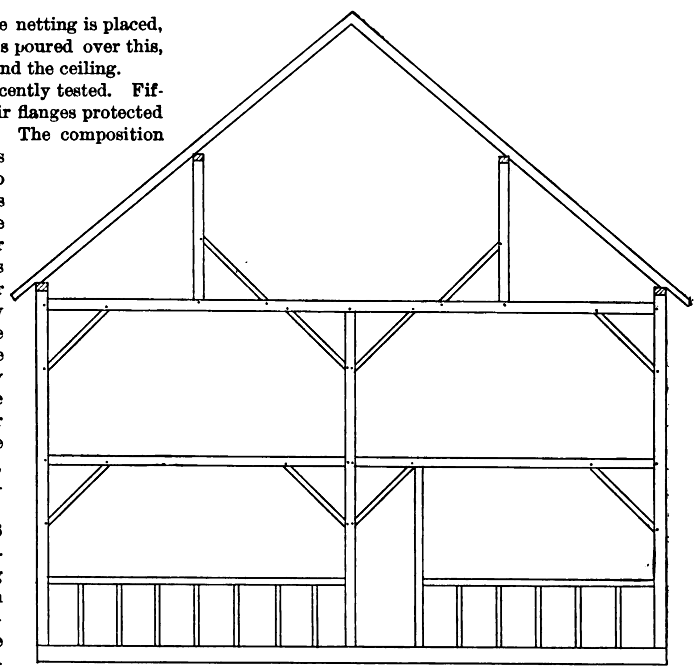


Fig. 50.—Method of Framing and Drawing Middle Bent.

Architectural Drawing for Mechanics.—Barn Framing.—Scale, ⅛ Inch to the Foot.

Chimney Inspection.

A large proportion of the fires which destroy buildings, says a Massachusetts paper, come from defective chimneys or faulty construction of pipes which connect with them. Two recent fires were from these causes. More care is needed in the construction of these appliances for heating. It occurs to us that it would be wise legislation to have all chimneys and connections therewith built under the charge of an authorized inspector, who shall be an expert in that line of work. This is a very important part in the construction of buildings, and it should be supervised more than it is. The State appoints inspectors of cattle, of plumbing, of buildings, to see if they are provided with proper fire escapes, and in various other ways looks after the welfare of the people. But in the matter of fires it leaves them to destruction through their own carelessness and ignorance. No chimney should be built without fire proof tiling the whole length of the flue, and no connection with a chimney should be made without an equally safe protection. There is no danger in too much thoroughness in the building of these avenues of heat. The danger all lies in pursuing the opposite course. A good law would be one that would provide for an inspection of the building of chimneys and all connections with them, with power to make and report stringent regulations for the better protection of life and property.

HOW TO BUILD A CHIMNEY.

SIMPLE as it may seem to build a brick chimney and top it out, it is seldom done in a first class and workmanlike manner. In the first place, especially in wooden houses, the best and hardest brick are selected for the outside walls, or the underpinning, and the soft brick and bats are put into the chimneys. Any one with a practical knowledge of the requirements of chimney flues will at once recognize the folly of this method, says a writer in the *Brickbuilder*. To be sure, they generally use good brick for the top, but it is up through the inside where there is danger of the fire eating through the soft brick and heating the timbers so that sometimes they become completely charred, and many disastrous fires have been traced directly to this cause. The use of tile flue lining, which we are glad to note is rapidly coming into general use, overcomes this evil to a certain degree. Many round tile are now placed in square flues, the tile being used for smoke and the four corners of the flue for ventilation.

In topping out a chimney there is a wide difference of opinion as regards the best materials to use as mortar. It has often been remarked that houses built in "ye olden times" had chimneys laid up with simple lime mortar, and when it becomes necessary to tear them down, to make room for more modern structures, they have been found in a good state of preservation; in fact it is often a hard matter to separate the bricks from the mortar. With a knowledge of this fact, many authorities claim that the masons of to-day do not use as good mortar as the masons of long ago. Their opinion is certainly open to severe criticism. In the first place, they used wood as fuel almost entirely, whereas the common fuel to-day is anthracite coal. As almost every one knows, the gases generated by the consumption of the fuel employed are the prime destructors of chimneys decomposing and destroying the life of the mortar employed, and causing the softer bricks to chip and flake. Now, the gases thrown off from a wood fire are not strong enough to make any perceptible effect on a well constructed chimney; but when coal is the fuel we find a far different state of affairs, and just here we find the reason why the chimney built 100 years ago did not fall to pieces in a few years, like those of the present day. Having found that the gases, or condensation of gases, are the chief factors in the destruction of the chimney, we must employ those materials least susceptible to their ravages, and the experience of some of the most practical mason builders in the country has suggested the following rule: Use only the best and hardest brick throughout the entire chimney, laying them in best lime mortar to roof, and be particular [to fill all joints full. Above the roof use mortar composed of one part lime and four parts cement, with sand enough to work smooth. The plainer the chimney top is in design the better. Saw tooth work and similar ornamentation should be avoided, and the largest chimneys should not be drawn out at the head more than 8 inches in each direction. Keep the inside of the flue straight and smooth. Change the bond in setting out the projections in the head to avoid the use of small pieces or "Dutchmen." Do not make the top course smaller than the shaft of the chimney. On top of the brick work put a stone coping and fasten the dowels with melted lead, and on top of this coping put a flat, smooth stone, supported at each corner by small blocks of stone, whose hight must depend on the size of the flue or flues. A strict observance of these rules will give as a result a well built, safe and durable chimney, which will not be affected by the weather or gases nearly as soon as those built in the ordinary manner.

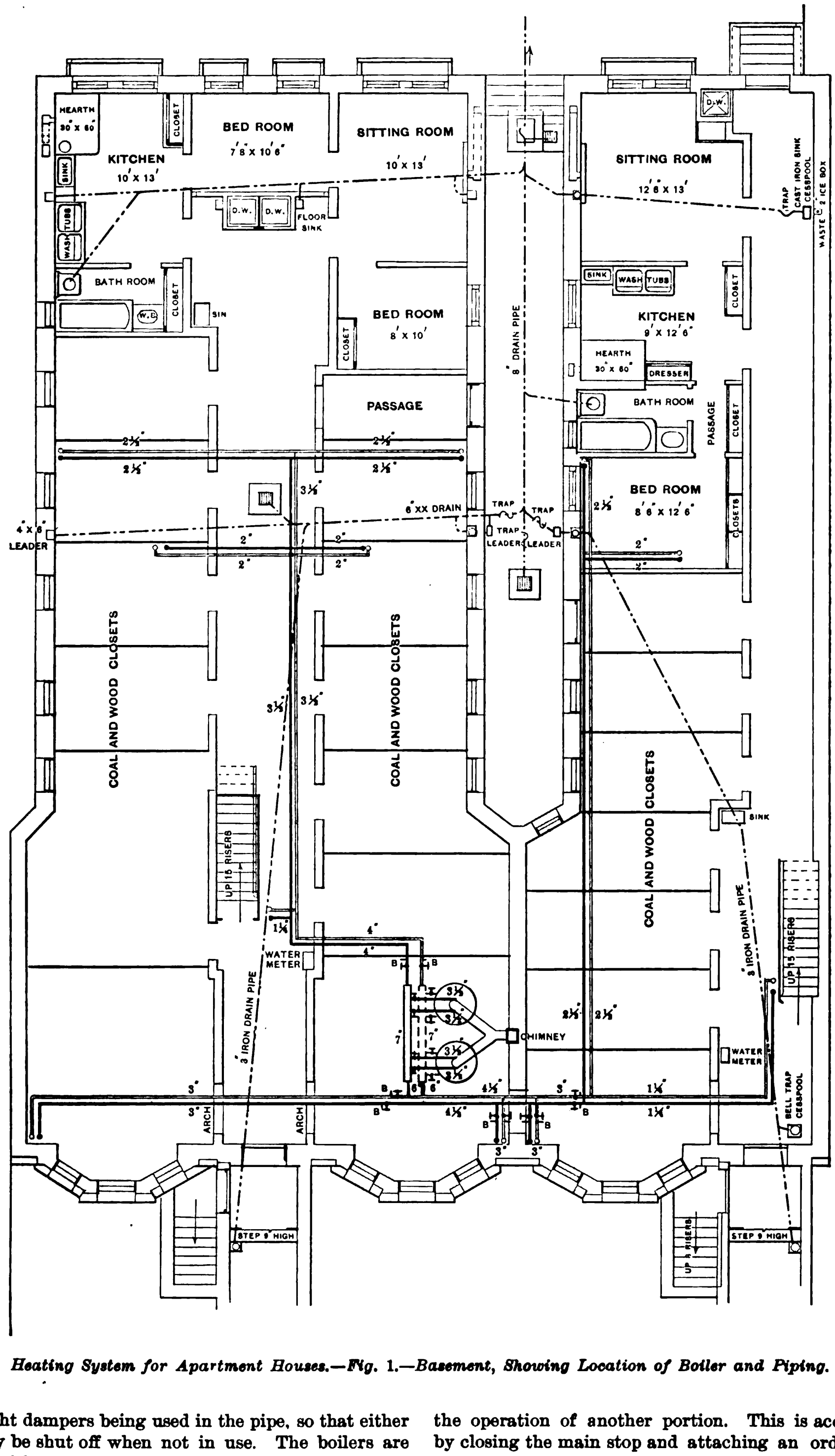
Effect of Freezing on Cement Mortars.

The results of a large number of experiments recently carried out with a view to determining the effect of freezing on cement mortars are contained in an article lately published in *Engineering News*. Most of the specimens were tested transversely, but many experiments in tension were also made. In order to reproduce the conditions of actual work as closely as possible, the various specimens were caused to set under a pressure corresponding to the average weight of a course of masonry 18 inches deep. These specimens measured 5 inches in length by 1 inch square in cross section. They were tested on a 4-inch span with a central load, and after breaking, the long fragment was again broken on a 2½-inch span. Six brands of cement were used, and were mixed with screened sand in various ratios, and then allowed to set at low temperatures. Both salt and fresh water were used in gauging the specimens. The conclusion arrived at, based on over 6000 results, is that Portland cement mortar suffers no surface disintegration under any condition of freezing, but that in most cases its strength is reduced, in some cases by as much as 40 per cent. Rosendale cement is disintegrated when exposed to frost when setting, and its cohesion may be entirely destroyed by immersion in water which becomes frozen round it. Salt water prevents this disintegration to a large extent, but seems to have an injurious effect on the strength. The cement below the disintegrated surface is stated to be increased in strength when the Rosendale cement is used. A mixture of a natural rock cement and of Portland cement gave very satisfactory results, as its surface did not disintegrate, and its strength was increased by the freezing. Portland cement is injured less proportionately as the percentage of cement in the specimens is reduced. Lime mortar is ruined by alternate thawing and freezing, but fairly good results can be obtained in the case of brick masonry when the mortar is kept frozen for some time after laying.

It is stated that in putting together quartered pine—or any other kind of wood, in fact—greater strength and durability can be obtained by placing the grain of the wood at an angle of 60 degrees than can be obtained by crossing at 90 degrees. The reason for this is that as all wood expands and contracts more or less under the variations of moisture in the atmosphere, the pieces glued at an angle of 60 degrees can expand and contract to a certain extent without tearing themselves apart, as is the case when glued at an angle of 90 degrees. The 60-degree glue joint simply pulls the object out of place a little and disturbs its shape, while the 90-degree glue joint pulls things all to pieces in its effort to accommodate itself to climatic conditions.

HEATING SYSTEM FOR APARTMENT HOUSES.

AT THIS SEASON of the year more than usual interest attaches to methods of heating buildings of various kinds and to the results achieved in connection therewith. Contractors and builders find profit in studying schemes of installation and carefully examining the location of boiler, radiators, &c., as well as the arrangement of pipes in connection with plans which have given entire satisfaction in operation. An example affording an interesting study of this kind is presented herewith. It is that of three apartment houses, each five stories in hight and accommodating 15 families. The striking feature of the heating is found in the fact that during the cold winter of 1894-95 there were consumed only 54 tons of coal, or 3⅗ for each family, and it is said that the tenants were well satisfied with the temperature afforded. The houses were erected by J. C. Carr of Hoboken, N. J., while the system of heating was laid out and installed under the supervision of Charles Yingling, engineer for the Nason Mfg. Company, of 71 Beekman street, New York. Two of their No. 4 Gulf Stream hot water boilers were used for the work, being located in the basement of the building, as shown in Fig. 1. They are connected to the chimney by means of a Y, tight dampers being used in the pipe, so that either boiler may be shut off when not in use. The boilers are provided with the usual automatic draft regulating apparatus. The method of connecting the boilers with the heating main is of a peculiar character. The flow mains from both boilers discharge into a 7-inch drum, which is placed above a similar one which receives the return mains from the piping system and which is in turn connected with the two boilers. Another feature of the piping is the use of ½-inch globe valves, B B, so placed in relation with the stop cocks in the system near the boiler that any portion of the system can be emptied without interfering with the operation of another portion. This is accomplished by closing the main stop and attaching an ordinary hose to a nipple placed in the ½-inch globe valve and running it to some point where the water may be discharged without inconvenience, and then opening the globe valve.



Heating System for Apartment Houses.—Fig. 1.—Basement, Showing Location of Boiler and Piping.

As seen in the illustration, a 4-inch main is taken from the rear of the drum at the boilers and carried back to heat the rooms in the back portion of the building, being reduced in size as the various branches are taken. From the front of the heating drum a 6-inch main is carried toward the front of the building, where it branches, a 8-inch main being carried to the left to heat the rooms on the different floors at that side of the building. A larger branch is carried in the opposite direction, being reduced after two branches are taken to heat the rooms at the front of the building and then carried on to a point where a $2\frac{1}{2}$-inch main is carried to the back part of the building to heat that portion of the wing. A $1\frac{1}{4}$-inch main branch is carried on to a radiator containing 70 square feet of surface which is placed in the first floor hall. A $1\frac{1}{4}$-inch branch is taken from the back heating main in the other building and connected with a radiator containing 120 square feet of surface used for heating the halls in that building. The return mains correspond exactly in size with the flow mains and are run beside them throughout the building. Fig. 2 is a floor plan showing the arrangement of the living apartment floors. It will be noticed on this plan that the heating riser diminishes in size as the connections are taken off to the radiators of the different floors and that the smaller radiators are used nearest the boiler, where the water is supposed to be hottest, and the risers and returns afford additional heating surface in the rooms. In the bathrooms no radiation is placed, as a sufficient amount of surface for heating them is exposed by the riser and return passing through them. The expansion tank is placed near the ceiling in one of the bathrooms and is so arranged as to secure a circulation in the tank. It is also provided with an overflow.

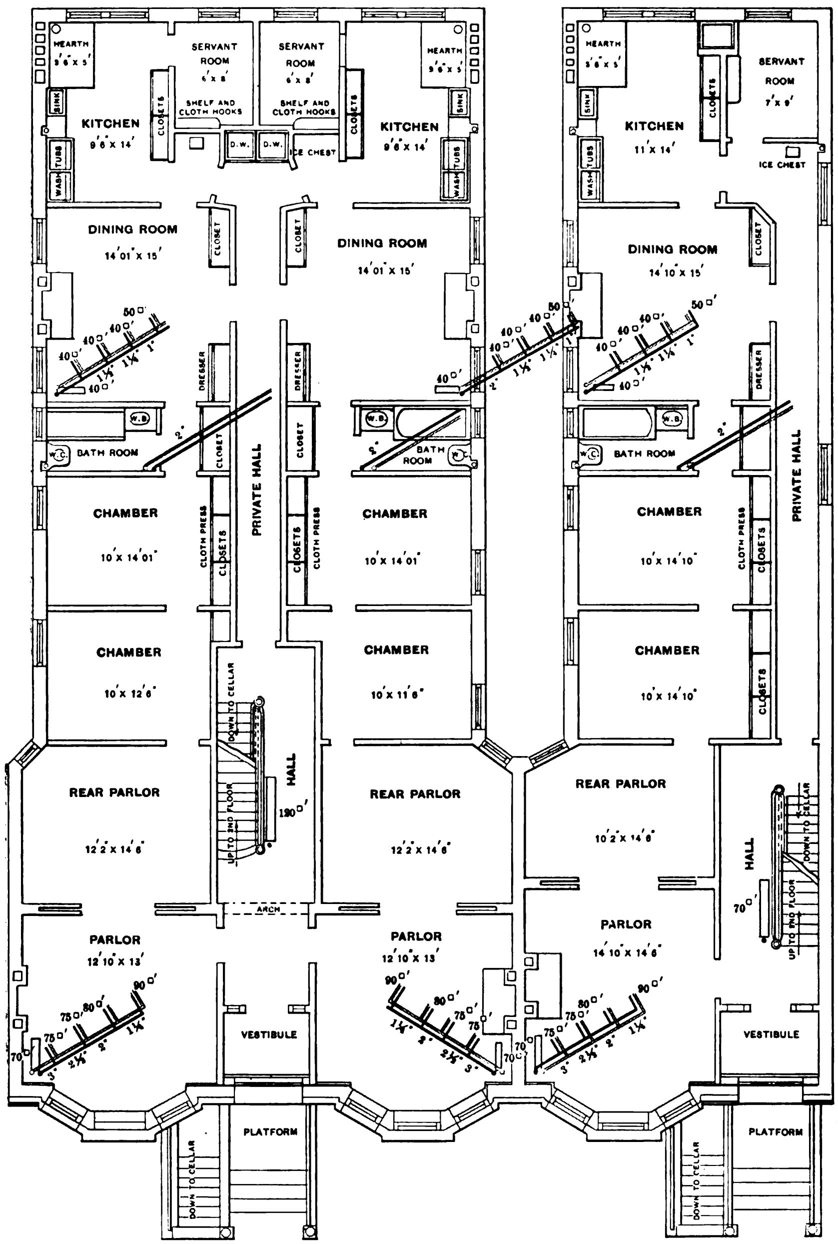


Fig. 2.—Floor Plans, Showing Location of Radiators.

HEATING AND VENTILATING IN CALIFORNIA.

AT A LATE meeting of the Santa Clara County Medical Society, at San Jose, Cal., the main interest, says the San Jose *Mercury*, centered in Dr. H. J. B. Wright's paper on "Heating and Ventilating."

"These two things," said Dr. Wright, "are so closely connected it is best to consider them together. The means used to heat and ventilate the different churches are much alike. Two or three churches may be taken as fair types and one school house may be taken as typifying all the other school houses in San Jose.

"The Second Presbyterian Church is warmed by means of a hot air furnace, the air coming to the furnace through an inlet tube, the distant end of which is outside the building. This air, having been heated, is carried by means of great pipes to the floor of the audience room. In the highest point of the ceiling is a ventilator through which the upgoing heated air may pass out of the room. If this opening is found to be inadequate the windows are opened. The supply of air and the manner of heating it, as found in this church, are ample and efficient, but the hole in the ceiling allows the escape of much heat, while it is insufficient as a purifier of the air in the room and the opening of the window causes a draft.

"St. Joseph's Church is heated by means of steam in coils of pipes placed near the walls. Fresh air is admitted through the doors and windows, which, with a so-called ventilator in the ceiling, forms the means of ventilation. The room having a large cubical capacity, and the great doors being frequently opened, the air does not become very impure, but the system of ventilation is faulty because of the currents of cold air that rush in through the great doors.

"The audience room of the First M. E. Church is warmed by means of hot air admitted to the room through openings in the floor. The impure air is supposed to escape through ventilating shafts in the walls. The openings into the shafts are placed near the door and at a point about 12 feet above the floor. In practice these ventilators are found insufficient, and then the windows are opened and the drafts of cooler air fall upon the heads of the unsuspecting congregation.

"In very many of the churches of this city heat is supplied by stoves. Cool air is admitted through the badly fitting windows and the cracks in the floors. As it rushes toward the stove to displace the heated and rarified air it abstracts the heat from the congregation, giving some persons cold feet and others cold in the head. When the air is found to be superheated opposite windows are opened and the hot air rushes out at one side of the building and cold, fresh air rushes in at the other.

"All the public school rooms in San Jose are warmed by means of stoves placed at such points in the rooms as the flues or the convenience of the pupils will permit. There are five more pupils in each school room in this city than there should be. The Normal School building is the only house in San Jose that is properly heated and ventilated. The system used may not be economical, but it is effective. Hot air is forced by fans through large tubes and thrown into the recitation rooms at a point about 10 feet from the floor. Having settled upon the pupils, bringing warmth and oxygen to them, and taking from them noxious exhalations, particularly carbonic acid gas, it makes its exit through an opening near the floor into a ventilating shaft and mingles with cooler air at the top and outside the building. The windows, it should be observed, are not used for the escape of vitiated air, nor for the admission of fresh air. The fans, run by an engine, drive the air into the rooms. As it enters the conveying pipes near the fans it passes over heated tubes, which impart to the air the desired temperature, and these means put the quantity and temperature of the air completely under the control of the authorities.

"In conclusion I will state: 1. That there is not one church building in San Jose that is properly heated and ventilated. 2. The same is true of the school houses, except the State Normal. 3. The State Normal School is unusually well heated and ventilated. 4. Upward currents of air will carry away all deleterious impurities found in respirable air, but the currents themselves will be injurious to health. 5. Downward currents will likewise affect the air of a room. 6. All appreciable currents of air should be prevented in the ventilation of a room during cold weather. 7. Windows and doors should be made tight and should not be depended upon from the admission of fresh air as long as the temperature of the atmosphere is such as to require the room to be heated. 8. Heated air is benumbing—is an anodyne—but it is high time to get away from the error that heated air is impure and cold air pure."

LAW IN THE BUILDING TRADES.

GUARANTY OF HEATING FURNACE AN INDEPENDENT UNDERTAKING.

A CONTRACT to put in a heating apparatus provided for payments as the work progressed, such payments to be made on the architect's certificate that the work was satisfactorily done. The specifications guaranteed the apparatus to warm the house to a certain temperature. The Superior Court of Buffalo held that the guaranty was an independent undertaking a breach of which could constitute defense in an action by the contractor for the con tract price, though the achitect had given a cetificate that the work was done to his satisfaction.—Gay *vs.* Haskins, 31 N. Y. S. Rep., 1023.

BREACH OF CONTRACTOR IN FURNISHING INFERIOR MATERIAL.

A building contractor is not excused for failure to furnish the quality of material contracted for by the fact that the work done was a fair average job for that class of building. And where a building contract calls for laths 1¼ inches wide, and for No. 1 rustic and the best quality of joist and studding, and the contractor supplies laths 1½ inches wide, No. 2 rustic, and a second quality joists and studding, there is such a substantial breach of the contract as will warrant the owner in refusing to pay the contract price.—G. G. Lumber Company *vs.* Sahrbacher, 38 Pacific Rep., 635.

RETAINED PERCENTAGES NOT SUBJECT TO GARNISHMENT.

Where a construction contract provides for partial payments to the contractor as the work progresses, less 10 per cent. to be retained by the owner to insure the faithful performance of the contract, and for the payment of this percentage on the final completion of the work, the retained percentages are not subject to garnishment at the suit of the contractor's creditors, unless it appears that the contract was faithfully performed by the contractor, and that the balance of the work can be finished in like manner.—A. F. Powder Company *vs.* L. M. Coal & Iron Company, Supreme Court, Pa., 31 Atlantic Rep., 90.

ARCHITECT'S AWARD SUFFICIENT.

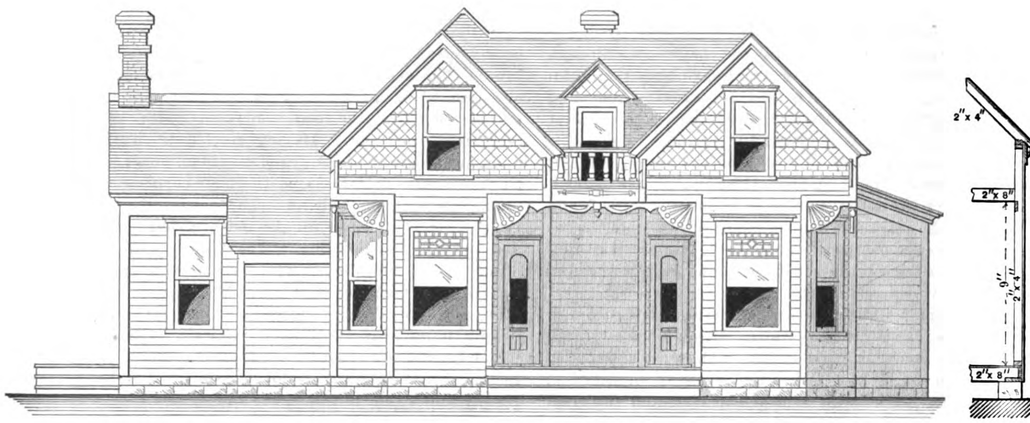
Where the building contract sued on provided that claims for extra work should be submitted to the supervising architect for decision, and the evidence clearly showed that such claim was submitted to the architect, and his award accepted by both parties, it was error to submit the question of the value of such extras to the jury.—Megrath *vs.* Gilmore, Supreme Court Washington, 39 Pacific Rep., 132.

DAMAGES FOR BREACH OF BUILDING CONTRACT.

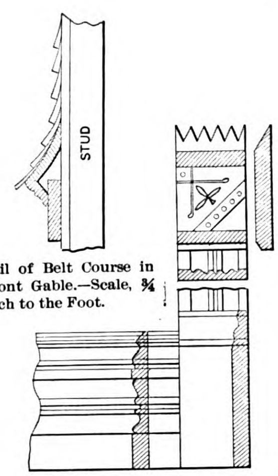
Where a building contract stipulated that the contractor should pay $10 per day as liquidated damages for every day's delay after a certain date, and the building was not finished at such date, and there is no evidence by which the actual damages can be ascertained, the amount of the recovery is governed by the stipulation. Where the owner entered and occupied a part of the building before it was finished, the damages are recoverable only from the time it was agreed to be done and the date on which the owner entered it. If the stipulation greatly exceeded the actual loss, if there be no approximation between them, and this be made to appear by the evidence, then and then only should the actual damages, under such a contract, be the measure of recovery.—Collier *vs.* Betterton, Supreme Court, Texas, 29 S. W. Reporter, 467.

A $900 Cottage.

A story and a half cottage with an arrangement of rooms which will probably interest many of our readers is illustrated in the engravings presented upon this page. The house was erected a short time ago by A. E. Green of Cleveland, Minn., for his own use, and contains a total of nine rooms, six of which are on the main floor. The sitting room and dining room are entered directly from the front porch, while the kitchen has a separate entrance from the side. A rather unique feature of the design is the location of seen from the floor plan that the sitting and dining rooms face the street, rendering them light and pleasant. The sleeping rooms, the author states, are easily warmed in winter from the stoves in the principal rooms on the main floor. The pantry is fitted with drawers and flour bin, the drawers working from both the dining room and pantry side. The kitchen, which is at the end of the house, is provided with hard and soft water, the well being located about 4 feet outside the wall and having a pipe running under the foundation wall and up to the sink. There is a 35-barrel cistern under the kitchen floor, and from it rain

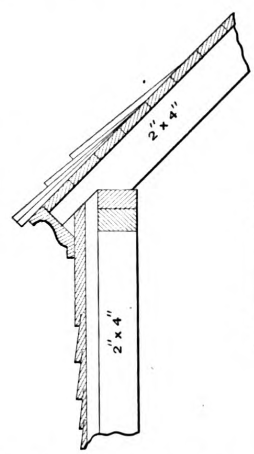


Front Elevation and Section.—Scale, ⅛ Inch to the Foot.

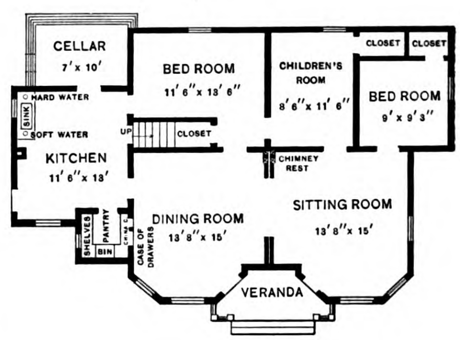


Detail of Belt Course in Front Gable.—Scale, ¾ Inch to the Foot.

Details of Inside Finish.—Scale, 1 Inch to the Foot.



Detail of Main Cornice.—Scale, ¾ Inch to the Foot.



Main Floor Plan.—Scale, 1-16 Inch to the Foot.

A Nine Hundred Dollar Cottage.—A. E. Green, Architect and Builder, Cleveland, Minn.

the cellar, which is not under the house, but is on a level with the kitchen floor. The builder refers to this as being of great advantage by reason of its convenience, and it is said to be more healthful than it would be if placed under the floor, especially if the opportunities for draining are poor. This cellar is said to be frost proof, last winter, which was very severe in that section, having successfully demonstrated this point. The walls are 18 inches thick, with four air spaces, the stone wall being banked with dirt on the inside to the top, and the joists are grouted between with lime and sand 3 inches thick. The floor consists of a layer of rough boards, then a layer of brick in cement, which, in turn, is covered with a layer of cement and fine gravel 1 inch thick. The house occupies a double lot and faces the south. It is finished inside with oak filled and varnished with three good coats. It will be water can be readily pumped at the sink. Nine hundred dollars is said to have been the total cost of the cottage.

According to some of the English architectural papers an investigation of the means to be adopted for more efficiently warming school buildings has been concluded by a special sub-committee of the London School Board. This committee after consulting the architect and heating engineer are of the opinion that 10 superficial feet of warming space for every 1000 cubic feet of area should be required as the standard up to which it is desirable to work, it being understood that this standard should be raised to 12 feet in the case of the top floor and also in the case of those class rooms situated furthest from the furnace and subjected to a greater amount of cooling surface.

The Builders' Exchange

Directory and Official Announcements of the National Association of Builders.

Officers for 1896.

President,
Charles A Rupp of Buffalo.
First Vice-President,
H. J. Sullivan of Milwaukee.
Secretary,
William H. Sayward of Boston.
Treasurer,
George Tapper of Chicago.

Directors.

Noble H. Creager	Baltimore.
E. Noyes Whitcomb	Boston.
John Feist	Buffalo.
William Grace	Chicago.
Frank L. Weaver	Lowell.
Louis A. Clas	Milwaukee.
Stephen M. Wright	New York.
Stacy Reeves	Philadelphia.
Thomas B. Ross	Providence.
Justus Herbert Grant	Rochester.
Thomas J. Ward	St. Louis.
George J. Grant	St. Paul.
A. S. Reed	Wilmington.
George H. Cutting	Worcester.

New York State Association of Builders.

The State Association of Builders of New York was permanently organized at a meeting held December 11, in the rooms of the Building Trades Club of New York City.

Delegates were in attendance from Batavia, Buffalo, Brooklyn, New York City, Rochester and Utica. The meeting was one of unusual significance in the history of the building interests of the State, and marks the beginning of a concerted and systematic effort to bring about many much needed improvements in the conditions now prevailing in the building business.

The meeting was presided over by John L. Hamilton, the chairman of the temporary organization, and J. C. Almendinger of Buffalo was temporary secretary.

Hon. John Jeroloman, president of the Board of Aldermen, made a brief and interesting address of welcome on behalf of the city, and then Mr. Isaac A. Hopper welcomed the visitors on behalf of the Mechanics and Traders' Exchange, of which he is president. He briefly rehearsed the benefits to be derived from united action by the builders of the State, and pointed out some few of the evils needing correction.

Chairman Hamilton stated briefly the purpose of the meeting, and then appointed a Committee on Credentials.

President Chas. A. Rupp of the National Association of Builders was called upon by the chairman for a few remarks, and he responded by saying he was heartily in favor of the existence of a State association, and believed in its future success. Wm. H. Sayward, National Secretary, stated that one of the cardinal principles of the work of the national body was better organization throughout the entire fraternity, and especially at the root, the local exchange. The function of the State organization was defined, in part, as being to create a wider interest and fresher concern among builders within the State in the welfare of the whole, and to define and foster better organization among the builders in the several cities, to the end that unity of action may be made possible and effectiveness secured. The intricacies of the labor problem; the complications arising from lack of method in conducting business between general and sub contractors, between sub-contractors and dealers in building materials, and numerous other conditions need urgently the attention of the most intelligent minds among the builders of the State. In order that action may not be immature and careless the National Association has prescribed a form of organization based upon wise and safe principles for local exchanges, and it is a part of the work of the State association to show to the builders within its jurisdiction the wisdom of a sound and enduring foundation upon which to build a harmonious relationship that shall last.

At this point a recess was taken in order that the Committee on Credentials might prepare their report. When the convention was called to order again the committee reported a total attendance of about 50, including the visitors.

The business of permanent organization was formally opened by a preamble and resolutions offered by Stephen M. Wright. The first proceeding was the unanimous adoption of the form of constitution for State associations as prescribed by the National Association of Builders. The chairman then appointed Stephen M. Wright, John Fiest and F. P. Stallman a Committee on By-laws, and on motion the meeting adjourned to give the committee time to prepare a report. During the recess the delegates and visitors partook of refreshments tendered by the Mechanics and Traders' Exchange, in the rooms of the club.

Upon the convention being called to order again the report of the Committee on By-laws was read, and the by laws as reported were adopted without material change. As adopted the by-laws are as follows:

ARTICLE I.

MANAGEMENT.

In accordance with the constitution of this body the general management of its affairs is vested in the presidents, secretaries and treasurers of the various associations in regular membership under the provisions of said constitution, and these by-laws are framed, adopted and established to further define the duties of the said Board of Management and the officers of the association, and to define and fix the methods of operation of the association.

This Board of Management shall carry out all orders of conventions and meetings of the association and endeavor to secure a following of its recommendations as well as a following of the recommendations of the National Association of Builders. In the absence of definite instructions, orders or recommendations of the association, this board shall have authority to act for the body during the interim between conventions or meetings as its best judgment may dictate; but such action, if taken, shall be submitted for approval, disapproval or revision at the next succeeding meeting of the association.

Article II defines the duties of the several officers in the manner usual to by-laws.

ARTICLE III.

COMMITTEES.

Executive.

There shall be an Executive Committee, consisting of the president, vice-president, secretary and treasurer. This committee shall have power to enlarge its numbers for special service, by selection from the membership at large of the various associations in membership. This committee shall be charged with the special duty to observe, investigate and report to the Board of Management upon any action proposed in legislative bodies that may affect the interests of builders; they shall prepare such forms of legislation as they may deem wise and for the best interests of the building trades; they shall make such recommendations as they may deem wise and necessary for the welfare and to promote the objects of the association, and shall present their views to the Board of Management on all these points for its consideration and action.

They shall have authority to employ all necessary assistance to carry out their duties as set forth in this article.

Membership and Extension.

The president shall appoint from the Board of Management or the membership at large a committee of three on Membership and Extension, whose duty shall be to promote the organization of local associations and extend the membership of this association.

Such other committees as the association shall deem necessary may be appointed from time to time. All committees shall report in detail their doings to the annual meeting and at such other times as requested.

Article IV provides for annual meetings, 30 days' notice of which must be given by the secretary. Special meetings may be called upon the written request of five members of the Board of Management, or by order of the Executive Committee, and special meetings of the board may be called at 48 hours' notice by telegraph.

Article V covers representation, and is in harmony with the requirements of the constitution, which has already been presented in these columns.

Article VI refers to the annual dues, and is based upon the same clause in the old constitution of the National Association.

Article VII defines a quorum as representation from a majority of the constituent bodies.

Article VIII provides that amendments can only be acted upon at an annual convention and by a two-thirds vote of all delegates present, and that 60 days' notice of proposed amendments must be given by the secretary.

Articles IX and X respectively cover the order of business and the rules governing debate.

The election of officers for the ensuing year resulted as follows:

President, Isaac A. Hopper of New York City.

Vice-President, Justus Herbert Grant of Rochester.

Secretary and Treasurer, John C. Almendinger of Buffalo.

The assessment was fixed at $1 *per capita*, and the board empowered to call for more if necessary.

Resolutions expressing appreciation of the earnest efforts in behalf of the new association made by Mr. Hamilton during the term of his chairmanship were passed with a will, and similar resolutions expressing thanks for the untiring service of Mr. Almendinger during the same period of the temporary organization, were passed by a rising vote.

After fitting resolutions of thanks to the Building Trades' Club for the use of their rooms, and the Mechanics and Traders' Exchange for their entertainment, and both for their generous hospitality, the convention adjourned.

The delegates from Batavia, Brooklyn and Utica were in hearty accord with the action of the convention, and promised to urge their respective organizations to join the State Association at once.

Massachusetts State Association.

A meeting of the Builders' exchanges in Massachusetts has been called for January 16, at the rooms of the Master Builders' Association, Boston, for the purpose of organizing the branch of the National Association for that State. The secretary of the Boston Exchange has issued the call, and it is hoped that on the date mentioned the State Association may be organized and made ready for business.

There are a number of exchanges in the State not now affiliated with the National Association that it is hoped will join as soon as the State Association is perfected.

"Code" Precedent.

The following is taken from the secretary's annual report of the Builders' Association Exchange, at Buffalo, to the National Association, and is printed for the benefit of the members of exchanges throughout the country, as an example of the practical results to be achieved by careful organization and united action:

On June 4, 1895, Jacob Reimann, a member of this exchange, received the following invitation:

GREEN & WICKS, Architects,
110 Franklin Street, Buffalo, N. Y.,
June 4, 1895.

MR. JACOB REIMANN,
174 Ellicott street, Buffalo, N. Y.:

DEAR SIR: Please call at our office, examine plans and specifications for proposed factory for Messrs. M. H. Birge & Sons, and submit proposal covering the following branches of work:

Mason work.
Cut stone.
Iron work.
Carpenter work.
Roofing work.
Paint and glazing work.

Estimates will be opened in our office, at 12 o'clock noon, Wednesday, June 12, 1895.

The owner reserves the right to reject any or all bids, subject to provisions of Article 12 of the Code of Buffalo Builders' Exchange Association.

Yours very truly,
GREEN & WICKS.

Article XII, referred to in the invitation, provides that should the owner proceed with the work within 60 days from the date on which the bids are submitted, and refuse to contract with the lowest invited bidder, the said owner shall compensate the lowest invited bidder.

On the date of the opening of the bids, Mr. Reimann's bid was the lowest. In the course of a few days it was officially announced that the contract had been awarded to other parties instead of to Mr. Reimann. Mr. Reimann thereupon presented a bill under the section of the code above mentioned for his compensation for estimating, which in this case amounted to $110.87. M. H. Birge & Sons refused to pay the same, claiming that Mr. Reimann was not the lowest bidder; that in his bid he had omitted the wire work, which amounted to $425, thereby making the parties to whom the contract was awarded the lowest bidders. The carpenter specifications provided for a number of things that the carpenter was to include in his bid; among these was the wire work. Mr. Reimann, in submitting his bid, stated that his bid included the carpenter work, and also mentioned several of the things, but did not mention the wire work; but at the same time stated his bid included everything in the carpenter specifications.

The parties took the ground that because he did not specially mention the wire work his bids did not include it, and refused to pay the bill.

Upon July 24 Mr. Reimann, through his attorney, Charles H. Ribbel, began an action for the recovery of $110.87 and costs. On August 28 M. H. Birge & Sons put in answer a general denial. The trial was postponed from time to time, and finally set for hearing for September 19. Mr. Reimann's attorney insisted that the case should proceed, but instead of allowing it to proceed, they settled by paying Mr. Reimann's claim in full.

The secretary says: "This being the first case in which our code has gone into the courts, has created considerable interest, though it did not come to trial, for which we are very sorry, as we should like to have had all the points thoroughly contested; still, under the circumstances, we cannot but consider it a great victory for the exchange."

National Iron Roofing Association.

The annual convention of the National Iron Roofing Association will be held at the Grand Hotel, Cincinnati, Ohio, January 8 and 9, 1896. As will be noted, two days will be devoted to the affairs of the association. The first meeting, however, will be more especially for the benefit of all manufacturers and producers of sheet metal roofings and kindred goods, irrespective of whether they are members of the association or not, and which all are invited to attend. It is hoped that by so doing the scope and aims of the association will be more thoroughly discussed and will undoubtedly prove interesting, particularly to non members. A number of special papers have been prepared for reading which will prove of the greatest interest.

CONTENTS.

— ABSTRACTION. — Tommy: "Papa, there is a large black bug on the ceiling." Professor (very busy): "Step on it and leave me alone."—*Fliegende Blatter.*

— SERVED HIM RIGHT.—"Woman," said the dejected young man, "is a fake."

"Yes?" spake one listener.

"Yes. It has not been so many moons since I saved up all my billiard money and lived on beans two weeks to blow myself on an opera and a supper for a young woman. Then I asked her to marry me, and she said she was afraid I was too extravagant to make a good husband."—*Indianapolis Journal.*

Carpentry and Building

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ENTERED AT THE POST OFFICE NEW YORK, AS SECOND-CLASS MATTER

NOVELTIES.

Cold Swaged Nail Sets.

Buell Bros. of Clinton, Conn., are putting on the market nail sets as shown in Fig. 1 of the accompanying cuts. The nail sets, of which there

Novelties.—Fig. 1.—Cold Swaged Nail Sets.

are three sizes put up in a turned wood box, have depressed corrugations on the corners. The depressions are formed so that a slight burr is thrown up, to secure a firmer hold for the fingers. The sets are formed by a process of cold swaging, and are oil tempered. It is stated that they will not break under blows, or will not batter at the points. The sets are furnished in boxes of assorted sizes, as shown, also by the dozen.

The Nason Mfg. Company,

71 Beekman street, New York City, have issued a catalogue, the cover of which is notable for its novelty and beauty, the front, presenting the name of the company and the dates 1841-1895, being illuminated like a mediæval missal. The decorative design is printed in blues and reds, and the effect is at once striking and beautiful. It should be added, however, that the value of the publication is not in its binding, for the contents embrace such a vast amount of information that it cannot but be appreciated by even those who are insensible to the artistic merit of its covering. Particular attention is directed in it to the Nason patented specialties, including the well-known Equator and Gulf Stream heaters, also steam traps ; but a host of other articles are alluded to in the 366 pages that comprise the volume. In the earlier pages wrought and steel metal pipe, fittings, cast iron pipe, flanges, steam fitters' supplies, hangers, valves, cocks, steam bibbs, lubricators, whistles, &c., are noted. Then come a number of pages given up to plumbers' brass work, wash basins, washtubs, bathtubs, pumps, chandeliers, gas fixtures, fittings, &c. A number of pages are devoted exclusively to plumbers' and gas fitters' tools and these are followed by patent die stocks, pipe vises and wrenches. Steam couplings, return steam traps, indicators, governors, pulleys and hangers cover a number of pages. Steam pumps are similarly noted, likewise vertical and horizontal boilers. Blowers and forges and packing of all sorts come next; then water meters. One section of the book is given up to the Nason steam and hot water heaters, which are fully described and illustrated. Radiators are similarly noted at length, some 30 pages being devoted to the subject. The last section of the book, from page 312 to the complete alphabetical index, which begins on page 349, is entitled "General and Practical Information Pertaining to Steam and Hot Water Heating," which was specially compiled for the Nason Mfg. Company from standard works. It is an excellent treatise on the subject and embraces many valuable tables.

A HALF-TONE engraving, printed on a sheet of coated paper, illustrates a 48-inch Globe ventilator manufactured by the Globe Ventilator Company, Troy, N. Y. The cut makes a most excellent advertising circular, and to show more vividly the size of the construction two men are standing beside it and are quite dwarfed by the mammoth ventilator.

Improved Self Feed Blind Slat Tenoner.

An improved machine for tenoning slats for both inside and outside blinds is that shown in Fig. 2 of the accompanying engravings, made by the Rowley & Hermance Company, Williamsport, Pa. The machine embodies a number of important improvements, one of which is a holder for self tightening and self releasing jaws, which hold the slat firm while it is being tenoned and release it when the tenon is completed, thus making each tenon round and true. The arrangement of parts is such that the jaws will allow a variation of 1/8 inch. This, we understand, is another new feature, and is covered by letters patent. The device for holding the slats is self centering, although it is so arranged that the tenon can be placed nearer one edge if so desired. The slat is moved to the saw and two tenons cut and divided by one motion of the foot treadle, thus making the operation quick and accurate. The stop which determines the length of the slat is referred to by the makers as simple and positive, and as admitting of no variation in the length of the slats. The machine will tenon slats from 3/8 inch up to 2 1-16 inches in width, and from 1½ inches to 24 inches in length. The machine has no complicated parts to get out of repair and can be readily operated. The tight and loose-pulleys are 6 x 2½ inches and should make 900 revolutions per minute.

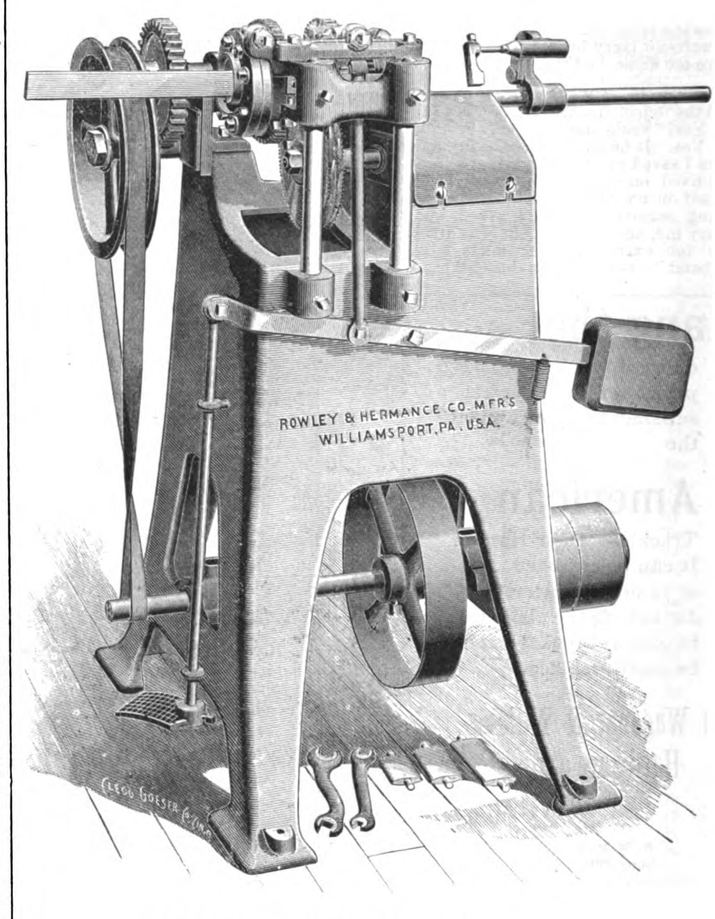
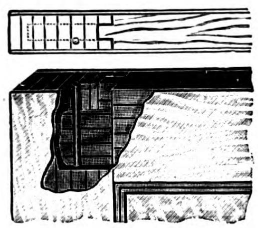


Fig. 2.—Improved Self Feed Blind Slat Tenoner.

The Phœnix Veneered Door.

An interesting feature of the veneered doors which constitute a specialty of the Phœnix Sliding Blind Company of Phœnix, N. Y., is represented by means of the broken and sectional views shown in Fig. 3. This patented feature is a hard wood dowel driven into the ends of the stiles and through the sides of the tenons before the doors are taken from the clamps, thus making it absolutely impossible, the makers state, for the stile to spring away from the rails. The company state that the value of this feature is greatest in connection with front, vestibule and all outside doors, for the



*Novelties.—Fig. 3.—**Broken and Sectional Views of the Phœnix Veneered Door.***

reason that these are most exposed to changing conditions of the atmosphere. As veneered doors are made up of laminated pine cores, the moisture is drawn out of the ends of the stiles and in contact with the glue, which, being soluble in water, becomes softened, so that without the patented dowel the stile is very apt to leave the end of the rail. This makes an open and unsightly joint, which the principle of construction employed by the company is said to fully overcome. The class of work turned out by the Phœnix Sliding Blind Company is of the finest grade and is produced from architects' details. The company also give attention to inside sliding blinds, wainscoting, ceiling and coves veneered on compressed pulp.

The Champion Improved Sash Lock.

We show in Fig. 4 of the accompanying cuts the Champion improved meeting rail sash lock, offered by the Champion Safety Lock Company, Cleveland, Ohio. The lock is referred to as combining new points of merit with the essential features of the Champion lock, which has been made by the company for the past eight years. The manufacturers explain that the lock is simple, having but five parts ; that the working parts are of

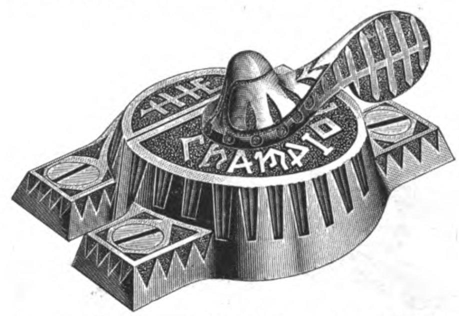


Fig. 4.—Champion Sash Lock, Ornamental Finish.

malleable iron, strong and durable ; that it operates easily, adjusting the sashes and drawing them together successively ; that it locks the window and locks itself automatically, making a secure fastening, and that a special feature of the improved lock is that the knob is the highest point of the lock, thus preventing damage to the upper casing when the window is thrown up. The locks are made in three sizes, all of popular finishes, or in any special finish desired.

The Barnes No. 4 Circular Saw.

For the purpose of meeting the demand for a foot and hand power circular saw covering a wider range of work than either their hand circular rip saw or their combined machine, the W. F. & John Barnes Company of Rockford, Ill., have brought out what is known as a No. 4 circular saw, illustrated herewith. The machine is made strong and rigid, the table being of iron planed true. While it is designed particularly to be used by hand or foot power, it can be driven equally well by steam or other suitable means. When used as a hand and foot power circular rip saw with self feed the latter can be regulated for hard or soft, thick or thin lumber, and is self adjusting for lumber of different or uneven thicknesses. The makers state that with a 10-inch saw lumber up to 3½ inches thick can be ripped, or with a 12-inch saw up to 4½ inches. The machine can be used as a cross cut saw by throwing back to the rear the self feed mechanism, leaving the table clear for cut off work. The self feed mechanism can be put in position for use or thrown back out of the way without the use of a wrench or the removal of any nuts or bolts. The cut off gauge can be set at any angle required. The construction of the machine is also such that it can be used for rabbeting and grooving, the high speed of the cutter heads insuring smooth and clean cut work. The cutter heads may also be used for gaining and dadoing, and with knives of suitable width for jointing. The table can be adjusted up or down so as to regulate the depth of grooves or rabbets. The machine is provided with a boring attachment which is the same as that used on the company's combination machine. Fig. 5 of the illustrations represents the machine arranged for ripping with the self feed mechanism in position, while Fig. 6 shows the machine with the self feed arrangement and rip gauge thrown back with the table clear for cut off work. The machine can also be used with a special universal gauge which particularly adapts it for the use of picture frame makers or for any other work where a perfectly accurate joint is required. The manufacturers state that the use of their patented perforated belt running over a spur or pin pulley is an important factor in machines of this kind. They state that it enables them to use a short belt from the drive wheel to the saw mandrel, thus securing great speed without loss of power. The perforated belt also allows the use of a smaller pulley on

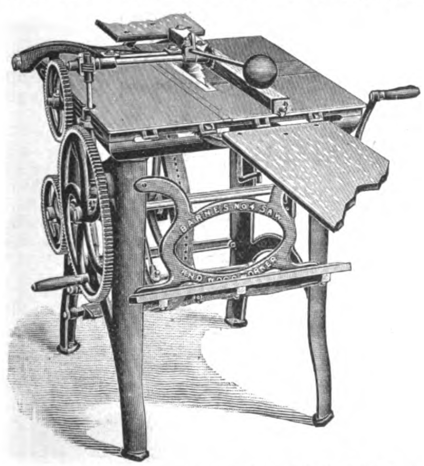


Fig. 5.—Machine Arranged for Ripping with the Self Feed Mechanism in Position.

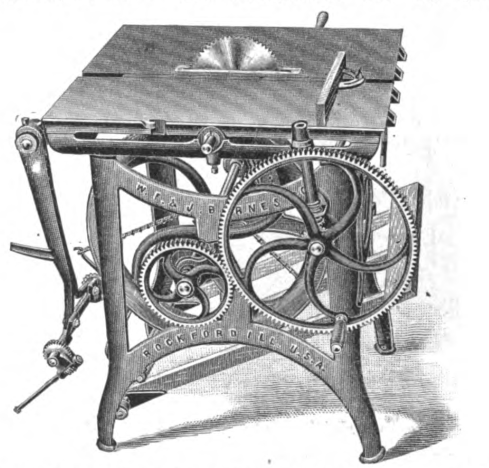


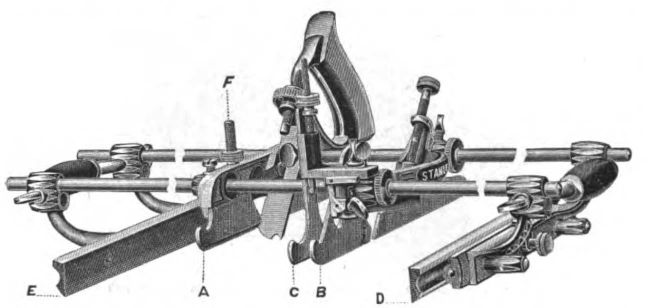
Fig. 6.—View of the Machine with the Self Feed Arrangement and Rip Gauge Thrown Back.

The Barnes No. 4 Circular Saw.

the mandrel than would otherwise be possible, and the pulley being entirely below the table the full depth of cut of the saw is secured.

Stanley's Patent Universal Plane.

One of the most interesting and valuable tools which has yet been brought to the attention of carpenters and builders is the patent universal plane, which is just being placed upon the market by the Stanley Rule & Level Company of 29 Chambers street, New York City. The arrangement of parts is such that in the hands of an ordinary carpenter the tool can be employed for all lines of work covered by a full assortment of so called fancy planes. The illustrations which are presented herewith give an excellent idea of the construction employed and the manner in which the tool is used. Referring to Fig. 7 of the cuts, the plane consists of a main stock A, with two sets of transverse sliding arms, a depth gauge F adjusted by a screw, and a slitting cutter with stop. The letter B refers to the sliding section having a vertically adjustable bottom. The auxiliary center bottom C is designed to be placed in front of the cutter as an extra support or stop when needed. This bottom is adjustable both vertically and laterally by means of thumb screws and nuts provided for the purpose and clearly shown in the engraving. In connection with the tool are two fences E and D. The latter fence has a lateral adjustment by means of a screw for extra fine work, while fence E can be reversed for center beading wide boards. The fences can be used on either side of the plane, and the rosewood guides can be tilted by simply loosening the screws on their faces, to any desired angle up to 45 degrees. When beading the edges of matched boards an adjustable stop is inserted on the left hand side of the sliding section marked B. With each plane the manufacturers furnish 52 cutters, thus permitting of a very wide range of work. In Fig. 8 of the illustrations is shown the tool as it appears when used as a molding plane. In order to employ it for this purpose the desired cutter is inserted and the bottom of the sliding section B, Fig. 7, is adjusted to conform to the shape of the cutter, after which the section is firmly fastened by means of the check nuts on the transverse arms. When so required the auxiliary center bottom can be adjusted for additional support in front of the cutter. By tilting the rosewood guides on the fences E and D moldings of various angles may be formed. For dado work the fences may be removed and the spurs set parallel with the edge of the cutter, after which a long adjustable stop is inserted on the left hand side of the sliding section. To use the tool as a slitting plane the proper cutter and stop are inserted on the right hand side of the main stock and either fence can be used as a guide. When the tool is used for chamfering the desired cutter is inserted, the fences are fastened on each side of the plane and the rosewood guides are tilted to the desired angle. The company make a large number of cutters which can be used with this tool and will furnish special cutters to order or blanks from which the workman can file up any form he may require.



Novelties.—Stanley's Patent Universal Plane.—Fig. 7.—General View, Showing Arrangement of Parts.

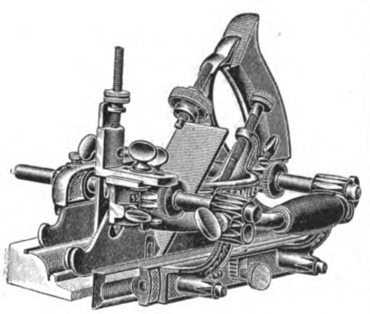


Fig. 8.—The Tool Used as a Molding Plane.

New Surface Burning Florida Steam Boiler.

The American Boiler Company, 84 Lake street, Chicago, and 94 Centre street, New York, have recently perfected and placed on the market a new and improved type of the surface burning Florida steam boiler, a sectional view of which is shown in Fig. 9. The special points to which the manufacturers call attention are as follows: 1. The heating surface has been greatly increased by deepening the corrugations in the sections. One of the features which have gained for the Florida its high reputation is its immense amount of heating surface, and in this respect a further improvement has thus been made. 2. A new and improved grate has been designed which will burn any kind of fuel, wood and anthracite or bituminous coal, including pea coal. 3. The flues are interchangeable, one of them being a return, so that the heater can be converted into a hard coal or a soft coal burner by simply placing or removing the flue caps. For instance, by placing the caps on tops of flues a hard coal heater is obtained, with indirect draft: removing the caps, a soft coal heater is provided, with direct draft. 4. In this latest pattern of the surface burning Florida the space between the top section and the dome has been greatly increased, so that no matter if the poorest quality of soft coal be used there is absolutely no danger of clogging. While this space in the old Florida was considered sufficiently large, the least possibility, if there were any, of the passage becoming obstructed is removed by the enlargement of this chamber. 5. Another improved feature is secured by increased corrugated surfaces. The pro-

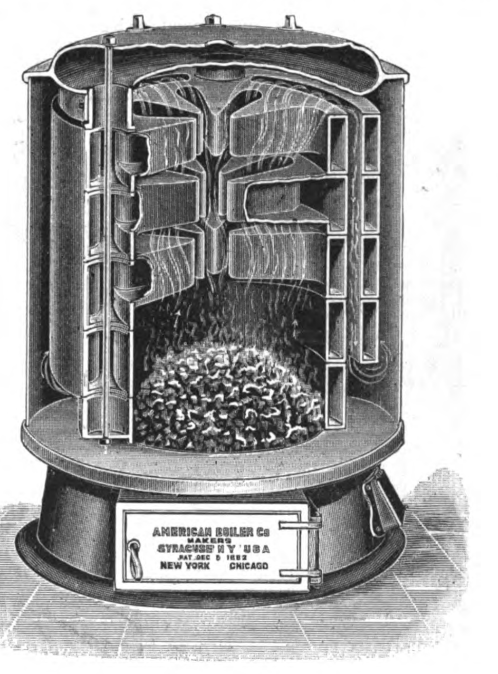
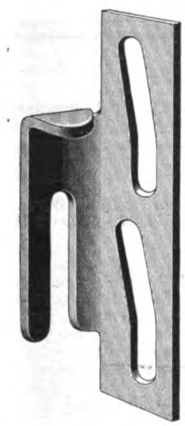


Fig. 9.—Sectional View of New Surface Burning Florida Steam Boiler.

jections, extending as they do far over the fire, by arresting the products of combustion in their course to the top of the heater, take from them a greater amount of heat than was possible in the old Florida; consequently, when the gases reach the dome they are almost devoid of heat, so that there is absolutely no danger of the dome cracking by becoming overheated. 6. In certain sections of the country it is found cheaper and more convenient to burn hard coal part of the year and soft coal in other seasons. The interchangeable flues in this heater permit it to be easily adapted to such changing circumstances. 7. The new construction is more easily accessible for cleaning, having more clean out doors.

Moore's Improved Wrought Steel Storm Window Fastener.

The Stanley Works of New Britain, Conn., and of 79 Chambers street, New York, are introducing an improved



Novelties.—Moore's Improved Wrought Steel Storm Window Fastener.—Fig. 10. —View of Outside Fastener.

wrought steel storm window fastener, to which the accompanying cuts relate. The outside fastener is shown in Fig. 10, while the inside fastener is represented in Fig. 11. The manufacturers state that with the aid of

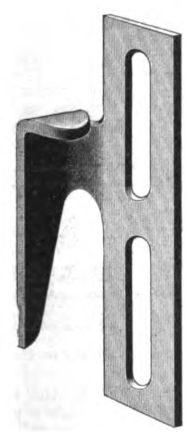


Fig. 11.—View of Inside Fastener.

these fasteners storm windows can be adjusted in a minute, and are held in place securely; also that they cost but a trifle and will last a lifetime.

The Leonard Refrigerator Insulation.

The illustration shown in Fig. 12 is a full size sectional view of one wall of a Leonard Cleanable refrigerator, and shows the efficient method of protecting the Excelsior line of refrigerators made by the Grand Rapids Refrigerator Company, Grand Rapids, Mich. The interior of the refrigerator is formed of zinc, next to which is a lining of the Bird patent water proof inodorous sheathing. Next to this is a layer of wood; then another layer of sheathing and then a packing of mineral wool, covered on the outside by a third layer of sheathing. Then comes an air space and finally the outside wood. In all there are given eight walls for insulation. The mineral wool, which is a material made by throwing a jet of steam against a small stream of liquid slag, is so expanded that it contains 92 per cent. of air and only 8 per cent. of the original substance. The refrigerators made by the Grand Rapids Refrigerator Company cover a most extended variety of all sizes for every purpose.

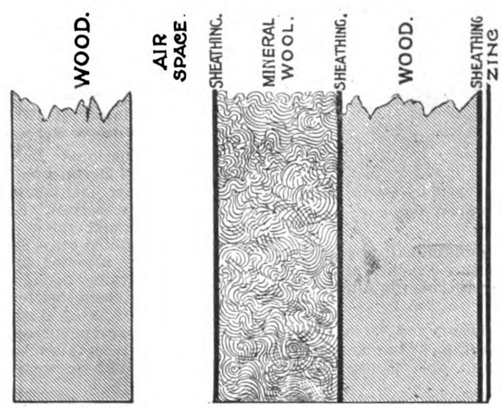


Fig. 12.—The Leonard Refrigerator Insulation.

Rotary Shackle Automatic Padlock No. 942.

The Slaymaker - Barry Company, Lancaster, Pa., John H. Graham & Co., 113 Chambers street, New York, agents, are putting on the market a padlock as shown in Fig. 13. The lock is described as being high grade, all parts of cast bronze metal, with three tumblers, phosphor - bronze springs, depressed background finished in dead black enamel, while the rest of the lock is polished and lacquered. Two rolled steel keys, nickel plated, accompany each lock, with no two alike in a dozen. To unlock, the key is turned in the usual manner, drawing the shackle into the case, where it is held automatically by the trigger shown in the opening of the case, thereby releasing the object locked. To lock, the staple or eye bolt is touched on the trigger, thus releasing the shackle, which automatically rotates and locks the lock. The point is made that the trigger, being near the top of the lock, will permit contact with the staple, no matter how short it may be, and the consequent operation of the lock. The manufacturers state that the action of the lock is positive and smooth, and that the mechanism is so arranged that the operation of the lock by the key is very smoothly and easily accomplished.

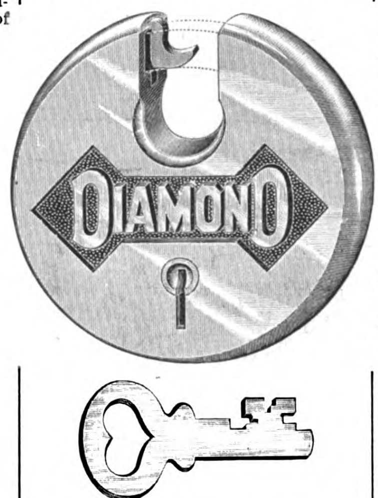
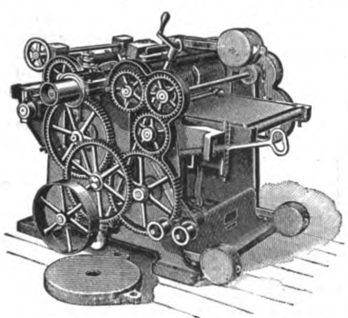


Fig 13 —Rotary Shackle Automatic Padlock No. 942.

Heavy Double Cylinder Surfacer.

The demand for a heavy surfacer with a short bed, capable of planing smoothly all kinds of lumber, has led J. A. Fay & Co. of 513-533 West Front street, Cincinnati, Ohio, to introduce the machine illustrated in Fig. 14 of the cuts. The frame is made very heavy with plate sides and girts, and supports a bed that is gibbed to planed ways while being adjustable vertically for variations in thickness. The end of the bed is arranged to swing around for ready access to the lower cylinder for the purpose of sharpening and adjustment. There are four feed rolls, each 7 inches in diameter and driven by powerful gearing. The regular feed sent with the machine is 37 feet per minute, but this, it is stated, can be changed if desired. The feed roll and bar before the upper cylinder are divided into two sections so that two pieces of material may be planed simultaneously, even though they vary in thickness. The pressure bar for the lower cylinder adjusts itself to the surface of the finished board, and has an independent vertical adjustment and swings out of the way to give access to the cylinder. The upper cylinder has journals 9 x 2¼ inches and belted on both ends. The lower cylinder journals are 8 x 2¼ inches and single belted. Both cylinders with their journals are made from a solid steel forging and are slotted on their four faces. The lower cylinder is carried in a heavy frame and is adjustable independently of the bed. A tightener is furnished to take up the belt when changing for different thicknesses. The manufacturers put a shop number on each casting by which it may be identified and also for the purpose of avoiding mistakes when the purchaser is ordering re-



Novelties.—Fig. 14.—Heavy Double Cylinder Surfacer.

pairs. The countershaft has tight and loose pulleys 12 x 6 inches and should make 900 revolutions per minute.

Scranton's Improved Tack Puller.

The Scranton Company, New Haven, Conn., are offering a tack

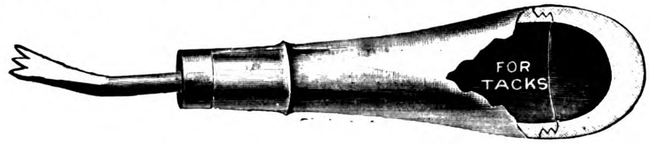


Fig. 15.—Scranton's Improved Tack Puller.

puller, as shown in Fig. 15. The jaw has three points, made of tempered steel and firmly set in the handle. The handle is of wood, hollowed to provide a place to store tacks. The puller is referred to as not tearing carpets, as pulling tacks, and as adapted to household use, being light and convenient to handle. The puller is designed to retail at 10 cents.

Belding's Ornamental Roof Gutter.

The illustration Fig. 16 shows a portion of a roof as well as a sectional view of Belding's ornamental roof

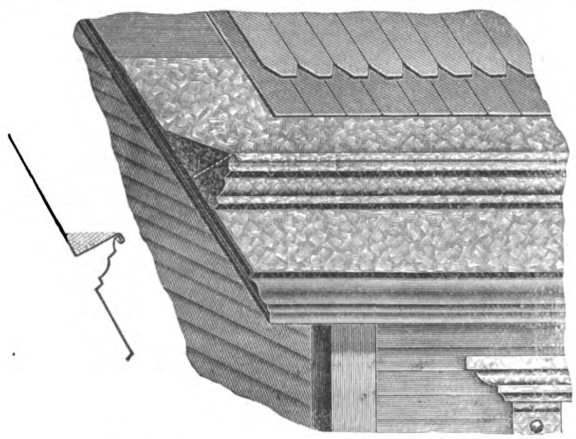
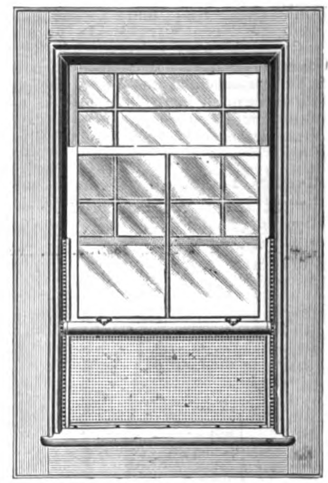


Fig. 16.—Belding's Ornamental Roof Gutter.

gutter, stop gutter and molding combined, which is being put on the market by the Canton Steel Roofing Company of Canton, Ohio. The gutter is made of galvanized iron and terne plate in 10-foot lengths and of copper in 8-foot lengths and from 12 to 30 inches wide, in two sections, which are adjustable and expanding. The system of construction will be clearly understood by the sectional view shown at the left of the engraving. The manufacturers allude to this gutter as more quickly and more easily applied than any other, gives any fall desired, will not leak and is very cheap. It is continuous, extending under the slate, tin or shingles, as shown. When the pitch of the roof is given the manufacturers can furnish miters for hips and valleys ; also pieces for closing the ends of the gutters.

International Rolling Wire Window Screen.

The International Rolling Screen Company, 113 Devonshire street, Boston, Mass., are introducing a rolling wire window screen, Figs. 17 and 18. Guide racks made in combination of hard rolled brass and enameled steel plate are screwed to the sides of the window frame, inside the window. The cylinder casing within which the screen is rolled is of steel, tinned and enameled to prevent corrosion. Within the cylinder is an inner tube of terne plate upon which the screen winds. A shaft of steel, coppered, runs entirely through the cylinder, on the outer ends of which hard rolled lacquered brass pinions are keyed and riveted. The tension spring is of steel, hard rolled and tempered. The bearing caps are of hard rolled brass, lacquered, and the foot piece, which is fastened above the window sill, is enameled steel. When not in use the screen rolls up in the cylinder casing at the base of the window, on the inside, as shown in Fig. 18, and when rolled up occupies a space $1\frac{1}{4}$ inches in diameter. The screen is raised or lowered similar to a window shade, and is wholly independent of the sash. The cylinder may be raised to any hight on the lower sash desired, raising and leaving the bottom of the lower sash the same hight as the cylinder. A weather strip is placed on the bottom of the upper sash, so that the rubber just clears the glass of the lower sash. This is to prevent flies crawling between the sash, and also serves as a weather strip in winter. The racks and foot piece are provided with felt strips to make the lower sash perfectly weather stripped when closed. The screens are furnished in colors to match the window sash, in ivory,



International Rolling Wire Window Screen.—Fig. 17.—Showing the Screen in Use.

white, cherry and oak. The point is made, that the rolling screen casings and fittings will wear many years, and that they may be painted over whenever painting the window sash; also that the copper bronze wire cloth will probably be the only part requiring renewal, and that the cloth is likely to wear for 12 or 15 years. It is stated that a competent carpenter can put in from 20 to 35 window screens per day. The following points of excellence are brought out by the

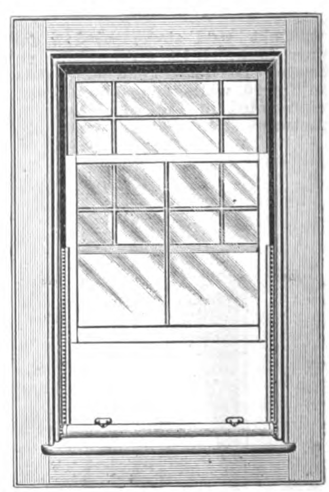


Fig. 18.—Screen Rolled in Casing.

manufacturers: When the screen is not raised it is thoroughly protected from the weather by being rolled in the case; the screen can be used at any hight of the lower sash and does not leave wire cloth behind or in front of the glass to look through; the screen operates freely and continues to do so, as it is not subjected to the swelling and shrinking of the wood work, as outside sliding screens are; that it does not require removing from the window casing the year around, but it can be conveniently taken out if desired; the screen is entirely out of the way when washing windows or when the blinds require adjusting; the screens as a whole are ornamental, and are guaranteed by the makers for five years.

The Jackson Patent Corner Grate.

Nothing makes greater economy of floor area than the corner fire place, as the space in the angle of a room is usually of comparatively little or no value. The corner fire place, however, has some serious disadvantages, especially in fitting a square grate to a triangle of brick work, and then in twisting the flue around the rim parallel with the walls. The corner grate lately patented by Edwin A. Jackson of this city is designed to overcome these difficulties and to effect a large gain in heating results. Fig. 19 shows the general appearance of the grate when open, Fig. 20 shows it when closed, while Fig. 21 is a plan of the grate. As will be seen from the illustrations, a square grate is placed with its sides parallel to the walls, one angle of which projects, owing to its position in the corner of the room. Handsome backings line each side of the fire place, while the hinges B B permit the front flanges F F to fold over, completely inclosing the grate, as shown in Fig. 20. This has the effect of practically placing the fire in a straight flue from floor to roof, the claim being made that it results in a strong draft, a quick kindling of the fire, and overcomes all tendency to smoke. When the grate is open, as shown in Fig. 19, the full effect of the fire can be seen in every part of the room, and every ray of heat strikes the back and is reflected out into the room instead of, as in the old form, being lost in the back or up the chimney. The crown piece G G hides the ashes, which drop into a pan, or can be arranged to pass to an ash pit below. A frame of brass or iron, A A, finishes the front of the grate, and around this can be set tiles or a mantel, as with other open fires. The gain in heat and the fine effect obtained from all parts of the room make this grate valuable, it is pointed out, from economic as well as decorative reasons. The manufacturers of this device are Edwin A. Jackson & Brother, 50 Beekman street, New York City, who will on application forward to those interested a copy of Catalogue No. 21.

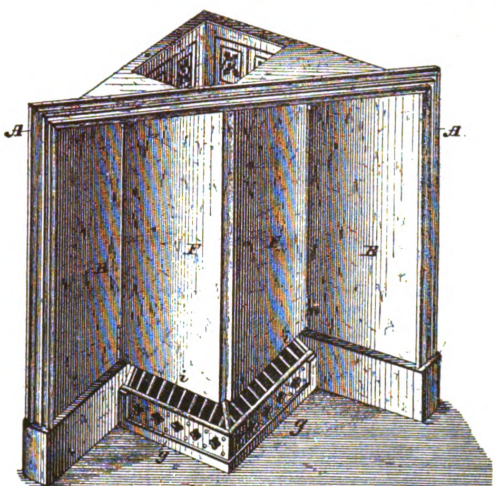


Fig. 20.—Appearance of Grate when Closed.

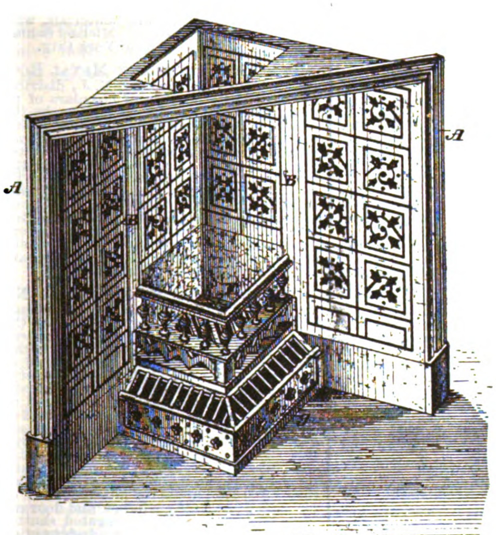


Fig 19.—Appearance of Grate when Open.

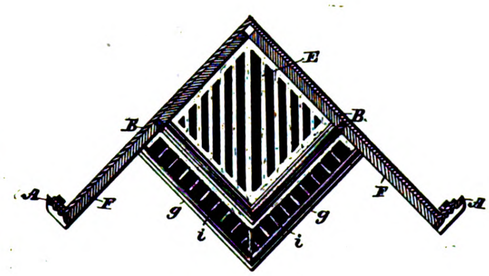


Fig. 21.—Plan View.

Novelties.—The Jackson Patent Corner Grate.

TRADE NOTES.

PIKE MFG. COMPANY, Pike Station, N. H., and 151 Chambers street, New York, have brought out a neat and well arranged sample case, so arranged as to contain in separate compartments samples of their leading specialties in sharpening stones of their manufacture. The case is 11 x 10 x 2½ inches outside, with handle and silvered mountings, weighing in all 9 pounds. Inside the various sections are lined with plush. The whetstones shown are Arkansas, Washita, Queer Creek, Hindostan, razor hone, and several styles of jewelers', scythe and axe stones.

WE are indebted to the Wheeling Corrugating Company of Wheeling, W. Va., for a copy of their illustrated catalogue relating to ceiling designs, and known as Catalogue C 170. This firm, who manufacture patent steel ceilings, tin and steel roofing, steel sidings, corrugated iron, galvanized cornices, eave trough, conductor, &c., show in the volume mentioned some exceedingly handsome examples of sheet metal work. Several pages in the beginning are given up to examples of ceiling and side wall designs, varying from simple patterns to most elaborate decorations. Then follow moldings; next come centers and friezes; then cornice borders, next ceiling and then side walls. Some large cuts later on show a complete ceiling with the paneling and centering, illustrating the whole design. Following this are views of several interiors showing the adaptation of this style of sheet metal work to libraries, offices, store rooms and other interiors. Corrugated, beaded, embossed and other plates are noted at the end of the pamphlet. The rich effects produced by sheet metal designs cannot be realized by those who have not followed the advances made in this department of manufacture during the past few years; and it is especially noteworthy that the manufacturers have brought out patterns that are adapted to the very highest class of interior work.

ON ENTERING the new establishment of H. S. Northrup of 40 Cherry street, New York, the character of the business transacted is everywhere reflected. The panels of the door are of sheet metal, the side walls of the stairway leading to the office on the second floor are covered with side wall patterns, and the ceiling is also of sheet metal design. Entering the office, the side wall patterns cover the four walls, and a handsome sheet metal ceiling meets them at the top, with a very pretty cornice at the juncture. Back of the office a sample room is fitted up for showing panels stamped from sheet metal in designs of infinite variety and varying in size up to 26 x 52 inches. The building is 31 x 60 feet, and six stories high. On the first floor are two large power presses, a 10-foot molding machine, an 8-foot power shear, and an electric motor for running the machinery on this floor, as well as an elevator and a corrugating machine, and other smaller machinery which is located on the third floor. The fifth and sixth floors are used for painting, the top floor being provided with all the appliances for painting large panels, side wall patterns and moldings, the fifth floor being used for smaller square patterns. The fourth floor is used for a stock room. Care has been taken in securing an especially strong building, and the plans, when submitted to the Building Department, with the statement that the floors would carry a burden of 600 pounds to the square foot, were returned to Mr. Northrup with no changes suggested. In the past year Mr. Northrup has enjoyed a remarkable increase in the amount of business transacted, and has met the requirements for improved building methods, as can be seen in his method of putting the ceiling on the Devonshire Building in Boston, which is ten stories high. This building was of the fire proof construction type, and the metal ceiling was fastened to metal furring strips, these strips being supported by the brick arches of the building, and the ceiling panels being secured to the furring steps by set screws.

THE proceedings of the Engineers' Society of Western Pennsylvania as published in the monthly pamphlet of the society for September, contain a paper on heat insulation with notes on asbestos prepared by John A. McConnell, chairman of the McConnell Asbestos Company, Limited, 87 Water street, Pittsburgh, Pa. The paper covers the ground in a comprehensive manner and presents information which cannot fail to interest all who require heat insulating coverings. The paper gives the results of numerous experiments as to the conducting power per square foot of various materials, while the notes on asbestos cover a brief history of the material, the places where it is found, the manner in which it is mined and other points of interest and value.

THE ADAMS ART AUGER BIT **made** by A. L. Adams of Bridgeport, Conn., has recently been introduced in the Manual Training School, at the corner of Livingston and Court streets, Brooklyn, N. Y. The outfit consisted of one set of 13 bits with 39 rosette cutters, 13 plain cutters and 13 outside brackets, with 26 cutters which execute work resembling hand carving. These, with other parts, constituted the most complete set of bits, we are informed, that Mr. Adams has over delivered.

THE NATIONAL SAW COMPANY, operating Wheeler, Madden & Clemson Mfg. Company, Woodrough & McParlin, Richardson Bros., and Harvey W. Peace Company, with general office at Newark, N. J., issue an 1896 calendar. Upon this are mentioned Wheeler, Madden & Clemson cross cut saws, Woodrough & McParlin plastering trowels, Richardson Bros.' hand and butcher saws, and H. W. Peace hand saws.

A VERY CONVENIENT COUNTING ROOM CALENDAR has been brought out by the Moore Mfg. & Foundry Company, manufacturers of hardware specialties, differential pulley blocks, door hangers, registers, &c., Milwaukee, Wis. It consists of a large leather covered frame, 6 x 10 inches, holding a pad of sheets, each sheet covering a week, with ample room for daily memoranda. A banker's calendar is pasted on the back.

FROM THE STANDARD TURNING WORKS, 122 Broadway, Cambridgeport, Mass., manufacturers of handles and turned goods of all kinds, comes to us a unique advertisement of their wares, consisting of a miniature crock, turned in wood, labeled "Boston Baked Beans." A genuine sample of the proverbial Bostonian diet, which appears at the top of the vessel, is, however, a delusion and a snare, for the esculents are securely attached to the rim, which lifts off, disclosing nested within the crock small specimens of the product of the concern in the shape of tiny handles, knobs, tops, beads, &c., in various colored woods. A card inclosed announces that the works are drepared to furnish, among other goods, tool handles, plumbers' supplies, turn pins, drift plugs, closet pulls, valve handles &c.

THE FOLSOM SNOW GUARD COMPANY, 178 Devonshire street, Boston, Mass., issue an illustrated circular relating to the Folsom patent snow guard for roofs. Some of the engravings are half-tone reproductions from photographs of buildings showing the manner in which the guard prevents the snow from sliding from the roof. There are also given sectional views showing the manner of applying the guard, together with directions therefor.

I. P. FRINK, 551 Pearl street, New York, whose justly celebrated reflectors are used so extensively, has recently equipped the following prominent buildings: Evangelical Lutheran Church, Cumberland, Md.; Baptist Church, Amherst, N. S.; St. Paul's School, Lagos, West Africa; Lutheran Church, Van Wert, Ohio; Drill Hall, Twenty-third Regiment Armory, Brooklyn; Evangelical Church, Wilkes-Barre, Pa.; Central Presbyterian Church, Akron, Ohio; Opera House, Portland, Ind.; St. Matthew's Lutheran Church, Hanover, Pa.; Holy Trinity Church, McSherrystown, Pa.; Baptist Church, Elberton, Ga.; M. E. Church, Quitman, Ga; Baptist Church, Franklin, Ohio.

THE CANTON STEEL ROOFING COMPANY have been awarded several thousand dollars' worth of work on the United States Government Post Office Building, Washington, D. C., which is now nearing completion. They have exceptional facilties for executing all kinds of architectural sheet metal work, and are having an increased demand for their heavy gauge galvanized conductor pipe, which they make of No. 18 to 28 gauge galvanized sheets. The company also manufacture square corrugated conductor pipe of either galvanized or copper.

THE FERROSTEEL COMPANY, Wade Building, Cleveland, Ohio, present in their advertising space this month an interesting announcement relative to registers made of what is known as "Ferrosteel." These registers are referred to as being handsome in design and made in a large number of sizes. The company request correspondence with architects and builders and suggest that those who are interested, write them for what is known as the "Blue Book for the Register Trade." The New England agency for these goods is the St. Louis Stamping Company of Boston, Mass.

THE NEW YORK VENETIAN BLIND COMPANY, William G. Orr, general manager, have removed their office to 304 Hudson street, New York City.

C. H. TUCKER, JR., 135 Greenwich street, New York, is introducing a 10-foot measuring rod of wood, with brass tips. They are made in a number of shapes, including ¾ and 1 inch square, ¾ x 1¼, ⅞ x 1 inch, &c., of uniform length. The graduation is by feet, subdivided into inches, halves, quarters and eighths, marked in an unfading black and covered with the best coach varnish. The rods are offered as particularly suitable for rolling mills, architectural iron works, machine and boiler shops, carpenters, masons, bridge builders, foundries, pattern shops, stone cutters and civil and mechanical engineers. The features referred to are accuracy and low cost. A yard stick ½ x 2 inches, divided by ¼ inches, is also made on the same principle.

DIXON SILICA GRAPHITE PAINT, **manufactured** by the Joseph Dixon Crucible Company of Jersey City, N. J., will be used in painting all the tin work and skylights of the Post Office Department Building at Washington. A quantity will also be used on the Capitol and the District Government Building.

WE ARE INDEBTED **to W. S. Roof of** Franklin, Ohio, for an illustrated pamphlet of Roof's patent sliding and folding doors and partitions, as exhibited at the Institute of Building Arts, at Chicago, Ill. The sections of partitions or doors are suspended from their tops by means of a rod placed exactly in their centers so as to render them perfectly balanced and at no time throwing the strain on the partition, doors or hinges. The suspending rod is hung on ball bearings, and as it is adjustable, the doors or partition can be made to swing easily. The manufacturer states that the settling of the door will not interfere with its operation. The doors and partitions are made in sections, so that they can be folded back as required with perfect ease by one man. By means of a system of interlocking the partitions and doors when extended form a solid wall that is referred to as being light, dust and, practically, sound proof. When open, they can be folded flat against each wall if needed, enabling the room to be thrown open its entire width, as the doors when folded will occupy a space not exceeding 9 inches on each side.

THE POWHATAN CLAY MFG. COMPANY of Richmond, Va., realizing the importance of dealing direct with the consumer, have canceled all of their agencies, and in the future all sales of the company will be negotiated from the home office at Richmond. The sales department will be under the management of F. H. S. Morrison, formerly of Lippincott & Morrison of Baltimore, Md., who has entered upon his duties, and who will give all matters connected with the department his personal attention. We are further informed of the intention of the company to manufacture cream white brick only, which is made necessary by the great popularity of and steadily increasing demand for these brick in the markets of New York and elsewhere. Brick manufactured by this company are claimed to be pure in color, first-class in workmanship and guaranteed not to change color when exposed to the action of the weather.

THE memorandum book issued by James A. Miller & Brother, slate, tin and iron roofers, 129-131 South Clinton street, Chicago, Ill., is a serviceable publication for the trade. It is of oblong shape, convenient for the pocket, measuring 3½ x 8 inches. It is bound in decorated manila covers and contains a large number of blank pages for memorandum purposes. At the front and back are four pages relating to the goods of Messrs. Miller & Brother, showing conductor pipes, cornices, skylights, roofing and siding, &c. Serviceable information is also given respecting sheet metals, and a calendar for the second half of the current year and the whole of next year is likewise presented.

E. C. STEARNS & CO., Syracuse, N. Y., are manufacturing a full line of carpenters' mallets, lignum vitæ included. Hickory mallets are furnished, both round and square, with mortised handles, as are also the lignum vitæ. Tinners' mallets are made in hickory and applewood with round handles. Round iron mallets with mortised hickory ends, round mallets with heavy iron sockets and round hickory mallets with iron rings are also included in the line.

THE MONTROSS METAL SHINGLE COMPANY, Camden, N. J., report business good with them. They have met with a very large demand for their goods during the season and have considerably extended their trade. They are working on the dies for some new styles of tiles, and expect to have them in readiness for their machines very shortly.

THE catalogue issued by the Sykes Steel Roofing Company, Chicago, Ill., with works at Niles, Ohio, is an oblong publication and presents illustrations and information of interest to the roofing trade. Various views of the works are shown by half-tone engravings and later on illustrations of corrugated roofing, crimped iron, &c., are presented. At the end are a number of testimonial letters and a separate page of testimonials also is distributed with the catalogue.

THE DISPLAY **recently made by W.** Jackson's Sons, at their showrooms at 246 Front street, New York, was highly interesting. Handsome fire places of wood, marble, tile and colored brick display handsome fire place linings of cast iron and antique bronze with trimming in various styles. A fine display of Venetian wrought iron andirons and fire place trimmings was made. Also basket grates for use in open fire places in various designs and styles of finish, as well as fire dogs, fenders, fire place frames in iron, antique bronze, polished brass and silver plated, some having onyx shafts. The company are doing a large trade in gas fire place heaters and grates, which are specially designed for use in apartment houses, and also in drawing rooms, to harmonize with the furnishings and surroundings.

A NEW SLATE MANUAL **and descriptive** price-list has been issued by the Slatington-Bangor Slate Syndicate of Slatington, Pa., and the company suggest that those engaged in the building trades who are interested in roofing slate write for a copy of this publication before placing orders. Reference is made to the manual in the advertisement of the Syndicate presented in another part of this issue. James L. Foote, manager of the Syndicate, states that the shipments of roofing slate for 1895 were the largest ever known and will aggregate more than 150,000 squares. He states that over 1,000,000 square feet of slate blackboards were shipped, but with all this activity, it cannot be said that the roofing slate business has been altogether satisfactory. He considers the condition of trade quiet and the outlook for 1896 encouraging.

AMONG **recent incorporations in New** York State is that of the City Fire Proofing Company of New York City, organized to manufacture fire proofing materials, whose directors are G.W. Rader, Michael Schmidt and Chas. A. Perry of New York City.

THE NATIONAL SHEET METAL ROOFING COMPANY, Jersey City, N. J., distribute to the trade a number of circulars of particular interest to the roofing trade. One relates to their sheet metal shingles, weather vanes, finials, &c. A second gives testimonial letters from those who have used Walter's patent shingles. A number of illustrations are presented on a poster which they are likewise sending to the trade. An interesting little publication of theirs is a collection of testimonial letters, all of very recent date, in fact, but a very few months old, giving opinions, covering various parts of the country, of users of their goods, all of whom speak in the highest praise of the articles.

THE catalogue issued by the New York Iron Roofing & Corrugating Company, First and Washington streets, Jersey City, N. J., is a square pamphlet, 8 x 9 inches in size, containing over 100 pages filled with information respecting the products of this firm, whose goods include a wide variety of sheet metal products for building purposes. The first illustrations show galvanized centers, and stamped plates for ceilings and side walls are similarly illustrated. Then come a number of illustrated pages given up to iron roofing laid in various ways, roll and cap steel roofing, corrugated iron roofing, angle forms, corrugated combing, caps and flashings. Stamped metal for interior finish, &c., is freely illustrated; window and door caps, rock face steel brick, corrugated shutters, &c., follow. Some handsome designs of ceilings are given later in the pamphlet and various designs of rock face sheets are noticed. Their new steel cluster tile or shingles are illustrated in various applications. A variety of miscellaneous goods for roofers and others are included in the pamphlet, which, in addition to the illustrations, contains a great deal of descriptive text.

THE PROUTY DOOR HANGER **is to be** manufactured by a new company organized at Midland, Mich. The company are to be capitalized at $30,000 and a factory will be built and stocked as rapidly as possible.

S. KEIGHLEY & CO., 49-53 Locust street, Pittsburgh, Pa., publish an attractive illustrated circular devoted to decorative metal ceilings of their manufacture. This firm, who are successors to the Capital Sheet Metal Company, Columbus, Ohio, are sole manufacturers of Moore's patent lock joint dust proof metal panels, and the illustrations presented in the publication show some exceedingly attractive examples of stamped metal and embossed plates. The ceilings are shown in different combinations of designs and various centerpieces are likewise illustrated. The trade will be interested in securing copies of this pamphlet.

CARPENTRY AND BUILDING

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
96-102 READE STREET, NEW YORK.

FEBRUARY, 1896

State Associations.

The wisdom of the movement which resulted in the creation of State associations of builders, is being proved by the interest shown in several States of the Union. New York and Massaschusetts have established their State organizations; Wisconsin has organized a temporary association, and Pennsylvania and Illinois are actively at work in behalf of the new movement. Several local builders' exchanges, at present outside of the national body and in States where it has no representation, are considering the subject in a way which it is hoped will lead to practical results. The interest in State and, therefore, in a sense local issues, seems to be vital to the builders of the country, and of a nature to make a more direct appeal than those issues which are purely national in their character. From present indications the solidity of the whole seems to have been given a fresh impetus and a greater assurance of success by the new effort.

Building Laws and Architectural Progress.

The discovery, not difficult to make, that the New York building laws—probably the best code of its kind in existence—do not meet the present or immediately prospective requirements of the building trades, has led to a demand for their revision, and a formidable commission, subdivided into many committees, has been organized to undertake this work. As might be expected, there exists a wide diversity of opinion among those most interested as to the way in which such revision should be undertaken. The question is one of more than local importance because most of the larger American cities are likely sooner or later to follow the lead of New York in whatever is found desirable or necessary in the way of statutory restraints upon individual liberty in building construction. By some it is held that the building laws should specify every detail of construction and regulate, by the highest standards to be formulated from experience, the use of every ounce of material employed in construction. Those who hold this view believe that nothing should be left discretionary with owner, architect or engineer, save perhaps what are simply matters of taste and convenience; and some would even restrict individual liberty in these respects. By others it is held that a building law, however carefully framed, and however properly adjusted to the conditions existing at a given time, soon becomes obstructive in its operations, and that the public interest will best be served by leaving the building trades as little hampered as possible by legislative requirements of any kind.

Development of Home Building.

In this discussion a great principle is involved which is often lost sight of in an effort to reach an agreement as to details which in themselves are of no great importance. Whether an attempt to regulate and direct by law a development which, in any event, is likely to take place along lines determined by considerations of self interest, is wise and beneficial or unwise and mischievous, is a question which has been discussed in one form or another since the beginning of civilization. The tendency in this country is so strongly in the direction of the assumption by government, municipal, State or national, of responsibility in matters of this kind that the question of its wisdom or unwisdom must be left to answer itself at some future time, in the light of a larger experience than we now have. Meanwhile the discussion of our building laws suggests some thoughts which are worthy of consideration by those who are most eager for the kind of "reforms" which are so often sought and so rarely attained by legal enactment. No art has experienced a development so irregular as that of home building. The first of the arts which mankind needed to learn, it promises to be the last to attain to any fixed standards. Of necessity the work of an architect reflects the demand of the time in which he lives. For him there are no lost arts. Whatever the ancients did can be done much better and more cheaply at the present time, if wanted. That it is not wanted is due to the fact that labor can be more advantageously employed in building for the present than for the future. In modern London, for example, Sir Joshua Wren would probably have to choose between going into some other business than architecture, or submitting competitive plans to speculative builders operating in the new residence districts, which are largely built up of flimsy dwellings with slight division walls, embodying every defect which experience has taught mankind to avoid in dwelling construction. "The fashion of this world passeth away." By the time these frail tenements fall to pieces, the ground they occupy will be needed for something else. The builders of such structures may be considered knaves, but certainly they are not fools. The capitalists and financial institutions which supply the money invested in speculative building operations are not in the least misled by false representations, nor deceived as to the value of the security. The kind of houses built by the tens of thousands in London are the kind most needed by the people and most profitable to the builders. So long as the conditions remain unchanged, so long will such houses be built. What is true of London is equally true of Paris, Berlin, Vienna and many other rapidly growing Continental cities.

Domestic vs. Foreign Construction.

Turning to our own country we find much in modern architecture "to make the judicious grieve," though it must be confessed that the grievance rests chiefly upon sentiment. Perhaps there is some satisfaction in the knowledge that our average construction, whether in wood, brick, stone or iron, is better than that of contemporaneous date anywhere in Northern Europe. New York, Boston, Philadelphia, Chicago and St. Louis, as representative American cities, are better built than those portions of the principal British and Continental cities which have grown up within the past 25 years. As a people we live in more comfortable houses than are found in any other country of the world. Our dwellings and business buildings are fitted up and appointed with a completeness and a regard for comfort which astonish foreign architects. There is a reason for this. During the comparatively brief period of our national life the building trades have necessarily taken rank as the most important of our great industries. To provide for our rapidly growing population, swelled by a steady inflowing tide of immigration, we have been compelled to build more houses than have been built in all Europe during the same time. Generally speaking, our people have very sensible ideas of comfort and utility. The records of the

Patent Office show to what extent the inventive talent of our people has been stimulated to meet the ever increasing and constantly diversifying demands of the building trades, and the result has been an architectural development better suited to the needs of our times than any other country of the world can show.

Standard of Architecture.

There is probably no standard by which the architecture of a period can be judged other than its adaptation to the needs of the generation which gives it birth. A people housed in mud hovels to-day may need palaces a century hence, while the palaces of a century ago may to-day serve the purpose of tenements of the cheapest and most crowded class. Mr. Ruskin may have had good reason to assert that "every brick in London is a lie," but the family comfortably sheltered by four brick walls, sufficiently substantial and weather proof to serve their present purposes, are not likely to lose sleep in speculating why Mr. Ruskin should have ventured such a generalization. Another writer of his eminence, but equal acidity of temper, has pronounced the brown stone front to be "the last ditch of architectural impudence." Perhaps it is, but it has served a very useful purpose, even though its monotony has wearied the eye. As to stability and thoroughness of construction, our standards have always been as high as the public requirement demanded. The capital which seeks investment in the improvement of real estate has no inducement to build for future generations. Every 20 years or so the character of a progressive city changes almost as completely as if periodically swept by conflagration and rebuilt. Many of the great office buildings now going up in New York occupy sites which have been two or three times built upon within the memory of the present generation. How long these modern towers of Babel, overlooking the weather vanes capping the spires of a century ago, will meet the public requirements and hold themselves together no one can tell. If the business center should for any reason shift a mile or two northward, we may, in 20 or 25 years, see these wonderful architectural experiments replaced by dwellings. Those whose capital seeks investment in such buildings have presumably taken into account every consideration which forethought and prudence could suggest. They now serve admirably the purposes for which they are built. If the next generation has new needs it will meet them in its own way. With such facts before us it may well be asked whether building laws can very well do more than reflect conditions existing at the time of their enactment, and which are so constantly and rapidly changing that such laws are likely to become, in some provisions at least, obsolete and obstructive before the machinery of enforcing them has been fairly set in motion. That the progress of any art or industry takes place under the conditions of greatest advantage to all interests concerned when as little hampered as possible is a safe general truth, and one which should be borne in mind by those who have undertaken to give New York a new code of building laws.

Lateral Motion of Brick Buildings.

One of the indirect results of the use of the skeleton construction which has become so common in connection with building operations throughout this country has been to call attention to the inefficient manner in which ordinary brick buildings are secured against lateral motion. A case in point is a building about 90 x 60, built of brick, carried up through four stories, and with two lines of girders at right angles to the front of the building. The construction, says the *Brickbuilder*, consists simply of posts superimposed upon one another with projecting iron caps carrying the girders of each floor. The floor beams are loosely tied together with iron clamps, but, although the wall runs from 20 inches in the first story to 16 inches in the upper, the question of how strong such a building would be against a sudden jar sidewise is something which is not easy to determine. Probably, if the side wall could be started enough to get a little off its center of gravity, the whole building would collapse like a pack of cards, and there would be another startling notice in the journals calling attention to such horribly bad construction; whereas, in reality, the building is constructed exactly on the lines of thousands of structures all over the country, and, were it not for the absolute necessity of lateral bracings, which the skeleton construction has manifested, it is doubtful if any one would think of condemning such a method of building.

A brick wall, in the eyes of a great many builders, will stand about all that can be put upon it, and one seldom takes into account the limits of its resistance to lateral motion. We are pretty well informed at present upon the resistance of brick work to vertical compression, but we know practically nothing of the lateral strength of a wall. In taking down a building recently in Boston, the walls were found to be some 8 feet thick outside, but with two hollow spaces, the whole being so slightly bound together that when truss plates, weighing perhaps 1000 pounds each, were lowered over one edge of the wall it was pulled out of plumb nearly 5 inches. It would seem as if it would be possible to make some experiments with the numerous old brick buildings which are being torn down nearly every day and ascertain by actual tests how much force would be required to throw a wall of certain thickness and hight sufficiently off its center of gravity to cause its collapse. Such data is very seldom collected and would be of great value.

Early English Houses.

A late issue of one of the English architectural journals contains the following relative to early English houses: The houses of the Germans on the Trajan and Antonine Columns, with their pine ends, narrow and lofty walls, and windows almost as high as the roof, exhibit a coincidence with Strutt's view of an Anglo-Saxon house, and their known fondness for solaria, or upper light rooms. Britton remarks of this house that there is no appearance of chimneys, that the doorway is in one of the gables and nearly reaches to the top of the house, as among the Britons; that above it are some small square windows, which indicate the appearance of an upper room or rooms, and that on the one side is a low shed, or wing, apparently constructed with square stones or large bricks, covered like the houses with tiles of a semicircular form, probably shingles. Strutt says that the large and grand houses were built with square stones, like those on the Trajan Column; the inferior sort being only faced at the corners with them. They had glass windows very early. Lath and plaster frame work occurs. The arches of the windows were also ornamented with stone or bricks, the latter being merely used for ornament. J. Rous says that they were low and mean, a fashion altered by the Normans, by which he seemingly alludes to their wooden buildings, with large porches before the principal entrance, great halls and roomy parlors in cities and towns, the stories jutting out over each other. We find Anglo-Saxon houses of twigs or basket work, with yards surrounded with a wall, and in these and the succeeding eras entered through an outhouse, curtains extending across the room—made of stone, paved, a convenience not universal even in Elizabeth's reign—good houses in London, with courts before them, some even with a chapel, orchard, &c., surrounded with other houses for the sake of safety. But nevertheless, timber with lath and plaster, and thatch for the roofs, constituted the chief materials in the dwellings of the English from an early period till near the close of the fourteenth century and beginning of the fifteenth, when bricks began to be used in the better sort of houses.

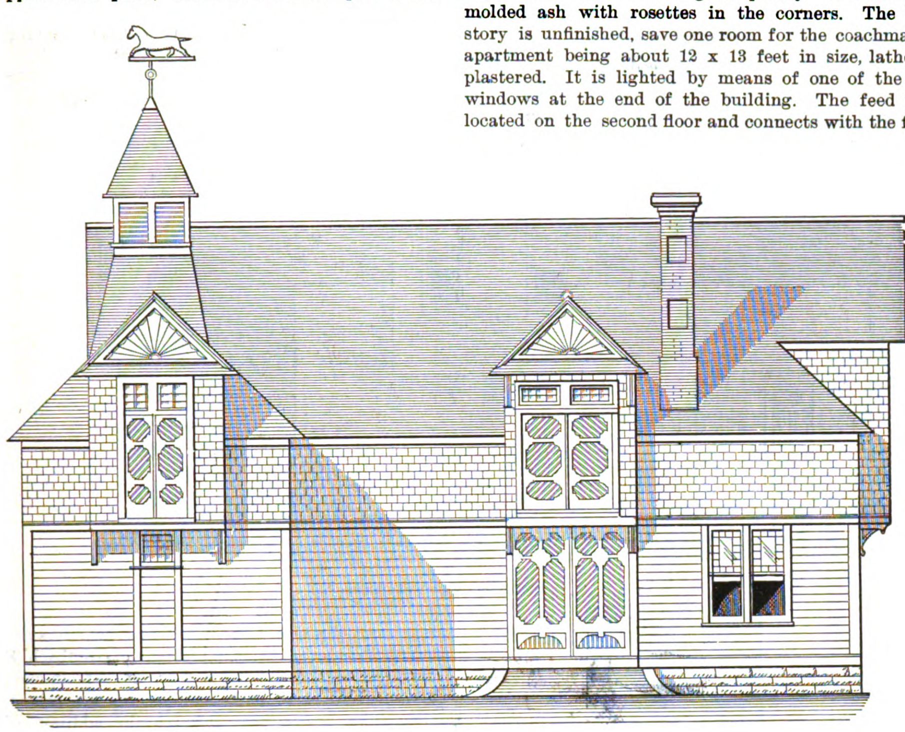
CARRIAGE HOUSE AND STABLE BUILT FOR MR. CLARE WILLARD AT ALLEGANY, NEW YORK.

E. E. CROCKER, Architect.

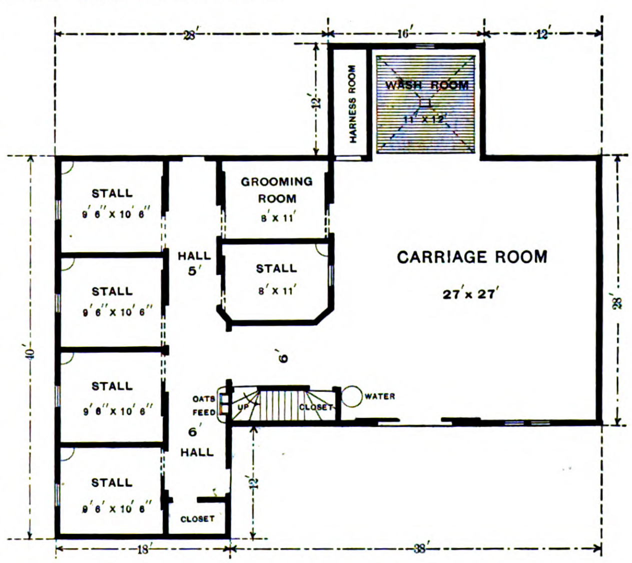
DESIGN FOR CARRIAGE HOUSE AND STABLE.

A CLEVERLY treated exterior, combined with a convenient disposition of the interior space of the building, are characteristic features of the fancy horse barn and carriage house illustrated herewith. The half-tone supplemental plate, which is a direct reproduction from a photograph taken specially for the purpose, serves to give an idea of the handsome appearance of the completed structure and its immediate surroundings. The building was erected a short time since for Clare Willard of Allegany, N. Y., from drawings prepared by architect E. E Crocker, formerly of Bradford, Pa., but who within the past month has taken up his residence in Allegany, N. Y. The floor plan shows the general arrangement of the interior so clearly that special reference to this feature is hardly necessary. From the architect's specifications we learn that the foundations are of stone, laid in trenches 2 feet deep and water cement to the top of the ground. The sills are 6 x 8 inches ; the first floor joist, 3 x 10 inches ; the second floor joist, 3 x 8 inches ; the studding, 2 x 5 inches, and the rafters, 2 x 6 inches. The studding is sheeted on the outside with sound hemlock boards covered with No. 1 pine siding and sized shingles, with building paper between. The roofs are covered with best grades of slate in different colors and patterns, forming a very neat and pretty effect, as will be seen from the supplemental plate.

The wash room on the first floor is covered with 1 x 6 inch ash strips, placed on edge and 1 inch apart, the whole being built in sections so as to be readily lifted out in case of necessity. The entire area of the floor has a hopper shaped drain underneath constructed of yellow pine laid in white lead. The drain empties in the center into a pipe for carrying off the water. The remaining portion of the main floor is of 1¼ inch matched maple. All the stalls are supplied with double thickness matched ash doors sliding on the inside, the upper portion consisting of iron bars. The interior finish of the main floor is double beaded and matched ash and oak of good quality. The casings are molded ash with rosettes in the corners. The second story is unfinished, save one room for the coachman, this apartment being about 12 x 13 feet in size, lathed and plastered. It is lighted by means of one of the double windows at the end of the building. The feed box is located on the second floor and connects with the first by means of a chute, which is larger at the bottom than at the top, so as to prevent clogging. The feed as well as the cutters and carriages are hoisted to the second floor by means of pulleys located in the gable projecting over the large doors in the front.



Front Elevation.—Scale, 3-32 Inch to the Foot.



Main Floor Plan.—Scale, 1-16 Inch to the Foot.

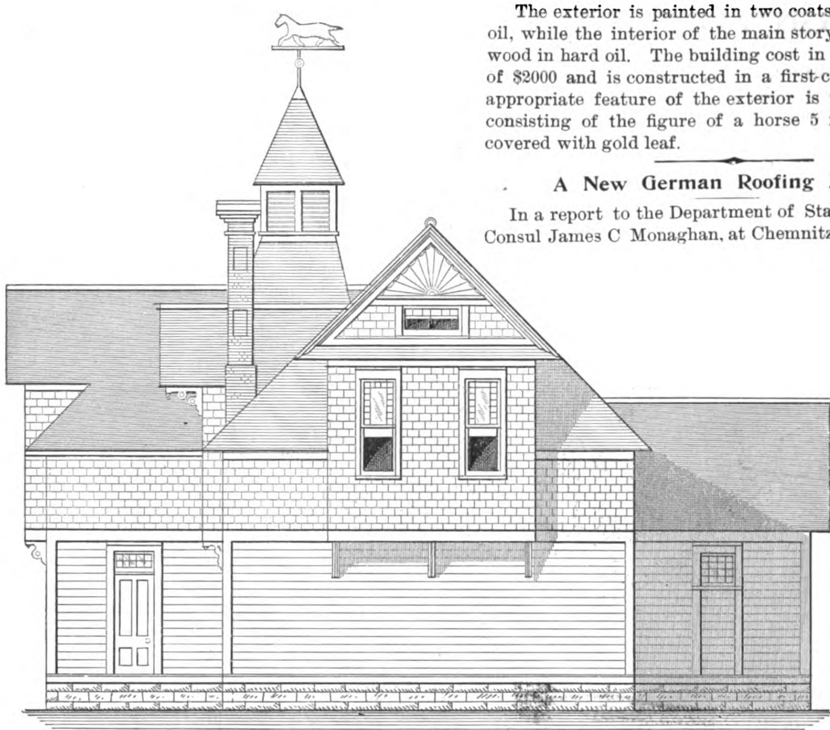
Design of Carriage House and Stable.—E. E. Crocker, Architect and Builder, Allegany, N. Y.

The exterior is painted in two coats of white lead and oil, while the interior of the main story is finished on the wood in hard oil. The building cost in the neighborhood of $2000 and is constructed in a first-class manner. An appropriate feature of the exterior is the weather vane, consisting of the figure of a horse 5 feet in length and covered with gold leaf.

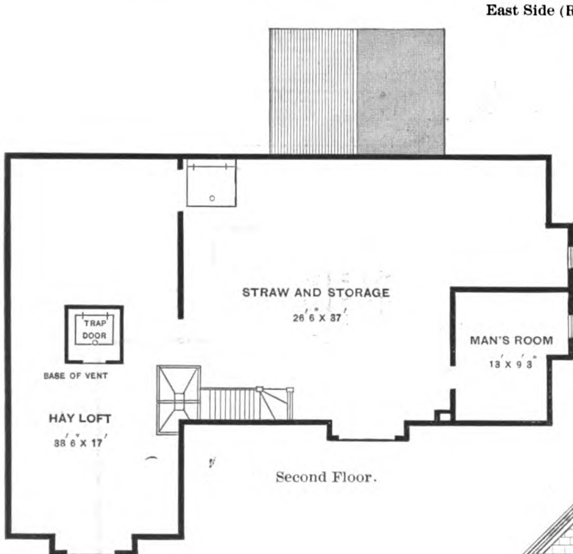
A New German Roofing Material.

In a report to the Department of State, United States Consul James C Monaghan, at Chemnitz, Germany, gives an account of a newly developed roof, which is the invention of Theodore Kohler, a resident of Limbach, Saxony. The separate pieces of the roof are made from one portion of cement to three parts sand, which are mixed into a mortar-like consistency through the addition of clean water, after which the mass is pressed into a mold.

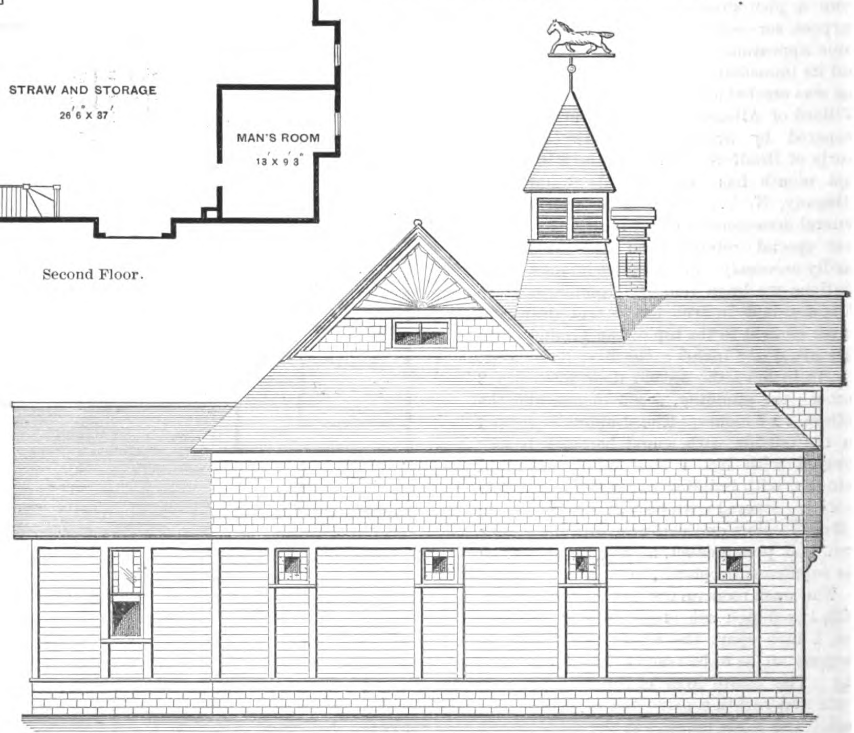
The main advantage claimed for this roof is its fire



East Side (Right) Elevation.



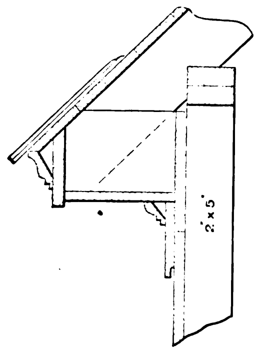
Second Floor.



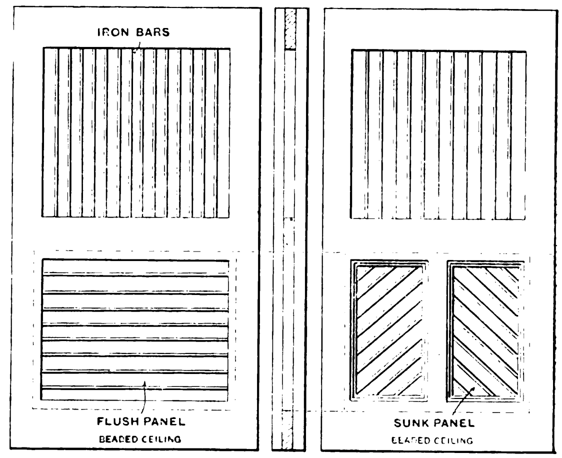
West Side (Left) Elevation.

Design of Carriage House and Stable.—Elevations.—Scale, 3-32 *Inch to the Foot.—Floor Plan.—Scale,* 1-16 *Inch to the Foot.*

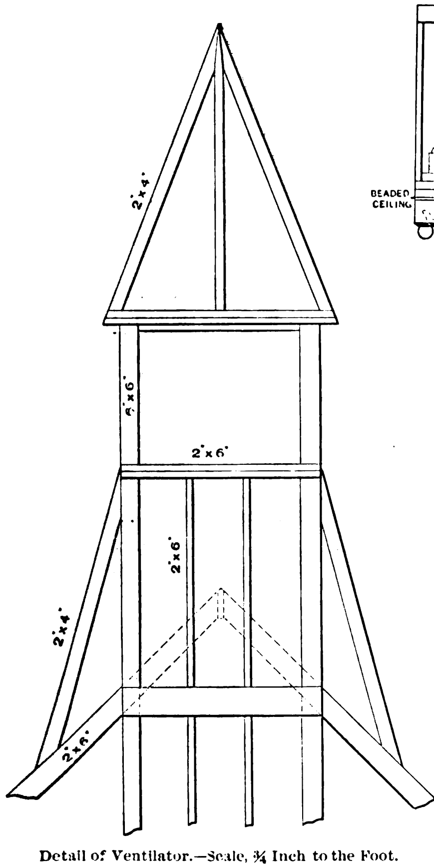
proof qualities and the fact that it is impervious to all kinds of weather. It can be made in either light or heavy weights as may be desired, and can be painted in all the colors of ordinary slate and many other shades besides. The individual plates are made into such a shape that been patented in nearly every civilized country in the world. He says that two firms in Germany have turned out from 10,000,000 to 20,000,000 of the plates in the last few years. The machinery and the material are very cheap. The machine, with 300 full size and 100 half size



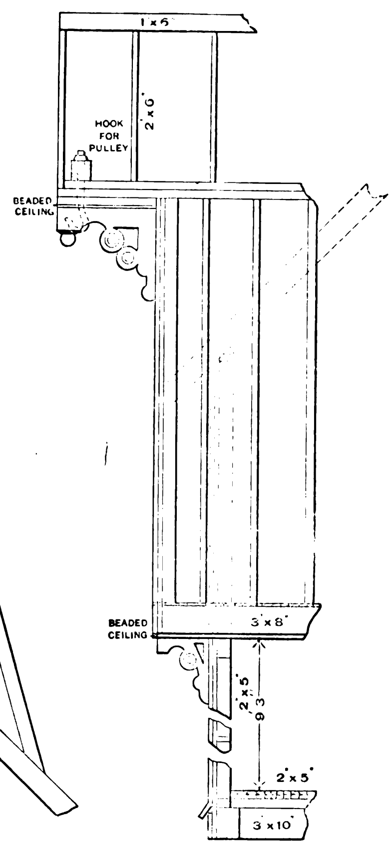
Detail of Main Cornice.—Scale, ¾ Inch to the Foot.



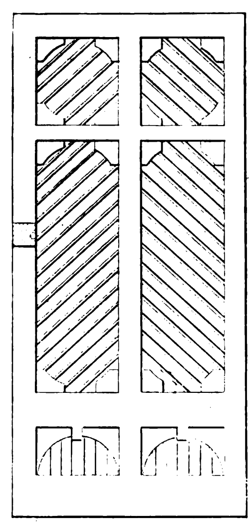
Stall and Hall Elevations with Section of Sliding Doors.—Scale, ⅜ Inch to the Foot.



Detail of Ventilator.—Scale, ¾ Inch to the Foot.



Section through Gable Over Main Double Doors.—Scale, ¼ Inch to the Foot.



Detail of One of the Main Double Doors.—Scale, ⅜ Inch to the Foot.

Miscellaneous Details of Carriage House and Stable.

ridging is formed on each so that when placed in position on a house the ridge of one fits over the smooth surface of the one below, so that it is impossible for rain or dampness to get through. The plates are fastened by means of nails in much the same manner as ordinary roofing slates are held in position. Consul Monaghan says the invention has molds, costs less than $500. The fact that all of the material used in the manufacture of the roofing is simple and of light weight is also claimed as an advantage for the use of the roof. The materials can be transported to the place of building and the plates manufactured on the spot, so that the danger from breakage is practically eliminated.

BRICK WORK IN WINTER.

IN building in frosty weather the brick should be kept perfectly dry, and for work that must be accomplished at this time of the year the mortar should be used immediately as made ; but the use of frozen mor tar tempered up cannot be too much deprecated, as well as brick that has been wet and frozen and laid in that condition. There is risk in using common mortar in cold weather, says a writer in the *Brickbuilder*. If the cold should continue long enough to allow the frozen mortar to set well, the work may remain safe ; but if a warm day should occur between the freezing and the setting of the mortar the work is apt to be weakened. Mortar which has partially set while frozen if then melted will never regain its strength. Strong hydraulic cements seem not to be injured by freezing. Experienced contractors assert that adding salt to mortar in cold weather to preserve it from the bad effects of freezing has been found beneficial. It is not quite clear why the salt should act in this way, as the beneficial results of using it are visible with mortar that has certainly been frozen, and frozen salt water expands nearly as much as fresh water. But engineers and contractors who have tried it are unanimous in their opinion of its value. Many cases may be cited where masonry has been laid in cement in cold weather, using a considerable amount of salt in the mixture, which after repeated freezing and thawing has remained in perfect condition, while work near by laid in mortar of the same kind, but without salt, has been disintegrated by the frost.

We know that good results have been attained with brick work in frosty weather, when the lime has been slaked and immediately made into mortar and used in a warm condition ; for the dry nature of the brick absorbs the water that may be in the mortar and cohesion takes place before the frost can accomplish much injury. It is said that at Norway, at Christiania, building operations are carried on successfully when the temperature is as low as 12 degrees above zero F. and that the work executed under these conditions compares favorably with summer work. In fact, the Christiania builders claim it is superior. The secret of successful work under these conditions is said to be in the use of unslaked lime in mixing the mortar in small quantities at a time, being made up immediately before use.

The mortar must be put in place before it loses the heat due to the slaking of the lime. The lower the temperature the larger the quantity of lime required, so that below 12 degrees F. the work cannot be carried on profitably.

In the winter it is very necessary to preserve the unfinished walls from the alternate effects of rain and frost, for if they be exposed the rain will penetrate into the bricks and mortar, and, by being converted into ice, will expand and burst or crumble the material in which it is contained, and is liable to leave a dark streak of discoloration where the work is left off. Consequently, as soon as cold and stormy weather sets in it is best to take extra precautions in covering the walls. Pieces of old sail cloth make an excellent covering, are handy to use, and with proper care will last for years.

LAW IN THE BUILDING TRADES.

SUBSTANTIAL PERFORMANCE OF BUILDING CONTRACT.

If a contractor should fail to perform some distinct or specific piece of work which by his contract he had stipulated to do, the value of which was one-tenth of the contract price, there would be no question that there was not a substantial performance of the agreement. The rule still prevails that the contractor must show performance when that is a condition of payment. The relaxation of its strict application in cases arising under building contracts was not intended to permit courts and juries to substitute a money indemnity as an equitable compensation for unfilled covenants of the contract, but arose because of the difficulty of complying with entire exactness with all the particulars embodied in that class of agreements. Hence it has been repeatedly said in the decisions that it is only in cases where there has been no willful omission by the contractor, but he has honestly and faithfully performed the contract in all its substantial particulars, that he will not be held to have forfeited his remuneration by mere technical or unimportant omissions or defects. But if the defects or omissions are so numerous and prevailing as to show that the whole job was done in a slovenly and improper manner, not conforming substantially with the plans and specifications, there is no rule of law which entitles the contractor to compensation. If the owner, having regard to strength and durability, has contracted for walls of specific materials, to be laid in a particular manner, the contractor has no right to substitute his own judgment for that of others. Having departed from the agreement, if performance has not been waived, the law will not allow him to allege that he has made as good a building as the one he engaged to erect.—Andersen *vs.* Petereit (Supreme Court, General Term, Second Dept.), 38 N. Y. Sup. Rep., 741.

WHEN EMPLOYER IS NOT LIABLE FOR INJURY TO A WORKMAN.

A workman, while in a contractor's employ, was injured by the falling of a "runway" over which he carried building material into a cellar. Immediately before the accident a heavy timber had been carried over the runway by two men not controlled by or in any way connected with the contractor, and without permission by him. The workman was following them closely on the runway and the unusual weight caused it to fall. The Superior Court of New York City held that the contractor was not liable.—Reilly *vs.* Parker, 31 N. Y. S. Reporter, 1014.

COLLECTION OF NOTES GIVEN FOR BUILDING.

Where notes were given in prepayment for the performance of a building contract, and their sale as negotiable paper was consented to by the makers at the time the contract was entered into, they cannot, in the absence of fraud, raise the issue of no consideration in an action upon the notes by an indorsee; and they cannot contend that such party is not a *bona fide* holder.—Churchill *vs.* Bielstein, Court Civ. App. Texas, 29 S. W. Rep., 392.

ARCHITECT'S LIEN FOR PREPARING PLANS.

The Circuit Court of the United States, Northern District, Ohio, has decided that a statute giving a lien to a person "who performs labor or furnishes machinery . . for erecting, altering, repairing or removing of a house . . . by virtue of a contract," &c., includes not merely those performing manual or unskilled labor, but extends to the labor of an architect in preparing plans and specifications and in superintending construction, where it appears that such plans and specifications were prepared with a view to the particular location where the building was actually erected, and in pursuance of a contract having a substantial financial basis.

The Judge said: There is no reason in equity or law why the architect who conceives and puts upon paper the design of such an immense building as that involved in this case, and who puts upon paper with such minuteness of detail the specifications and drawings as to enable any one skilled in such business to erect, with perfect proportions and proper stability, such a mammoth structure, should not be protected in his contribution to the completion of such work, as well as the carpenter, the plumber, the painter, or any one who performs manual labor.

The Court certainly ought not to strain the statute to exclude labor of this high character and grade, unless it is plainly the intent of the Legislature that it should bear such interpretation. The architect in this case is entitled to a lien not only for the plans and specifications, but for the labor and assistance in the construction of the building in pursuance of these plans.—Phœnix Furniture Company *vs.* Put-in-Bay Hotel Company, 66 Fed. Rep. 685(270).

INJURIES FROM BRICK FALLING FROM A WALL.

The fact that a contractor failed to erect proper scaffolding guards about a building because they could not be erected without occupying adjacent property, and that he was prohibited from so occupying it, will not relieve him from liability for an injury to a third person through the absence of such guards.

One superintending the construction of a building, as agent of the contractor, is equally liable with his principal for such injury, or from the negligent construction of the wall.—Mayer *vs.* T. H. Building Company, Supreme Court Alabama, 16 So. Rep., 620.

CORRESPONDENCE.

Address Wanted.

Will the correspondent who signs himself "E. A. R.," and submits a design of a brick hotel, kindly furnish the editor with his full name and address, as additional information relative to the drawings is required. Attention has previously been called to the desirability of correspondents signing their letters with full name and address, not necessarily for publication, but in order that the editor may communicate with them direct should the occasion arise. The lack of this important information in connection with a letter will often explain its non-appearance in the columns of the paper.

Correction in Truss for Church Roof.

From E. E. C., *Whitesboro, N. Y.*—There is an error in the design of truss submitted by me on page 17 of *Carpentry and Building* for January. The common rafter that is marked 6 x 6 should be 2 x 6 inches.

Wood Patterns for a Water Heater.

From J. W., *Portsmouth, Va.*—The pattern for the casting about which "P. J. C." made inquiry in the August issue of the paper is not difficult to produce, and it can be cast in a two-part flask. All meaurements are to be taken from the iron shrinkage rule, that is 12⅛ inches equal 1 foot. In the first place make full size drawings of the pattern, cross sections and longitudinal sections, as may be required. All the lumber must be perfectly dry, free from knots, shakes, sap and pitch, white pine, of course, being understood. Make an octagon core piece for the foundation of the pattern, as shown in the cross section, Fig. 1, tapering as required. The best way to make this is to turn it upon a lathe to the correct size and taper, making the octagon afterward. The next thing is to make the corrugations and plant on, as shown in Fig. 1, counter boring the screws and plugging with wooden plugs. When this is finished put it back into the lathe and turn off the semi-circular end, notching the lower end to saw off and plane true. Now turn two core prints of the size and shape shown in Fig. 2. Bore a hole in each end of the pattern exactly in the center to receive the core prints. The bottom one is to be fastened and the upper one is to be left loose, so that it will come out freely, but which, when in position, has no movement sidewise. Now give the pattern two coats of shellac and rub perfectly smooth with No. 0 sandpaper. We will now take the core box and make an octagon box out of 2-inch stuff, glued and screwed at the angles except those upon the lines C D of Fig. 3. These must be doweled and screwed, but not glued. Place heavy black marks upon the wood around the heads of these screws to distinguish them from the others, so if the core maker desires he can remove the screws and take this portion of the box apart.

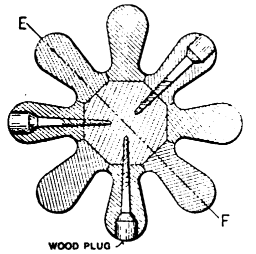


Fig. 1.—Section of Pattern on Line A B.

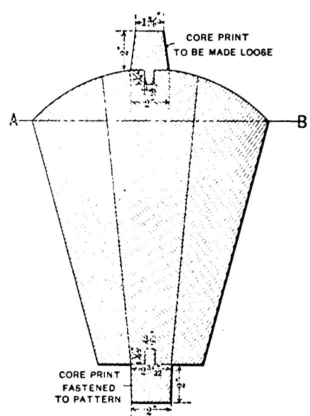


Fig. 2.—Vertical Section through the Pattern on Line E F.

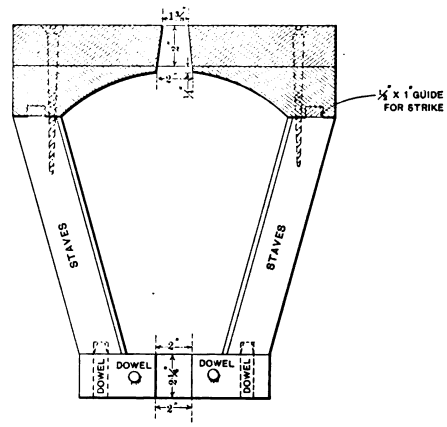


Fig. 4.—Vertical Section of Core Box on Line C D of Previous Figure.

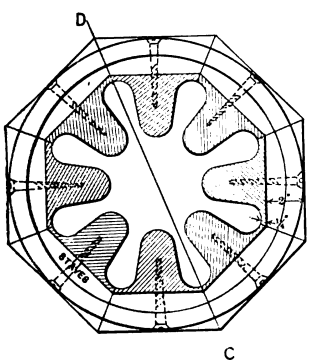


Fig. 3.—Cross Section of Core Box.

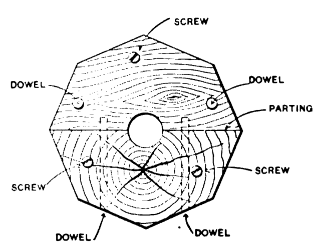


Fig. 5.—Plan of Small End of Core Box.

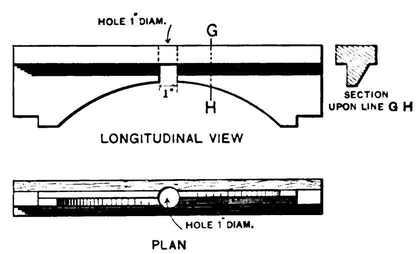
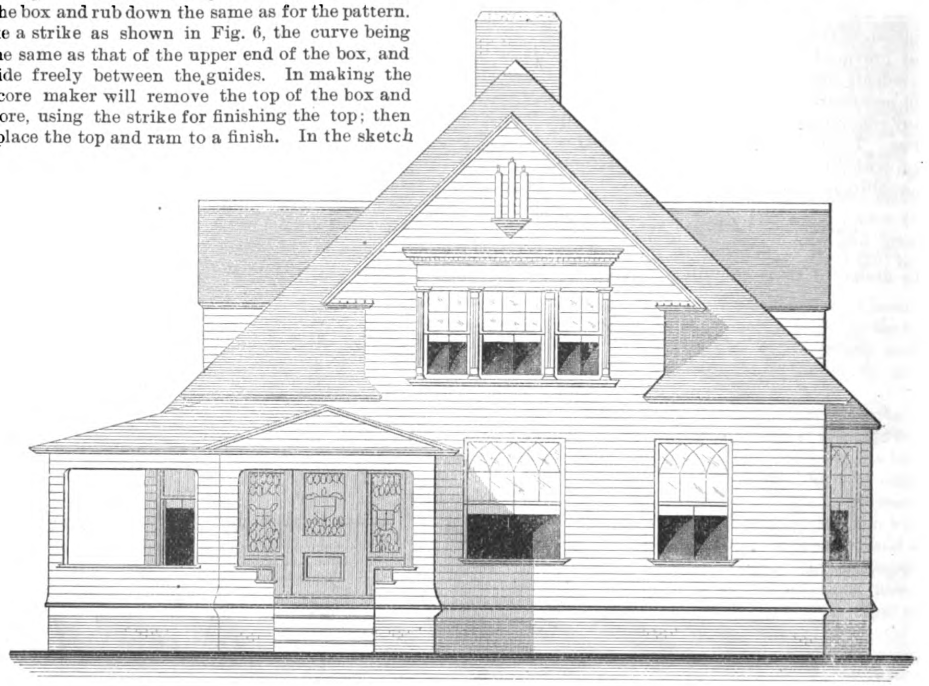


Fig. 6.—Longitudinal and Plan Views of Strike.

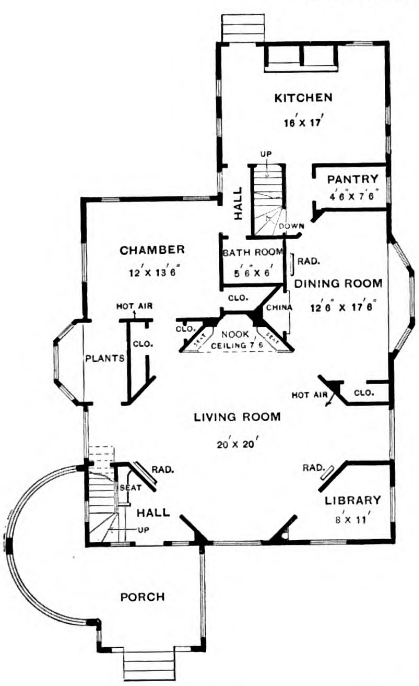
Wood Patterns for a Water Heater.—Scale, 1½ Inches to the Foot.

The next thing is to make the corrugations as shown in cross section in Fig. 3. These corrugations are laid off so that when the core is made it shall be ¼ inch away from the pattern, leaving that amount of space for the metal. Trim the ends of the staved part of the core box as shown in Fig. 4 of the illustrations. Next work the ends of the corrugations, the lower ends at an angle and the upper ones curved to the complementary curve of the top of the pattern. Then screw them on to the inside of the core box, as shown in Fig. 3, allowing the screw heads to come flush on the outside, so that they will be accessible to the core maker. The corrugations must not be glued or fastened otherwise than with screws, for the reason that the core maker will have to draw them all out of the box before the core can be removed. Now turn a ring ½ x 1 inch, as indicated in Fig. 4, and mark "Guide for strike." Fasten this securely upon the core box in the position indicated by the dotted lines in Fig. 3.

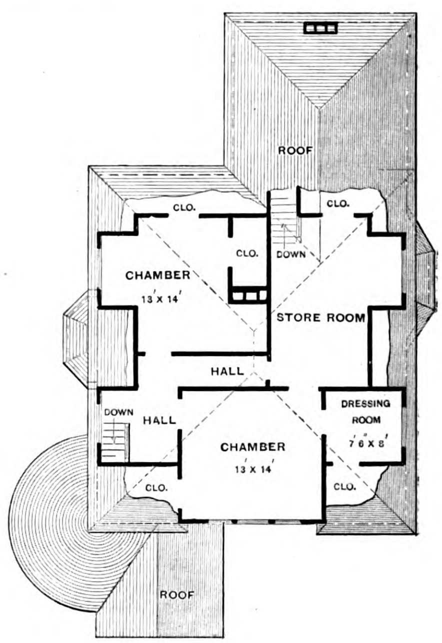
The top of the core box is made of two thicknesses of stuff worked separate and nailed together, after which they are screwed to the staved part by three or four screws. The bottom or small end of the core box requires to be parted—that is, made in two separate pieces. It is secured to the staves by means of two dowels and three screws in the position shown in Fig. 5. Shellac the whole inside of the box and rub down the same as for the pattern. Now make a strike as shown in Fig. 6, the curve being exactly the same as that of the upper end of the box, and it must ride freely between the guides. In making the core, the core maker will remove the top of the box and ram the core, using the strike for finishing the top; then he will replace the top and ram to a finish. In the sketch submitted the pipe connections are too small to support the core, and if the holes in the casting are too large a nipple can be tapped in and reduced to the size desired. All of the work requires to be done with great precision; otherwise the casting will be faulty. Bear in mind that the partings of the core box must all be in line.



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



First Floor.



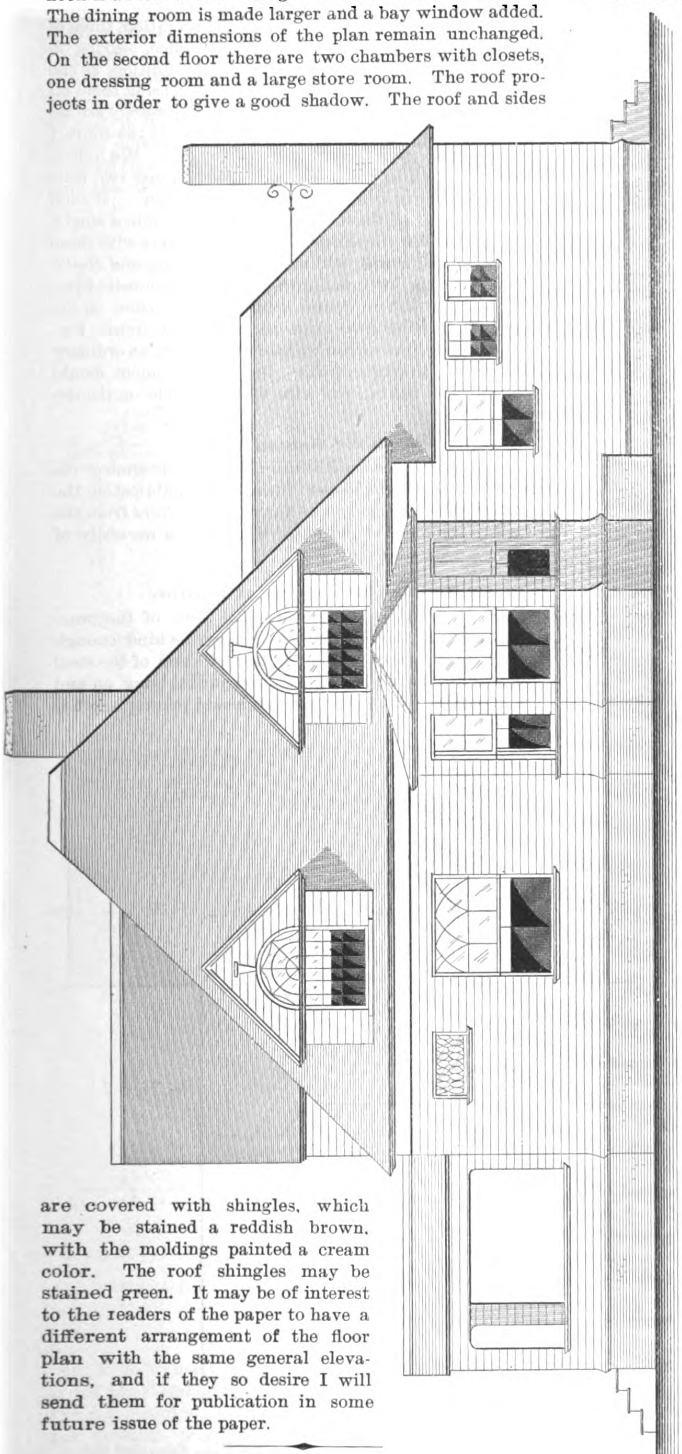
Second Floor.

Scale, 1-16 Inch to the Foot.

Elevations for the Plan of "Diamond Room."—Walter P. Crabtree, Architect, Holyoke, Mass.

Elevations for the Plan of "Diamond Room."

From WALTER P. CRABTREE, *Holyoke, Mass.*—In answer to "Diamond Room" of Red Wing, Minn., who wished some of the readers of *Carpentry and Building* to furnish elevations to his floor plan published in the November issue of the paper, I respectfully submit the inclosed sketches. It will be seen that I have changed the floor a little in order to give a better elevation. The changes are slight, the front hall being made larger, and the living room being moved a little to the right in order to have the large window in the center of the building. A nook is added to the living room and a seat in the hall. The dining room is made larger and a bay window added. The exterior dimensions of the plan remain unchanged. On the second floor there are two chambers with closets, one dressing room and a large store room. The roof projects in order to give a good shadow. The roof and sides



Side (Right) Elevation for the Plan of "Diamond Room."—Scale, $\frac{1}{8}$ Inch to the Foot.

are covered with shingles, which may be stained a reddish brown, with the moldings painted a cream color. The roof shingles may be stained green. It may be of interest to the readers of the paper to have a different arrangement of the floor plan with the same general elevations, and if they so desire I will send them for publication in some future issue of the paper.

Coloring Drawings.

From J. H. B., *Wauwatosa, Wis.*—Can you favor me by describing the colors used to represent stone section work, as for instance, the stone of an arch drawn in parallel perspective, then shaded with India ink and given the slight tint of stone color to make it appear natural ?

Note.—Our correspondent does not state what kind of stone he desires to represent, but we would suggest that if it is standstone he use in connection with the India ink a little yellow ochre. If he desires to represent blue stone or anything of a similar color he can make use of Payne's gray, or a color called neutral tint ; brown stone by a shade of sepia, and granite by a little Payne's gray added to the wash of India ink. It is the general practice where no specific color is mentioned to use neutral tint to represent stone on drawings.

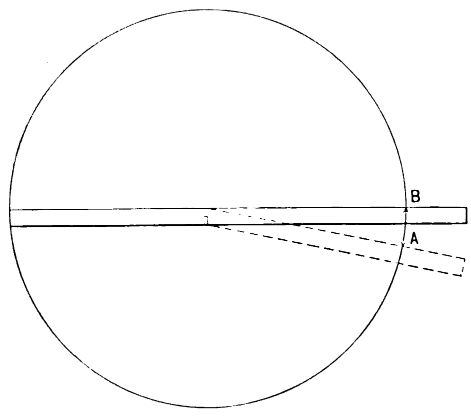
Protecting Wood and Brick Work from Dampness.

From J. J. D., *Cornwall Station, Cal.*—For the purpose of protecting wood and brick work from damp weather take 3 pecks of air slaked lime, 2 pecks of wood ashes and 1 peck of white sand. Sift them fine and add linseed oil sufficient to use with a paint brush. Thin the first coat and for the second coat use it as thick as it will work. Grind it fine and put it in a trough.

Condensation Under Iron Roof

From J. D. S., *Fredericton, N. B.*—As I have always been benefited by the information contained in the Correspondence department of the paper, I now ask for assistance in my present difficulty. Last fall we put a galvanized iron roof on a building 40 x 100 feet, having a pitch of about $\frac{1}{4}$ inch to the foot. The roof was laid with tongued and grooved boards, and covered with tarred paper before we put on the galvanized iron, which was No. 26, and put on over a wooden roll, the seam being on top. The cross seams were well grooved and soldered. We did not have any trouble from leaks during the heavy fall rains, nor until cold weather set in, when we had a spell of soft weather. There was about $\frac{1}{2}$ inch of snow on the roof when it began to drip in several places. The building is of brick, four stories high and the upper stories are used for storage and are not finished. Would the building, being just finished and consequently not thoroughly dry, cause the dampness ? We have laid several roofs like the above mentioned and have had no trouble from them, but the buildings are all finished inside, being lathed and plastered under the roofs. What is best to do to stop the "leaks," which to my mind are caused by condensation.

Answer.—As there was no drip or leak from the roof during heavy rains, it would indicate that the seams did not leak. Such being the case, it would appear that our correspondent was right in supposing the drip was caused by condensation. However, as it is possible that the subsequent cold weather may have caused the roof iron to contract sufficiently to crack the seams, it might be well to give the roof a thorough inspection. When a building is provided with a metallic roof which is so arranged as not to prevent moisture from coming in contact with its under surface, and when the weather is sufficiently cold, the moisture evaporating from the building coming in contact with the surface of the roof covering is sometimes condensed in such quantities as to run along the roof boards until an opening is found, and drips upon the floor below. The obvious method of stopping this condensation is to prevent the moist air from coming in contact with the roof. This might be accomplished by covering the underside of the joist with building paper or lath and plaster. If this cannot be done it might be well to place ventilators in the



Rule for Kerfing.—Fig. 1.—Method Suggested by "C. V. S." for Finding the Distance Between Kerfs.

roof so the evaporation from the building can be carried off. This latter plan has often been followed with success. We would be glad to have suggestions from our readers.

Rule for Kerfing.

From C. V. S., *Naugatuck, Conn.*—In reply to "G. N. Y.," Woodbine, Iowa, I send sketches of a simple method of obtaining the distances between kerfs for springing a circle of any size and using any size of timber, boards or moldings. In the first place draw a circle of the size desired, as shown in Fig. 1. Saw a kerf in the piece to be used, or in one about the required size and quality; then place it across the circle with the kerf at the center. Hold one end firm and spring the other end until the kerf is entirely closed. The distance from A to B of Fig. 1 is the distance between the kerfs. I also send a sketch, Fig. 2, of a kerfing gauge which, if not sold at the hardware store, is easily made of a piece of ¼-inch iron, fastened to a saw with two small clamps, as indicated.

Trouble With Electric Bell.

From C., *Connecticut.*—We have an electric bell connection between two buildings which are some 200 feet apart. The battery of five cells is located within 10 feet of the push button, and seems to be sufficient for one bell, but not for two, as desired. It is an assorted battery, composed of a Diamond, Sampson and one cell not marked. These have each been tested on short circuit; also, the wires are properly insulated. The question is, shall we increase the power by additional cells or lay the battery within 10 feet of the bells? We can't put it midway.

Answer.—As the current generated by the battery must

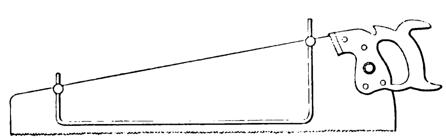


Fig. 2.—View of Kerfing Gauge Referred to by "C. V. S."

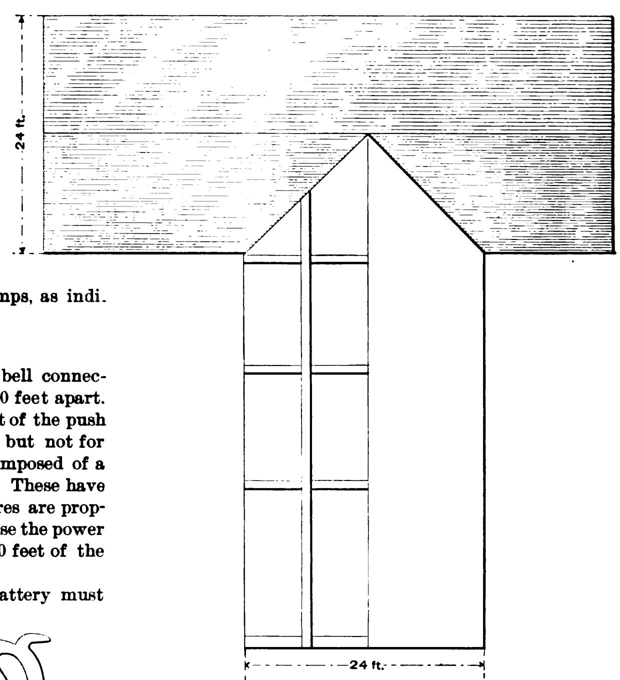
travel around the entire circuit of bells and wire back to its starting point, it will readily be seen that the location of the battery on the line in no way affects its working. Our correspondent has an abundance of battery power now; in fact, more than is necessary. Three cells should be sufficient for the purpose. Where more than one cell of battery is used they should be of one make. A mixed battery seldom gives good results. If, as stated, these cells have been separately tested and each found in good condition, three of them, if of the same construction, will suffice, bearing in mind that each of them must be in good condition, as one weak cell in any number of strong ones will bring them all down to its own level. The use of an unnecessarily strong battery is to be avoided, as it is apt to burn out the contact point which touches the armature of the bell. We understand from the query that our correspondent has two bells on one circuit which are to ring simultaneously. If such is the case, one of them should be converted into a single-stroke bell, as the vibrations of one bell interfere with those of the other and neither will ring. In *Carpentry and Building* for February, 1894, under the head of "Domestic Electrical Work," will be found detailed information on the subject of operating more than one bell on one circuit. Fig. 5 of this chapter shows the manner of changing an ordinary vibrating bell to single stroke. Our correspondent should be sure that he has but one wire under a staple on the circuit.

Derrick for Raising Rafters.

From J. J. D., *Cornwall Station, Cal.*—Will some of the many readers of the paper furnish for publication the drawings of a derrick or pole for raising rafters from the ground to the top of a building without the necessity of erecting a peak scaffold?

Top and Down Cuts of Purlins.

From H. V. S., *Butte, Mont.*—Will some of the practical readers of *Carpentry and Building* be kind enough to give me the figures on the tongue and blade of the steel square for the top and down cuts of a purlin, lying on and at right angles to the principal rafters and joining another



Top and Down Cuts of Purlins.—Roof Plan Submitted by "H. V. S."—Scale, 1-16 Inch to the Foot.

roof of the same width and pitch, as shown in the sketch submitted. The intersecting roof is boarded. The span of both buildings is 24 feet, measuring from out to out. The pitch of the roofs is two-thirds—that is, a rise of 16 feet with 12 feet run. I would also ask the readers to give me the cuts for the purlins striking against the roof when the span is 24 feet and the rise is 8 inches to the foot run, both roofs being the same width and pitch.

Strength of Truss for Building of 60 Feet Span.

From A. B. C., *Brandon, Manitoba.*—I inclose sketches of a roof which I am putting on a building of 60 feet span, and as there is some discussion about the strength of it I submit it for criticism. It is constructed of spruce, a timber which is tougher for this class of work than pine. I would like to know about what strain the roof will bear, and also where are the weak points of the truss. What can I do to make it more substantial? It will be seen from the sketches that I employ no rods whatever, while the 6 x 8 cord is cambered 6 inches in the center to allow for sinking. Fig. 1 represents an elevation of the truss, while Figs. 2, 3 and 4 represent details of the joints at *a* C′ *b*. I should like to have a report of this truss after the manner of the one published on page 143 of *Carpentry and Building* for last year. That roof collapsed just in the manner described in the paper. The cause was a load of snow lodging on one side of the building. The sketches which I now send represent the new roof erected this past winter, and I am convinced it is far superior to the first one.

Note.—The drawings forwarded by our correspondent were submitted to a civil engineer, who gives the following opinion: The sketch, Fig. 1, shows a queen post truss having four additional struts or braces introduced for the purpose of providing a support for the main rafters by dividing their lengths into three panels. The dotted lines indicate the additions which it is suggested be made to the correspondent's sketch, in order to render the truss adequate for the purpose. The upper portion of the truss, forming the ridge, cannot be considered as a component part, as it has no structural connection with the main part of the roof. In computing the strains in trusses it is always necessary to know what distance the trusses are placed apart and as this information is not given in the present case, it is assumed to be 12 feet, which should be the maximum in this instance. A load of 50 pounds per square foot has been allowed, including wind and snow. From computing the strains in the several members of the truss it is found that the timbers shown in the sketch of the correspondent are of sufficient size, with the exception of the rafter E C and the straining beam C D, both of which should be at least 6 x 10 inches. It is also difficult to understand why the correspondent fails to use iron rods, for by the use of two iron rods at the points B and G, as indicated by the dotted lines in Fig. 1, he would have improved the truss both in design and strength. As

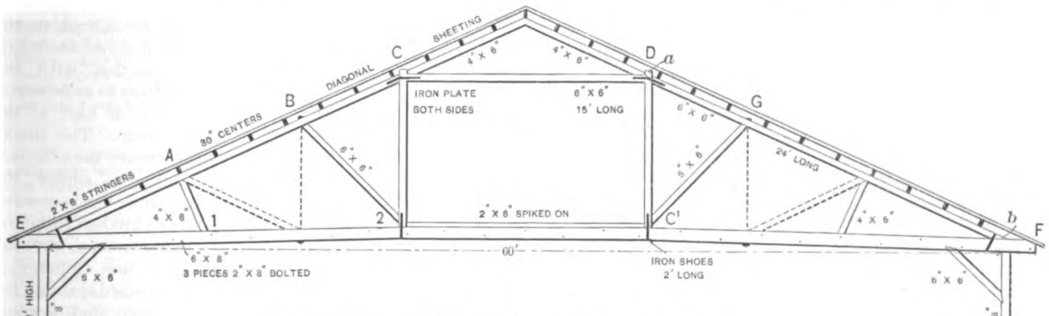


Fig. 1.—Elevation of Roof Truss for a Building of 60 Feet Span.

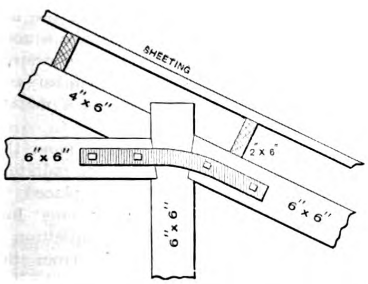


Fig. 2.—Detail of Joint at *a* of Previous Figure.

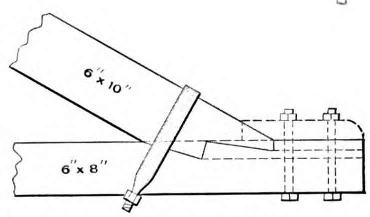


Fig. 6.—Method Suggested for Making Joints at *b* and E at Foot of Rafters.

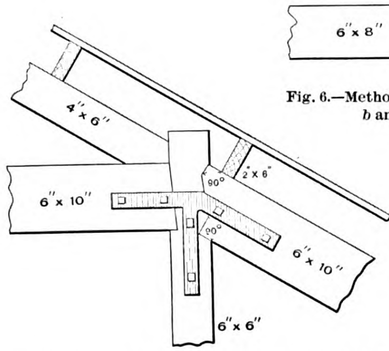


Fig. 5.—Construction Suggested for Joints at *a* and C of Fig. 1.

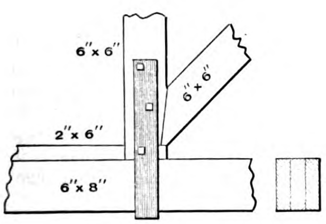


Fig. 3.—Detail of Joint at C′.

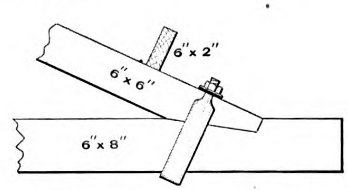


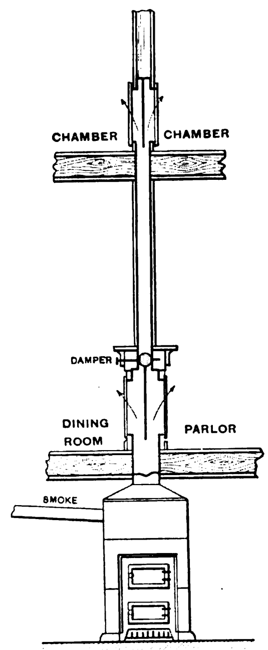
Fig. 4.—Detail of Joint at *b* of Fig. 1.

Strength of Truss for Building of 60 Feet Span.—Scale of Details, ½ Inch to the Foot.

originally shown, however, the design is somewhat faulty, not only in the details, but also in the distribution of the members. The short brace A 1 serves only as a support for the rafter at A, and transmits the load to the tie beam at 1, whereas if the brace had been so arranged as to bring it to the foot of the rod suspended from B, the transmitted load would have been taken up by the suspension rod, thence transmitted to the strut B 2, thence up the queen post to the rafter and down to the abutments. This would have been the proper arrangement, and would have required very little additional material. The detail, Fig. 2, showing the connection of the main rafter, straining beam and the queen post is not of the best. The joints are not made in such a way as to best resist the action of the stresses through that point. The strength of a truss depends not only on the strength of its timbers, but also on the strength of the joints, and it often occurs that causes of failure can be traced to the joints. The abutting surfaces should be joined as nearly as possible at right angles to the direction of the forces, taking care not to cut too deeply into the wood. The idea will be more readily understood, perhaps, from an inspection of Fig. 5, which shows the advantage of this form of construction over that shown at Fig. 2. The joint at the foot of the rafters, as shown in Fig. 4, should also be made stronger, notwithstanding the fact that an iron strap has been provided by the correspondent making the inquiry. A computation of the horizontal shear on the fibers of the beam at this point shows that the area of resistance is not sufficient to withstand the strain. It is true that the iron strap is there to hold the timbers in place which, in this case, is very fortunate; but Fig. 6 shows an improved form of construction for the joint at this point. By examining the sketch closely it will be seen that the area of resistance is increased more than double simply by cutting down deeper into the tie beam, with the offset shown by the dotted lines. Where iron straps cannot be conveniently obtained a wooden shoe bolted on to the tie beam at the foot of the rafter is a very good way of securing a strong joint. This construction is clearly indicated in Fig. 6 of the sketches. In this connection it may be well to mention that diagonals should be introduced in the quadrangular portion in the center of the truss, as they would be very useful in resisting heavy winds. With these suggestions carried out there would seem to be no doubt that the truss will answer all practical purposes required of a 60-foot span.

Heating a Workingman's Cottage.

From J. P. S., *Hazleton, Pa.*—I notice in the last issue the plans of a six-room cottage from "N. H. D.," Newburg, N. Y., but do not like his preparations for the heating. The cottage could be cheapened by leaving out the chimney between the parlor and the dining room. It could then be nicely heated by placing a furnace in the cellar under the parlor and dining room partition and running up a flue, as indicated in the sketch which I send. I have used with excellent results the method of heating here suggested and described. Very little more fuel is consumed in a furnace of the right construction in heating four rooms than would be used in a stove for heating one room in the house suggested. The secret of success, if there be any secret in such a system, is in locating the furnace under the heating flue, and in the size and shape of the latter. Any deviation from this location is liable to impair its efficiency. A furnace that is as small as 24 inches in diameter, having a galvanized casing and sending all of its heat into one 10-inch round flue, such as is shown in the illustration, will heat the four rooms as warm as a person would desire. By running this tin flue up in the corner of the room as suggested it would occupy less space in the house than the chimney proposed. In some cases this tin pipe has been covered with a fire proof enamel, and in other cases it has been inclosed behind wire lath which has been plastered over. The 10 inch pipe should be reduced abruptly to 8 inches in diameter immediately above the top of the two registers on the first floor, one being placed in the side of the 10 inch pipe to send the heat into the dining room and the other to send the heat into the parlor. In order that the wind currents shall not force all of the rising air into either room, a vertical partition made of a sheet of tin should be placed in the 10-inch pipe and extended for 6 inches or so below the registers and up to the damper, which prevents the heat from flowing to the upper floors when it is not required. After passing the registers on the first floor, an 8-inch pipe continues to the second floor, and should rise above the floor sufficiently to permit of registers being so placed as to heat both of the chambers. A partition should be placed in the 8-inch pipe, as described, in connection with the lower floor, so as to secure a division of heat at the upper floor. The smoke pipe from the furnace should run across the cellar and be connected with the kitchen chimney. By this means the expense of one chimney is saved toward paying for the furnace; and I know from experience that the furnaceman can afford to place such a heating plant all ready to start the fire for $50 and make a good profit. If heat is desired in the back chamber and bathroom it is a matter of a little piping to carry the hot water from the kitchen boiler to radiators of small size placed in each of these rooms; but the general supposition is that the heat from the kitchen will be sufficient for both of these rooms, and it is only the heating of the main portion of the house in which I think the owner will be interested. In planning workingmen's homes the feature of heating evidently is not sufficiently understood to provide a low priced effective system. Surely the health and comfort increases the vigor and reduces the probability of light sickness sufficiently to warrant the use of a good method of heating.



Heating a Workingman's Cottage.—Sketch Submitted by "J. P. S."

Area of Pipes.

From YOUNG CHIP, *Montreal, Canada.*—I would like to lay before the readers of the paper a little problem which at first sight may appear to be no problem at all. I never but once had a correct answer in reply to it, however, and I have asked some smart people, or at least people who thought they were smart. The problem is this: Which will carry the most water, one 12 inch pipe or three 6 inch pipes?

Note.—The problem of our correspondent is one of arithmetic, and with no intention of anticipating the methods which may be described by our readers we present a plan of solving the problem. Regarding the cross section of the pipe as a circle, the area is found by multiplying the square of the radius by 3.1416. In the case of a 12-inch pipe the area is therefore 6 x 6 x 3.1416, or 103.0976 inches. In the case of a 6 inch pipe the area is 3 x 3 x 3.1416, or 28.274 inches. This being the area of one pipe the area of three would be 3 x 28.274, or 84.822 inches. Thus a 12-inch pipe is larger than three 6-inch pipes by 18.275 inches, and will therefore carry the greater volume of water.

Designs for Window Caps and Inside Trim

From E. E. C., *Whitesboro, N. Y.*—I would very much like to see published in the columns of the paper designs of neat window caps for outside; also designs for inside trim that do not call for corner blocks.

WHAT BUILDERS ARE DOING.

THE general outlook for building in 1896 is about the same as outlined last month; the season not being sufficiently advanced to materially alter conditions existing at the close of the year. A hopeful feeling pervades most of the localities where business was dull in 1895, and in several cities the ensuing year is expected to be a record breaker.

Baltimore, Md.

The Baltimore building inspector's report for 1895 shows the total number of permits issued for new buildings and improvements to be 2991 as against 3087 in 1894. It is estimated that the ratio of money invested has been about the same. In addition to the business blocks erected were an unusually large number of dwellings in various parts of the city. A large number of building operations, particularly in dwellings, are still under way, and promise employment to many men for some time to come. The new court house, which will be one of the largest buildings ever erected in the city, has already caused the expenditure of a vast amount of money in the city, and during several years to come will keep many workmen busy.

Boston, Mass.

The amount of building on hand in Boston continues about the same as was reported last month, and nothing has occurred to disturb the peaceful relations between employers and workmen, except in a few unimportant individual cases. At the annual meeting of the Master Builders' Association the following officers were elected for the ensuing year: President, E. Noyes Whitcomb; vice-president, C. Everett Clark; secretary and treasurer, Wm. H. Sayward; trustees for three years (to succeed Ira G. Hersey and Charles W. Parker), David P. Page, John F. Buerkel. The State Association of Builders met for permanent organization in the rooms of the association on January 15.

Bridgeport, Conn

The Master Builders' Association of Bridgeport recently celebrated its first anniversary by giving a dinner to about 85 of its members and their friends. President Zalmon Goodsell acted as toast master. Among the guests were George Watson of Philadelphia, who made a most interesting and instructive address on trade schools, during which he briefly sketched the history of the trade school conducted by the Master Builders' Exchange of Philadelphia, and pointed out the features which have made it a success; Dr. I. DeV. Warner, who spoke on the future of Bridgeport; W. R. Briggs, whose remarks dealt with the relationship between architect and contractor, and Senator W. H. Marigold. Robert Morgan of New Haven and ex-Mayor Patrick Coughlin also responded to toasts.

The affair was one of the pleasantest that has been held in the city for a long time.

Brooklyn, N. Y.

The following from the annual message of the Mayor of Brooklyn presents an interesting summary of the conditions that have prevailed among builders during the past year: No marked increase in building operations occurred last year, but an improvement in character and quality of the structures erected has been secured by reason of the new requirements of the building law and more careful inspection. The need of encouraging those engaged in the business of erecting houses for the purpose of selling is apparent, as the growth and prosperity of the city depend upon this to a great degree. It is necessary that builders should consider the safety, durability and healthful condition of such houses as much as they do the question of cost. In the enforcement of the law forbidding the use of soft brick, defective or unsound timber or other material, an obstacle has been encountered in the fact that such objectionable material must have been actually used to constitute an infraction of the law. An amendment authorizing the condemnation of such material before delivery at the site of the building is suggested by the commissioner. The builder, who is often the innocent party, would thus be saved annoyance and delay, and the dealer could secure a decision before the material was delivered. A considerable extension of the fire limits was secured last year, but a further extension is desirable. The thorough reorganization of the force of building inspectors has been effected, and the requirement that they wear uniforms has resulted in improved discipline and service. The total number of new buildings completed during the past year was 3035, representing a cost of $11,930,075, compared with 2482 in 1894, costing $11,532,770.

Buffalo, N. Y.

The report of the department of buildings of Buffalo shows a marked increase in the amount of building done during 1895 as compared with 1894 or 1893. A comparative statement of the year 1895 with the two preceding years shows that there has been a wonderful improvement in the quality of the buildings contemplated or begun in that time. During the year 2257 permits were granted by the Bureau of Building, and the total estimated cost of the proposed structures was $9,322,458. In 1894 the department issued 2173 permits for buildings, the total estimated cost of which was $5,284,933. The number of permits issued in 1893 was 2143 and the total estimated cost of the buildings was $5,408,272.

The first quarter of the year witnessed the beginning of the most notable improvements in both the residential and business sections of the city. In March the Ellicott Square Building, the most magnificent addition to the office buildings of Buffalo, and costing upward of $2,000,000, was begun. During the three months 326 permits were issued for new buildings and improvements estimated to cost $3,416,821. The number of permits issued during April, May and June was 754, the estimated cost being $2,269,217. During July, August and September there were granted 577 permits, the estimated cost of the improvements contemplated under their provisions being $2,061,156. The reports of the Bureau of Building for the last quarter of the year are complete with the exception of the month of December. In October, 188 permits were granted, the estimated cost of additional buildings and improvements being $469,351; in November 218 permits were issued, the conditional cost being $564,970 and during December there were issued 194 permits, the approximate conditional cost being $540,943.

Officers of the Builders' Association Exchange for 1896 have been elected as follows: President, Alfred Lyth; vice-president, Henry Rumrill, Jr.; treasurer, George W. Carter; trustees, J. H. Tilden, F. T. Coppins, Henry Schaefer, Henry E. Boller, A. A. Berrick, B. I. Crooker, C. B. Jameson, Lawrence Ginther, A. P. Kehr and Robert Sherman; secretary, J. C. Almendinger; Arbitration Committee, George Duchscherer, John W. Henrich and George W. Maltby; delegate at large to national convention, John Feist; delegates, John Lannen, Charles Geiger and Alvin W. Day.

Chicago, Ill.

The following taken from the Chicago *Record* of January 1, may be accepted as a fair estimate of the relative amount of building done in that city during the past year. The work of 1894 was estimated to cost some $33,000,000 and upward and to have a frontage of some 41 miles; that of 1895 will probably be found to show a cost of some $34,500,000, with a frontage of some 39 miles, indicating a less amount of building of a slightly higher proportionate cost.

A somewhat detailed observation of the building reports from week to week shows a relatively small number of downtown structures, a relatively small number of high-class residences, a large number of inexpensive private residences, a surprisingly large number of flats of the cheaper sort, a few apartment buildings of the better sort, and, considering the economic conditions, a surprisingly large proportion of factories and churches. It would appear to be a safe deduction from the classification of kinds and costs of buildings that a large number of individuals of moderate means had suffered proportionally less from the hard times than the people of the smallest or the greatest means, and that these people of moderate means had taken advantage of the low price of land and the cheapness of building materials and labor to build for their own sole occupancy a great number of cheap houses, or for part occupancy and part investment a great number of small flat buildings, two, three and four stories in hight, on narrow lots.

Among the larger works of the year possessing some degree of artistic value may be mentioned Haskell Hall, at the University of Chicago, the Virginia Library, at the McCormick Seminary, the residences of P. D. Armour, Jr., Blair and Slaughter, and particularly the quiet and homelike residence of Mrs. Emmons Blaine. Chicago has not yet evolved a satisfactory type of lofty fire proof steel office building. The last year has seen the completion of the Marquette, which, in spite of apparent defects, is praiseworthy in comparison with most of its recent predecessors. The Fisher Building, now just ready for the roof, is an advance on the Reliance in the same lines, and holds out more promise of a dignity suited to so high a structure.

The question of consolidating all labor unions in the city into one general organization advocated by the Building Trades Council is being steadily urged, and with an increasing show of success.

During the past month there has been established in Chicago a Building Trades Club, composed of contractors and others in the building trades, based on lines similar to those which have proved so successful in New York City. The officers are: Joseph Downey, president; Robert Vierling, first vice-president; E. Ernshaw, second vice-president; Chas. W. Gindele, treasurer, and Edward E. Scribner, secretary. Temporary quarters have been established at 148 to 154 Monroe street, and from present indications there is every reason to hope that the new venture will be a success.

Cincinnati, Ohio.

Late in December the bricklayers of Cincinnati were notified by the contractors that a reduced wage scale would be put in force after January 1. The cut was as follows: Bricklayers to 45 cents per hour, from 56¼, and hodcarriers to 25, from 31. A notification of the new scale was sent the unions representing the bricklayers and hodcarriers, and a reply was received asking that the old scale of wages—56¼ cents per hour for bricklayers and 31 cents for hodcarriers—be renewed for 1896. The employers stated that owing to competition from outside contractors who employ cheaper labor they would be unable to continue the scale of 1895. The unions upon consideration determined to strike against the reduction, but the gradual concession by the employers, one after another, of the old scale obviated the necessity of quitting work. At the last regular meeting of the Contracting Bricklayers' Association, the following officers were elected for the ensuing year: President, George Mason; vice-president, Henry Huerman; secretary, Charles W. Ireland; treasurer, A. E. Hiff; Board of Trustees, Samuel Tappin, C. Fuerst, Julius Hesterberg, H. Hoelscher and John Schulte.

Detroit, Mich.

The Carpenter Contractors' Association of Detroit recently passed resolutions expressing their disapproval of the mode of procedure in securing plans and specifications for the county jail and sheriff's residence. They object to ignoring the skill of Detroit architects, whose reputation they think will compare favorably with that of any architects in the country. They say: "Circumstances are deplorable which favor so extensive a contract going out of the county, showing a lack of appreciation of architects and builders in our city."

At the annual meeting of the Builders and Traders' Exchange of Detroit, the following officers were elected for the ensuing year: James Meathe, president; A. Chapoton, Jr., vice-president; Joseph Myles, secretary; Charles H. Little, treasurer; Benjamin F. Guiney, superintendent. The directors elected were E. H. Chamberlin, Michael Finn, Robert Teakle, J.

M. Spaulding and Francis Hinds. Director for the National Association, Richard Helson.

Indianapolis, Ind.

The various carpenters' local unions of Indianapolis and vicinity have adopted trade rules for the coming season. These rules state that eight hours shall constitute a day's work; that time and one-half shall be paid for overtime and legal holidays and double time for Sundays; that 30 cents an hour shall be the wages. The wages paid during the past season, the men say, have made the carpenters so dissatisfied that unless the contractors are more liberal the carpenters will have to take matters into their own hands.

The prospects for building during the coming year are at present somewhat uncertain. It is stated that a large amount of work will be done in altering and modernizing business buildings, and that there will be a considerable amount of work in the residential parts of the city, particularly in the outlying districts.

Lowell, Mass.

At a special meeting of the Master Builders' Exchange at Lowell, held for the purpose, the members listened to an interesting address on the benefits of organization, by Chas. H. Coburn, and elected the following delegates to attend the meeting held in Boston on January 15, for the organization of the Massachusetts State Association of Builders: President, Frank L. Weaver; secretary, Charles P. Conant; G. H. Watson, treasurer; Charles H. Coburn and Fred. O. White.

Milwaukee, Wis.

The members of the Builders and Traders' Exchange of Milwaukee have established a temporary State Association of Builders and elected the following officers, pending permanent organization: President, C. A. Sercomb; vice-president, Henry Ferge; secretary, L. A. Clas; treasurer, Henry Langenberger.

It is proposed to call a convention of contractors from the State at large, to be held in the city as soon as possible, to which it is expected that the exchanges at Appleton, Racine and Oshkosh will send delegates. An effort will then be made to organize exchanges in all the principal cities of the State. As this city is the only one yet recognized by the national organization the Milwaukee Exchange will have the privilege of passing upon the admission of the outside exchanges to the State organization and will endeavor to have all new exchanges carefully formed and thoroughly familiar with the obligations and benefits of organization. At the December meeting C. A. Sercomb was appointed a delegate, to represent the Builders and Traders' Exchange at the convention which was called for the purpose of preparing for the celebration of the State semi-centennial.

It has been the intention of the exchange members for a long time past to interest themselves in the manual training classes at the East Side High School, believing that they might benefit the school to some extent, and also be able to help themselves, as the employers of skilled workmen, through its means. A committee, consisting of L. A. Clas, Henry Ferge and C. A. Sercomb, was appointed at the November meeting to visit the school. This committee reported at the last meeting in favor of paying closer attention to manual training and the report was adopted. It was decided to give five entertainments during the winter season, lectures on manual training, building materials, &c., to be folowed by card parties.

The exchange gave its annual banquet on January 8, at the exchange rooms on Grand avenue. Addresses were made by J. C. Stover, C. R. Huebl, H. Graetz, Henry Ferge, L. A. Clas, C. A. Sercomb, Garrett Dunck, M. Quinn, J. Lanberger, F. Luenzmann, E. E. Hilgen and others. Manager W. H. McElroy in his annual report showed that the membership was 178.

The following officers were elected: President, Henry Ferge; vice-presidents, L. A. Clas and C. A. Sercomb; secretary, M. Quinn; treasurer, J. Langenberger; manager, W. H. McElroy; Board of Directors, Garrett Dunck, C. A. Sercomb, F. Luenzmann and E. E. Hilgen.

New York City, N. Y.

The statistics of the Bureau of Buildings of the City of New York indicate that as compared with previous years the past 12 months witnessed a very gratifying amount of work in the building line. The total number of buildings projected during 1895 was 3838, estimated to cost $84,111,033, or an average of $21,913 per building, as compared with 2583 structures estimated to cost $51,673,997 in 1894. The figures for 1895 are notable for the reason that the total estimated cost of the buildings projected was the largest for any recent year, the nearest approach being 1890, when the estimated cost was $74,676,373. The estimated average cost per building in 1895 was exceeded only once, and that was in 1893 when the figures were $24,279. The figures of the Building Bureau show that a number of important operations were undertaken during the year, and that capital was less timid in regard to investments in this field. Of the 3838 buildings projected, 1840 estimated to cost over $40,000,000, were for flats and tenement houses; 1245, estimated to cost $11,360,000, were for private dwellings; 243, estimated to cost nearly $30,000,000, were for office buildings, hotels, stores, churches, &c., while 510, estimated to cost $2,578,000, were for miscellaneous structures such as stables, shops, &c. Some of the more important operations undertaken during the year aggregated an estimated expenditure of over $1,000,000 each.

The Mechanics and Traders' Exchange held its regular monthly meeting on January 8, President Isaac A. Hooper being in the chair. It was decided that on May 1 the exchange would rent the entire second floor in the home of the Building Trades' Club, 117 East Twenty-third street, and remove thereto.

The building trades of the city were disturbed during the month by a number of small strikes, none of which assumed at any time serious proportions. One of the more notable affairs is the differences existing between the Board of Walking Delegates and the United Brotherhood of Carpenters and Joiners. For some time past there has been more or less jealousy between these two bodies and a good deal of interior work has been interrupted as a result of the controversy. Some of the labor unions side with the United Brotherhood of Carpenters and Joiners and some with the walking delegates. The former organization issued during the month a statement showing that in 1895 their sympathy with striking members of other unions cost them $10,354.50, which they disbursed.

An agreement is said to have been entered into between the Executive Board of the Bricklayers' Union of the City of New York and the Stone Masons' Protective Union, by which the bricklayers will hereafter refuse to lay brick on stone set by non-union masons. The masons in return will refuse to work on any building where non-union bricklayers are employed.

A movement has been in progress for some little time among the organized housesmiths and bridgemen in this and some of the larger cities to form a national union, and three delegates from each union, it is said, will attend a convention which has been called to meet in Pittsburgh on January 20.

The New York Wood Carvers' Association has adopted resolutions favoring the payment by the day instead of by the hour. It is stated that there are 400 men in the association who are employed in 100 shops. The minimum rate of pay is 33 cents an hour and the limit of a day's work eight hours.

An association under the title of the Builders' League of New York City, which was incorporated a week or two ago at Albany, N. Y., has been formed to foster trade and commerce in the building trades and to reform business relative thereto. Among the directors are Judson Lawson, Alexander Walker, Walter Scott, Clarence P. Smith, Alexander A. Jordan and others of New York City.

Omaha, Neb.

On January 6 the annual election of the Builders and Trades' Exchange of Omaha was held. The polls were open from 11 to 5. There was no spirited contest. The result was: President, J. W. Phelps; vice-president, W. C. Bullard; treasurer, W. B. Rutherford; directors for two years, John H. Harte, G. H. Kelly, A. D. Marriett. The hold over directors are M. B. Copeland, Thomas Hord and Charles Baxter. The new Board of Directors reappointed as secretary W. S. Wedge who has so long and acceptably fulfilled the duties of that office. The building business is still reported as being dull.

Philadelphia, Pa.

The year 1895 will go down in the history of Philadelphia's building annals as a record breaker, says the *Record* of that city. Despite hard times through the early months, and the statements of many builders that it was not a remarkably good year, the figures show that work estimated to cost $28,272,376 was authorized, and is now either finished or in progress. This is far ahead of any previous year, the best former totals being $26,000,000 in 1891, and $26,800,000 in 1892. In 1894 the work authorized aggregated only $22,189,664. Not only has the total for last year been greatly increased, but under the new building laws the character of the work has been much improved.

The enormous total for the year was made up in 7289 permits authorizing 14,058 operations. While there were many extensive structures started the bulk of the work will be found in the dwelling house list. Nearly $18,000,000 of the entire amount represents dwellings and store work, and the major portion of it was confined to the northwestern and suburban sections of the city.

The members of the Master Builders' exchanges spent the parting year on the afternoon and evening of December 31 in a most enjoyable fashion.

The committee of the exchange having the affair in charge included Franklin M. Harris, chairman; D. A. Woelpper, Murrell Dobbins, R. H. Watson, W. S. P. Shields, William B. Carlisle, John N. Gill, Charles P. Hart and Walter F. Bradley. That the members of the exchange are a sociable set of folk is a well-known fact. It has been the custom to celebrate the death of the old year by having a reunion. Short speeches, songs and jokes were told. Just before the last lap of 1895 launched into view, and to show that the members of the exchange are not superstitious, it was suggested to Secretary Harkness to arrange 13 of the popular songs of the day. Accordingly Mr. Harkness attended to his important duty of preparing a programme containing the funeral dirges of old 1895. There were fully 800 persons who partook of the collation which was served prior to the singing out of the old year. The following nominations for directors of the exchange during the ensuing year have been made in 11 classes, according to the trades, as follows: Lane Hart, James J. Ryan, Charles P. Hart, M. Melody, Jacob Myers, A. J. Slack, D. S. Creswell, W. W. Stevens, J. E. Brown, William Harkness, Charles H. Reeves, William S. P. Shields, J. Turley Allen, Peter Gray, David H. Watts (unexpired term), F. F. Black, Edwin Webster and Howard B. French (unexpired terms), John F. Wilt, E. M. Staggers, Charles J. Taylor, Edwin F. Morse.

Seven directors are to be elected and two to fill unexpired terms.

Providence, R. I.

The Builders and Traders' Exchange of Providence recently held its annual meeting at the headquarters on Custom House street, which was followed by a banquet and general good time in the athletic association rooms.

At the business meeting the following officers were elected for the ensuing year: President, W. W. Batchelder; first vice-president, Spencer B. Hopkins; second vice-president, James C. Goff; treasurer, James S. Hudson; Executive Committee for two years, David Glover, Duncan McGregor, H. R. Horton, P. Tierney, Andrew Dempster; for one year, Charles F. Sanford, Edward R. Crowell, John F. Mahoney, Henry R. Chadsey, Charles E. Pierce.

The treasurer's report showed that receipts and expenditures for the year have been about $2900, and that there is a small balance in the treasury.

Secretary Cady reported that the year had been one of unusual activity and progress. The present membership is 96, a gain during the year of three.

The following were elected delegates to the Convention of the Builders and Traders' National Association in Buffalo in September, 1896: James C. Goff, E. R. Crowell; Alternates, William Gilbane and Spencer B. Hopkins.

The association was addressed briefly by D. B. Garnsey of Boston, assistant to the secretary of the National Association of Builders, and was congratulated upon its progress and urged to continue its work.

At the close of the business meeting the members adjourned to the athletic club where a banquet was served, and followed by a pleasing entertainment by the Falstaff Club. The evening was a most enjoyable one, and great credit is due the committee having the affair in charge for the delightful manner in which it was carried out.

Rochester, N. Y.

Secretary J. Herbert Grant of the Builders' Exchange of Rochester says that a slight gain is expected to be shown in the amount of building done in 1895, as compared with 1894. Competition during the year, however, has been so keen that the prices obtained for work have been lower than those prevailing during any of the three preceding years. No strikes or lockouts disturbed the progress of work during 1895, but a condition of affairs has existed among the union bricklayers that has been very unsatisfactory to the employers. An agreement has existed for some years between the Master Masons' Association and the Bricklayers' Union, relative to the fixing of wages, working rules. The employers, it is claimed, carefully observed both the letter and spirit of the agreement for 1895, but have been surprised to find themselves underbid by certain new concerns of contractors, outside of the association, and therefore not bound by its agreements with the workmen. Upon investigation it was shown that members of the unions were working for the contractors mentioned at much lower wages than those demanded of the members of the Master Masons' Association. The men accepted almost any wages the outside contractors were willing to pay, so long as the amount was kept secret from both their fellow workmen and the members of the Master Masons' Association. The Bricklayers' Union, it is said, does not countenance any such action on the part of its members, and the outcome of the meeting of the Joint Committee, of employers and workmen, for the fixing of agreements for 1896 is looked forward to with great interest. There is no trouble anticipated in reaching an agreement for the coming year, but its enforcement may prove difficult.

St. Louis, Mo.

At a special meeting of the St. Louis Builders' Exchange held recently a communication from the Merchants' Exchange was read in relation to the improvement of the Mississippi River, and asking the Builders' Exchange to take action on the plan advocated by the Merchants' Exchange. After some discussion the exchange indorsed the scheme of improvement and appointed P. Mulcahy, John W. O'Connell, Joseph L. Guedry, Hy. Fairback and John A. Lynch a committee to confer with similar committees from other bodies. The meeting also indorsed a communication from the Builders' Exchange of Philadelphia requesting Congress to improve the Delaware River from the city of Philadelphia to the sea. The Legislative Committee is at work preparing certain amendments for the improvement of the building law, in relation to recent action by the city council, regarding the limiting of the hight of buildings.

San Francisco, Cal.

The latest step in the struggle between the contracting carpenters and masons as to the right of the former to take contracts for entire work thus making the latter a sub-contractor, is the request by the Masons and Builders' Association to the Board of Supervisors to have, in future, separate bids advertised for, on all brick work for fire engine houses or other brick work to be done for that department. Also that only bids from those in that particular line of work, as called for, to be entertained. The association calls attention to the fact that the Board of Education has found the same method successful, and that it has been upheld by the Superior Court.

St. Paul, Minn.

It is estimated by Mr. Romaine Sheire, secretary of the Builders' Exchange of St. Paul, that the amount of building done in that city during 1895 was double that of 1894. Although little work is being done at present, aside from interior finish of unfinished buildings, the outlook for 1896 is considered very good, there being much more work in sight than there was at this period of 1895. Relations between employers and workmen were undisturbed during the year, and there appears little likelihood of unfavorable change in 1896.

At the annual meetingof the Builders' Exchange, the following officers were elected for the ensuing year: President, M. Gordon Craig; first vice-president, J. W. L. Corning; second vice-president, A. P. Cameron; third vice-president, J. M. Carlson; treasurer, W. H. Ulmer; secretary, Romaine Sheire.

The committee appointed to report on the Mechanic Arts School expressed themselves as highly pleased with the work so far accomplished, and is being convinced that the work done is of importance to the youth of the city. The report closes with the following:

"We deplore the fact that some of our citizens seem disposed to criticise this school unjustly, and we are convinced that if they would give the matter a little time and visit the school for themselves they would be convinced, as we are, of its great usefulness."

Worcester, Mass.

At the eighth annual meeting of the Builders' Exchange the report of the secretary showed a membership of 90, an increase for the year of 20. The report of the treasurer gave a balance in the treasury of over $700. The annual election of officers resulted as follows: President, C. A. Vaughan; vice-president, J. H. Pickford; treasurer, F. H. Goddard; trustees for two years, George H. Cutting, J. A. McDermott and B. W. Stone.

The Board of Directors was authorized to procure assistance for the secretary and to purchase a drafting table, also to consider the matter of replacing the mail boxes now in use in the rooms by boxes of a more improved pattern.

On January 14 a unique and delightful banquet was given the members by the exchange and Vice-president J. H. Pickford. Mr. Pickford having recently returned from a successful hunting trip in Maine, conceived the idea of a moose dinner; and moose, the result of his prowess as a hunter, was served in various styles, from soup to minced pie. Nearly 150 members and their friends participated and were unanimous in praise of the success of the occasion. Geo. F. Blake, Jr., officiated happily as toast master and presented Mr. Pickford with a beautiful cup on behalf of the exchange. Among the speakers were President Vaughan of the exchange, Alderman Henry Brannan and D. B. Garnsey who appeared in place of the secretary of the National Association of Builders. Mr. Pickford, who told how it all happened, and Mr. Libby, the guide, was present and bore witness to Mr. Pickford's statement. After the banquet, an entertainment of magic and music was furnished the members. The whole affair was one of the pleasantest ever given by the exchange.

Wheeling, W. Va.

At the annual meeting of the Builders' Exchange of Wheeling, which was well attended, the election of officers took place. The Board of Directors, Committee of Appeals and Trustees were first chosen. The officers are as follows: President, Wm. A. Wilson; first vice-president, Jos. A. Bier; second vice-president, P. J. Gilligan; secretary, Edward A. Schenerlein; treasurer, Jacob A. Morris.

A committee of six was appointed, for the purpose of conferring with the special Council Committee, relative to the enactment of a building ordinance. The outlook for business for 1896 was considered to be good, and the members generally felt encouraged to look forward to an improvement in business during the year.

Notes.

The following members of the Kansas City Builders and Traders' Exchange have been elected directors for 1896: C. L. McDonald, A. Sutermeister, W. B. Hill, W. A. Kelly, W. W. Taylor, A. F. Roddy, W. A. Wilson, Jacob Welsh, W. S. Holliwell. The board at its first meeting elected the following officers: W. A. Wilson, president; Jacob Welsh, vice-president; C. L. McDonald, secretary; Jerome Twichell re-elected treasurer. C. L. McDonald will act in the position of honorary secretary. J. G. Durner will hold the position of acting secretary under Mr. McDonald, and also have charge of the building.

A labor exchange has been established in Chattanooga, Tenn., in the form of a store where each member can deposit any sum of money desired; the manager will buy goods on the best terms possible with the deposits, and then each member can draw out goods to the extent of his deposit.

The Bloomington, Ill., Builders and Traders' Exchange held its annual meeting at its rooms on East Front street, January 2, and elected the following officers for the ensuing year: President, C. L. Hutchison; first vice president, J. H. Jefferies; second vice-president, J. A. Rankin; secretary, J. A. Shrock. The exchange is doing a good work for the building interests of the city.

The Cincinnati *Tribune* of recent date, says: Nashville, Tenn., contractors are advertising for more help, and it is expected that in a few days at least an additional hundred workmen will be at work. Everything in the building trade is booming, and the contractors are pushing the work forward on the Centennial buildings as fast as circumstances will permit. The contracts are ready and the bonds have been approved, so there is nothing to hinder work being started on new buildings.

It is understood that only union men are to be employed. This was promised when the Centennial was first spoken of, and, acting by this promise, a large number of union men subscribed and voted for the $100,000 proposition.

The Builders' Association of New Rochelle, N. Y., has been made a permanent organization. Among the charter members are: James F. Seacord, Robert Barnett, John F. New, Frank New, William J. Crennan, William Pagan, P. H. Donohue, Peter Doern, A. J. Rivers, William Rafferty, Charles Hildring, W. W. Dodge, Thomas Smith, W. T. Bell, M. O. Booker, Wm. Harris, Frank Brady, John Schlotter, John P. Donohue, John Wackerbarth and Henry A. Wackerbarth.

The Builders and Traders' Exchange of Newark, N. J., has been incorporated. The officers for 1896 are: President, George T. Clark; vice-president, H. Kinnard; treasurer, A. C. Courter; secretary, W. W. Schouler. Board of Managers, James H. Van Houten, Thomas Boyle, J. G. McGrath, G. A. Smith, W. J. Hughes, Thomas O'Connor and Henry Dickson.

Springfield, Ill., is looking forward to a building boom in 1896. The amount of work already projected is sufficient to warrant a very hopeful view, and additional work is expected to come into the market after the season opens.

The Builders' Exchange of Utica, N. Y., at its annual meeting, January 10, elected the following officers for the ensuing year: President, John F. Hughes; vice-president, Fred. G. Weaver; secretary, Harry Lancaster; treasurer, Joseph Wicks; trustees, William Fisher, Thomas R. Bailey and William Foley. A committee was appointed consisting of Messrs. B. McDermott and Edward Callahan, to arrange for a banquet.

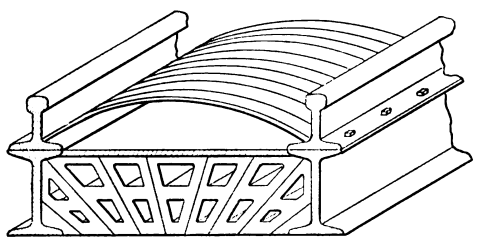
The Master Builders' Exchange of Marlboro, Mass., has elected officers as follows: President, J. E. Warren; vice-president, H. O. White; secretary, C. H. Andrews; treasurer, H. P. Richardson; directors, H. K. W. Andrews, Jos. I. Aldrich, W. H. Hill.

The Salem, Mass., Master Builders' Association at its annual meeting elected the following officers to serve during the ensuing year: Thomas F. Mack, president; Thomas G. Pinnock, vice-president; Charles W. Brown, secretary; Ebenezer H. Morse, treasurer; Benjamin A. Touret, treasurer; John F. Cabeen, Jos. F. Parsons, B. Frank Hill, directors. The association enters upon the third year of life with bright prospects and favorable conditions.

"Strengthening" Floors.

One of the very best ways to learn how to do things right is to observe how they have been done wrong. Notes of bad practice are danger posts which tend to keep us in the middle of the road and not let us stray into the marshes and pitfalls on either side. One of the most marked examples of how not to do it developed in connection with the erection of one of the largest, finest, most imposing and expensive hotels in New York City. After about $1,000,000 had been spent on the structure it was found or thought that the floors were too weak and, of course, they had to be strengthened before the building could be finished or used. As at first constructed they were of the ordinary type, made of I beams having flat composition arches sprung in between them.

The conditions were such that the floors could not be ripped out, but, of course, they could be strengthened by any one of several different methods. They might be trussed from below, or shored up by more columns, or some of them might be held up by suspension rods from above. But none of these ways seemed to suit the architect. The highly original plan which he adopted is shown



A Method of Strengthening Floors.

in the accompanying engraving, from which it will be seen that he simply laid down on each I beam an inverted deck beam, which he bolted fast to the I beam by its flanges; then he sprung an arch of corrugated iron between each pair of these deck beams and leveled the whole thing off with concrete, on which the floor boards, or the tiling, as the case might be, were laid.

This method of strengthening arches beats all hollow the scheme of lightening the load on the horse that was carrying a man in the saddle and a small boy on the crupper, by the man taking the small boy in his arms.

Baron de Hirsch Trade School.

The closing exercises of the graduating class of the Baron de Hirsch Trade School, 225 East Ninth street, New York, on Saturday evening, January 11, afforded the opportunity of showing the proficiency which some of the young men from Russia and Roumania have acquired in the short term of five months and a half in the different trades taught at the institution. The carpentry class is under the instruction of L. Wasself, and at the outset was composed of boys between the ages of 16 and 25 years who had not been in this country longer than three years, many of whom not only could not understand a word of English, but could neither read nor write their own language. In some instances, they had so little knowledge of arithmetic as to be unable to understand an ordinary 2 foot rule. By the use of scale drawings of the work on which they received instruction, beginning with a set of joints of various characters, the pupils began to add to their English vocabulary and to lay out work in full size from the scale drawings, while at the same time adding to their knowledge of arithmetic. From these they advanced to larger work; and on exhibition at the shop at the close of the course was a miniature house made by the students, and framed according to American methods, with doors, window casings, flooring, joists, rafters, studding and all that go to make a building complete. This school was established through a gift from Baron de Hirsch, to aid young men who come to the United States in gaining a start by which they earn an honest living and become good citizens of their adopted country. The proficiency which they have obtained and the fluent knowledge of English which they have acquired is shown in their work and also in the address made by Albert Edelstein, the winner of the prize for mechanical drawing in competition with the students in the machinists' and plumbing departments, as well as those of his own class. Those who wish to enter the school may apply in person to Superintendent Yalden between 9 and 11 o'clock in the morning, on any day in the week except Saturday and Sunday.

Who Builds the House?

The relation of a man who builds a house to the man who designs it, and the relations of both to the owner, who is to pay the bills, are vexed questions which each man tries to settle for himself, says the *Trefoil*. In the first place, the owner has an indistinct idea of what he wants and a very positive idea about how much it ought to cost him, and is also firmly convinced that he knows all about it. He therefore engages an architect in order to have the privilege of telling him how to build his house for him, and incidentally also to make the designs and drawings and superintend things generally. When it comes to matters of detail the owner supposes that the architect will take care of them; if not, why have one at all? And so, after many changes and much discussion, the drawings are accepted and the specifications and contracts are prepared. At this stage the owner begins to appreciate the fact that there is a builder in the case, and that his province after all is to make the house for him.

Among the three parties there seems to be an impression in the mind of each that he is really the man who builds the house. The owner talks freely of the house he is building, while the architect does not hesitate to call it his, however much his idea may be cut and hacked; and in the meantime the builder goes ahead with the work, and with many portions does pretty much as he pleases.

The result of this combination, which a diplomat would call a "tripartite agreement," but which is much more frequently a disagreement, is not always to the benefit of the work, and as the owner is the one who pays the bills and generally lives in the house the relations of the others to him are sometimes more interesting. Of course, he wants to get the best for the money, but he doesn't always know just what he does want, and hence it is the function of the architect to tell him what he wants and the function of the builder to get it for him, and furthermore it is the province of the architect to see that he gets it.

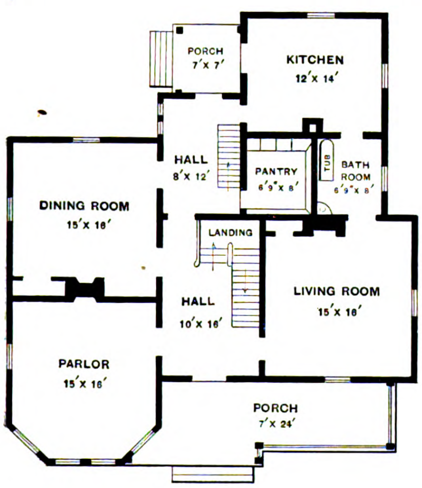
This brings us to the real question in hand—the function of the builder. He is expected to take the contract at the lowest possible figure and to execute it in the best possible manner, and incidentally to make a fair margin of profit for himself, he not being in the business from purely philanthropic motives. In carrying out these laudable objects he has his chart, his specifications and the drawings, and if he keeps strictly to the imitations he does well. Much of the fault which is found with the builder is uncalled for, either in justice or in the specifications, and when his shortcomings, which are so frequently denounced, are heard, one is sometimes reminded of the housemaid who, when reproved for not having divined the intentions of her mistress, retorted: "Did you expect to get a mind reader for $3 per week?"

The builder is all right if he is only given a fair chance; but before he is called in at all the owner and the architect should make up their minds as to what they really want, and say so clearly and unmistakably in specification and drawings. The articles which the owner should himself select ought clearly to be stated as being omitted from the specification and to be furnished when required; and then, with the addition of a limited amount of common sense, there may be good reason to expect mutual satisfaction and, what is still more desirable, a fairly good building when all is done.

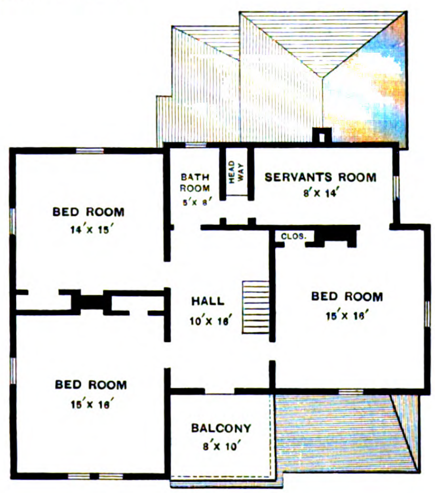
Design of a Southern Dwelling.

A style of dwelling more or less popular in the South is one having rooms so arranged as to open from both sides of the main hall, the latter extending through the house from front to rear. An arrangement of rooms which has met the requirements of many in certain parts of Southern plicity of construction. In the present instance, the cost of the building is said to have been $1650. The plans were drawn by Architects W. K. & H. H. Holt of Chase City Va., and erected by W. K. Holt, contractor and builder of that place. The foundation walls are of hard brick, 9 inches in thickness and the cellar has a cement floor. The sills are 8 x 10 inches; the floor joist, 2 x 10 inches; corner

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



First Floor.



Second Floor.

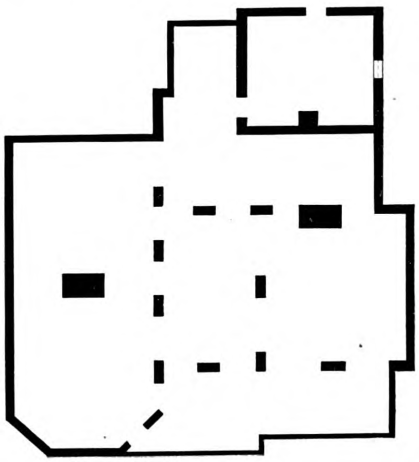
Scale, 1-16 Inch to the Foot.

Design of a Southern Dwelling.—W. K. & H. H. Holt, Architects, Chase City, Va.

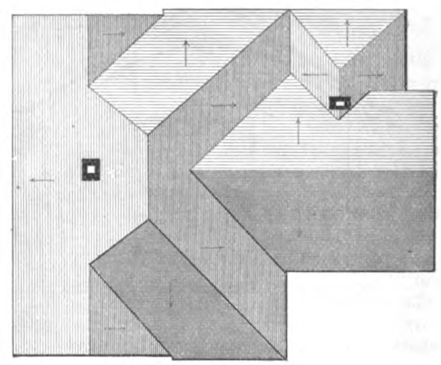
Virginia is shown in connection with the dwelling here illustrated. We are informed that 10 or 12 buildings have been erected on the basis of the plans here given, the one approximating most closely to those published being a cottage lately built for Dr. John I. Boswell of Chase City, Va. The main features which render the plans attractive to the people in that section are the large rooms with direct hall connection for each, open fire places for wood and sim- posts, 4 x 8 inches; studding, 2 x 4 inches, doubled; braces 3 x 4 inches and the bearers, 1 x 6 inches. The frame is square cut and spiked. The exterior is covered with No 1 German siding, 5 inches wide, while the roof is close sheeted and covered with pine shingles. The porches are constructed of pine with sills, 4 x 8 inches; joists, 2 x 8 inches; plates, 2 x 14 inches; top joists and rafters, 2 x 4 inches and columns, 5 x 5 inches. The inside finish is stained in imitation of walnut and oak and then varnished. The exterior is painted.

Weathering of Nails.

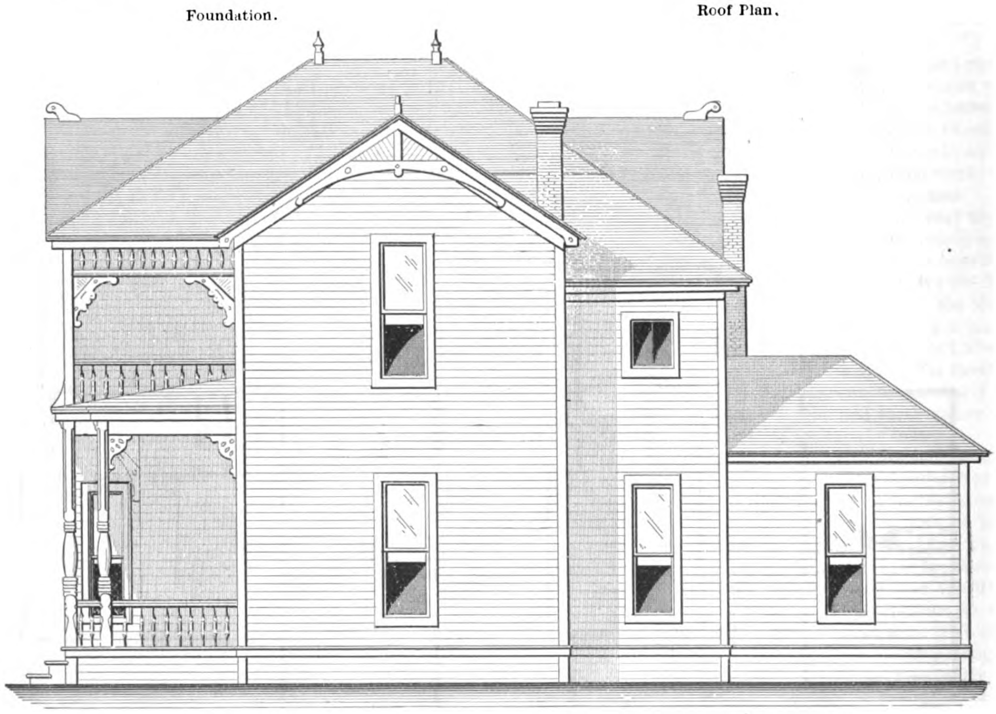
In a letter to a recent issue of the *American Architect and Building News*, Mr. Samuel Cabot says, with regard to the above subject: "When a plain iron nail in any



Foundation.



Roof Plan.

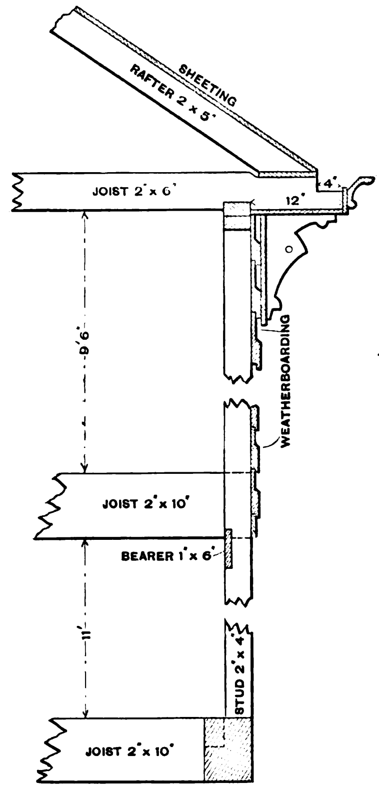


Side (Right) Elevation.

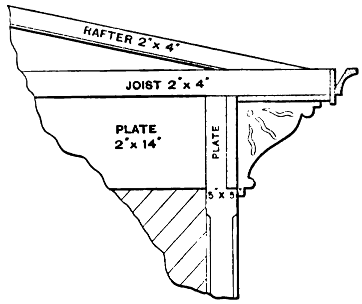
Design of a Southern Dwelling. Elevation.—Scale, ⅛ Inch to the Foot. Plans.—Scale, 1-16 *Inch to the Foot.*

structural wood work is so placed that water can gradually work between the nail and the wood, a hydrated peroxide of iron is formed by the oxidation of the surface of the nail. This oxide acts rapidly and very destructively upon the fiber of the wood, which, in chemical parlance, is almost wholly cellulose, the same material which we find in cotton and linen. The action of this hydrate upon the cellulose seems to be a completely destructive one, resulting finally, in the case of a nail, in its becoming so loose in its place that it can be frequently removed with the fingers, as you draw a pin from a cushion. If the examination is then made, all the adjacent parts of the wood will be found to be deeply tinged with the red-brown color of the hydrate of iron, and to be completely disintegrated and decayed by the oxidizing effect of the hydrated iron oxide. This of course tends to gradually diminish the structural strength of the part so affected, and in such cases, for instance, as piazza rails and posts, may result in dangerous fickle support and so in perhaps serious accident. Of course, the means of avoiding these objections are quite obvious: The first is to shun as far as possible the exposure of the nail head or point in a position where water can trickle upon it and follow down between the nail and the wood; but a still more radical, though more expensive cure, is the use of galvanized nails, or still better, composition nails, in all such cases, and it is the writer's conviction that such construction would be a great economy in all cases such as above cited."

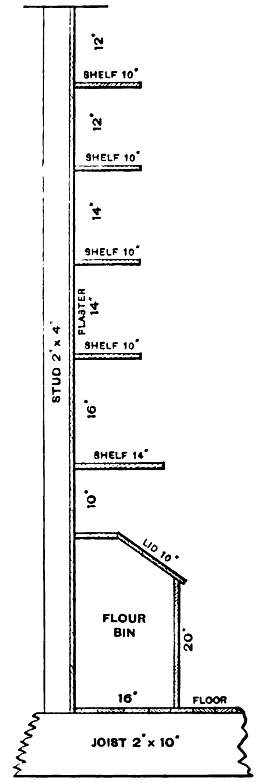
Toledo (Ohio) architects and builders are reported as being elated over the outlook for the coming season in the building trades. It is predicted that 1896 will eclipse all past years in amount of building done in that city.



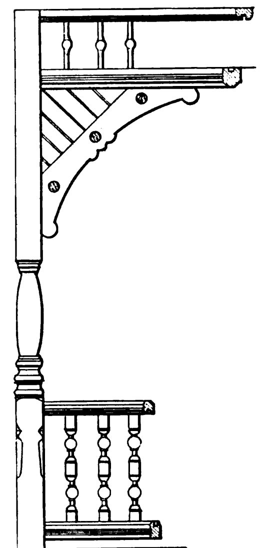
Details of Framing and Main Cornice.—Scale, ⅛ Inch to the Foot.



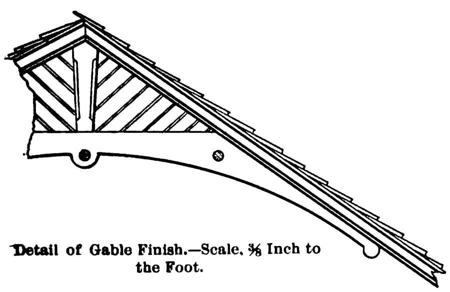
Detail of Front Porch Cornice.—Scale, ⅛ Inch to the Foot.



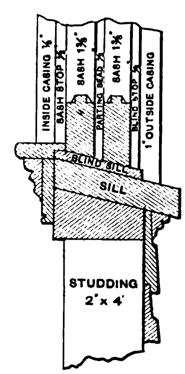
Section through Pantry Shelving and Flour Bin.—Scale, ⅛ Inch to the Foot.



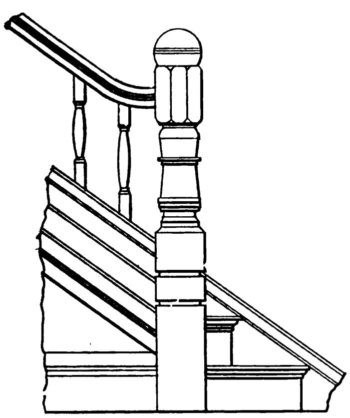
Detail of Balcony.—Scale, ⅜ Inch to the Foot.



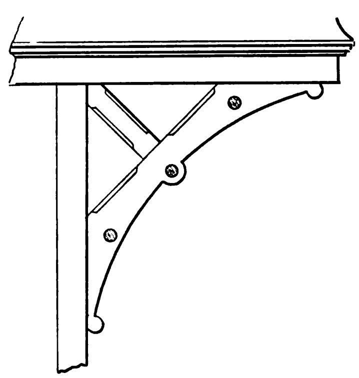
Detail of Gable Finish.—Scale, ⅜ Inch to the Foot.



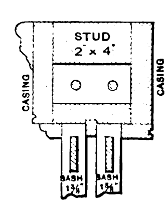
Vertical Section through Window Sill.—Scale, 1½ Inches to the Foot.



Detail of Main Stairs.—Scale, ⅛ Inch to the Foot.



Detail of Piazza Bracket.—Scale, ⅜ Inch to the Foot.



Horizontal Section through Window Frame.—Scale, 1½ Inches to the Foot.

Miscellaneous Details of a Southern Dwelling.

NATIONAL IRON ROOFING ASSOCIATION.

THE tenth annual meeting of the National Iron Roofing Association convened at the Grand Hotel, Cincinnati, Ohio, January 8, at 10 a.m., with President Biechele presiding, the following firms or their representatives being present:

Wheeling Corrugating Company: E. C. Ewing, Alex. Glass, H. C. Meckling.

Berger Mfg. Company: Jos. Biechele, E. Langenbach, A. L. Langenbach.

Canton Steel Roofing Company: T. C. Snyder, H. P. Ball.

American Roofing Company: Chas. Aldrich, H. P. Lloyd, Geo. M. Verity, R. C. Phillip.

Hyndman Steel Roofing Company: R. J. Hyndman, W. G. Hyndman.

Cincinnati Corrugating Company: Jas. Hicks, J. G. Battelle, J. H. Frantz.

Garry Iron & Steel Roofing Company: G. E. Needham, B. F. Powers.

Rhodes, Dickelman & Co.: J. L. Dickelman.

St. Louis Corrugating Company: Giano Paddack.

Ætna-Standard Iron & Steel Company: J. A. Topping, W. T. Graham.

Jas. A. Miller & Bro.: Jas. A. Miller.

Allen Corrugating Works: W. H. Duffield.

Chas. H. Connor & Co.: Chas. H. Connor, E. H. Connor.

E. E. Souther Iron Company: W. M. Scudder, A. G. Souther.

Chattanooga Steel Roofing Company: J. E. Annis.

W. A. List & Co.: W. A. List.

J. H. Eller & Co.: J. H. Eller.

Globe Iron Roofing Company: J. A. Andrews, A. L. Andrews.

Scott & Co.: E. L. Bevitt.

Jeffersonville Roofing Company: R. M. Martin.

St. Paul Roofing, Corrugating & Ornament Company: A. K. Pruden.

Kanneberg Roofing Company: A. C. Kanneberg, Wm. Kanneberg.

Porter Iron Roofing Company: Mr. Bussey.

The convention being called to order by the chairman, it was moved and seconded that an adjournment to 4 p.m. be made owing to the fact that the United States Eave Trough & Conductor Pipe Association, whose business sessions beginning the day previous, were as yet uncompleted, and that the presence of the majority of that body, most of whom were also manufacturers of roofing, was desirable in the interests of thorough discussion of the affairs of the Roofing Association. The adjourned session having been called to order at 4 p.m., the balance of the day's time was expended in the reading of the reports of the various officers and the discussion of the secretary and treasurer's reports, particularly the workings of the agreement entered into by the members at the last regular meeting regarding the sale of roofing. The treasurer's report indicated a very satisfactory result in consequence of said agreement. A paper was read by J. G. Battelle of the Cincinnati Corrugating Company, Piqua, Ohio, relating to what had been accomplished during the past six months, the effect of the above agreement on the organization as a whole and on individual members, and the paper further dealt with what is still to be accomplished toward effecting a more thorough and perfect organization.

After the reading of this paper the first day's meeting was adjourned, to participate in the annual dinner, given at 8 p.m. in the Grand Hotel.

Thursday's sessions, both morning and afternoon, were entirely occupied with routine business and the election of officers, which resulted as follows:

James A. Biechele, president.

C. H. Conner, vice-president.

Geo. M. Verity, secretary and treasurer.

Executive Committee: C. H. Conner, J. G. Battelle, G. E. Needham, J. E. Annis, Alex. Glass, Jas. Biechele, Charles Aldrich.

The next semi-annual meeting will be held at Cleveland, Ohio, in July next. The next annual meeting will be held at the Grand Hotel, Cincinnati, on January 8 and 9, 1897.

SUGGESTIONS FOR STONE MASONS.

THERE are many builders who have a practical knowledge of brick work and know how to construct an excellent piece of brick work, but are careless or ignorant regarding that most important part of every building and that upon which their structure depends most entirely. A poor stone wall has been the cause of ruining many a noble and otherwise perfect edifice. Let me give my brother masons a few pointers on laying stone, says R. N. Buell in a late issue of the *Brickbuilder*—not that I shall attempt to give an exhaustive treatise on the subject, but simply to place before him a few simple rules, which may possibly be the means of saving him many dollars. Of whatever quality the stone may be of which a wall is to be built, it should consist as much of stone and as little of mortar as possible.

If it be inferior in durability and power in resisting the action of the atmosphere, &c., to the mortar, besides the certain fact that the mortar will yield until it has set hard, and so far act injuriously, no ulterior good is gained; and if the stone be the more durable material, the more of it that enters into the wall the better. Indeed, in rough walling, if the stones be laid so that the most prominent angles on their faces come into actual contact, the interstices being occupied by motar, it will be better than if a thick, yielding mass were allowed to remain between them. Absolute contact, however, should not be permitted any more than in brick work, lest the shrinkage of the mortar in drying leave the stones to such unequal bearing as the prominent parts alone would afford. Stone being generally of a less absorbent nature than brick, it is not a matter of so much importance that it be wetted before setting. Nevertheless, adhesion on the part of the mortar is more certain and more complete if the stones be worked in, at least, a damp state.

Bond is of not less importance in stone walling than in bricklaying. Instead of carefully making the joints recur one over the other, in alternate courses, as with bricks and gauged stones, the joints should as carefully be made to lock so as to give the strength of two or three courses or layers between a joint in one course and one that may occur vertically over it in another. In bonding through a wall or transversely it is much better that many stones should reach two-thirds across alternately from the opposite side than that there should be a few through stones, or stones extending the whole thickness of the wall. Indeed, one of the many faults of stone masons is that of making a wall consist of two scales or thin sides with through stones now and then laid arcoss to bind them together, the core being made of mortar and small rubble merely. This is a mode of structure that should be carefully guarded against. There is no better test of a workman's tact and judgment in rubble walling than is afforded by the building of a dry wall, or a wall without mortar. Walls are frequently built with motar that without it would have fallen down under their own weight in a hight of 6 feet, in consequence of their defective construction, thus rendering it evident that they are only held together by the tenacity of the mortar, which is very seldom an equivalent for a proper bond of stone. Masons are very apt to set thin, broad stones on their narrow edges to show a good face, by which the wall is injured in two ways. It tends to the formation of a mere case on the surface of a wall and it for the most part exposes the bed of the stone to the atmosphere, as a stone is more likely to be broad in the direction of its bed than across it.

ARCHITECTURAL DRAWING FOR MECHANICS.*

By I. P. HICKS.

Architectural Perspective.

WE have now treated the subject of architectural drawing somewhat extensively, going into the details of the various parts of the work in a concise and thorough manner. Actual working drawings to scale measurements have been a special feature of the work as one of the principal points of value to the mechanic. Working drawings are what mechanics necessarily require from which to work, and they must always be drawn full size or to some convenient scale. Working drawings show but one side of an object, but if it be required to show more, then a separate drawing is necessary for each side. In preparing elevations of buildings, we have front, right, left and rear elevations, each being represented separately in the working drawings.

Perspective drawing is a far more difficult subject to understand and master than the making of working drawings. As a rule the mechanic has little demand for perspective drawings, as they are not to work from, and he who can make the floor plans, front and side elevations, sections and details in a creditable manner is master of the art of architectural drawing so far as his work is likely to require a knowledge of drawing. So many inquiries, however, in regard to perspective have been received that it is deemed best to give in brief the objects and principles of perspective for the benefit of those who may desire to take up the subject.

Perspective refers to the appearance of objects as influenced by the position and distance from the eye. Perspective drawings give the appearance from one point of view; and is an art required more particularly in picture making. In perspective we do not see the size of objects as they really are, but as they seem to be from a given point of view. The perspective view of an object requires that the object be placed in an oblique position to the direct line of vision or point of sight from which it is viewed. For example, the perspective view of a house is obtained by placing the plan in an oblique position to the principal line of vision. In architectural perspective the plan is usually placed on an angle of 45 degrees with the point of sight. A building so placed will show two sides to the draftsman, but will not show either side as it really is, but as it seems to be from the point of sight. By placing objects obliquely to the principal line of vision they not only appear smaller, but their shape also appears changed—that is, the general outline and appearance seem to take on a different form. There is a science of maintaining a proportional scale in representing the appearance of objects in perspective.

It is not the intention to enter into the work of perspective in an exhaustive manner, but to give a few simple diagrams which will illustrate the principles in a way to be easily understood by the student. Many of the intricacies of perspective drawing can with proper diagrams and explanations be made easy of comprehension to the average mechanic. We will, before proceeding further, explain a few of the terms and points used in the work. Referring to Fig. 51, let H L represent the horizontal line and P L V the principal line of vision. In a perspective diagram these two lines are always present, and invariably bear the same geometric relation to each other. The first indicates the level of the eye, the second is the direct line of vision and extends from the eye of the spectator to the horizontal line, and at right angles to it. The length of these lines is variable according to the requirements of the objects to be placed in perspective. The P L V is drawn vertical in order to represent it, but it should be remembered that it is a horizontal line—extending from the eye of the spectator. S P is the station point, which is sometimes called the point of sight, and represents the position of theeye in the diagram. When this point is determined—that is, its distance from the horizontal line—it decides the limits of the drawing, for all other points in the diagram are determined by the position of the station point. C V is the center of vision, and is the point in the horizontal line directly opposite the station point. V P is the vanishing point, which may be any point in a diagram where two or more really parallel lines meet, but which, on account of retreating, appear to converge. There may be two or more vanishing points in a diagram, according to the number of planes of the object to be drawn and its position from the station point.

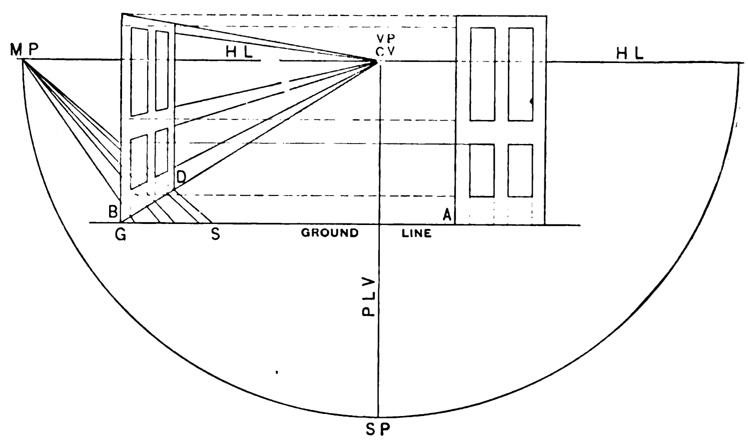


Fig. 51.—Geometrical Drawing and Perspective of a Door.—Scale, 3-16 Inch to the Foot.

Architectural Drawing for Mechanics.—Diagram Illustrating Architectural Perspective.

All horizontal retreating lines have their vanishing points in the horizontal line, but their positions are variable, depending upon the position of the retreating lines of the object to be drawn. The P L V is a horizontal line retreating from the eye at the station point on an angle of 90 degrees, and its vanishing point is therefore the center of vision. It is plain that all parallel retreating lines converge to a common point, and all lines parallel to the P L V which retreat at an angle of 90 degrees find a common point in the center of vision, which is the vanishing point for all such lines.

We have now explained a few of the principal points required in perspective, but other points will come up as the work advances, and as we do not wish to weary the student with a labyrinth of lines and points at the beginning of the subject, we will proceed with the diagram and explain the other points as they come up from time to time. Take for the first lesson in perspective a plain four-panel door, which is about as easy to make as anything in the line of architectural work. Referring to Fig. 51, first draw the horizontal line, which represents the level of the eye, and from a point near the center draw at right angles the principal line of vision. On this line determine the station point. This may be assumed at any convenient distance from the horizontal line, but when once fixed the other points are dependent upon its position.

* Copyrighted, 1894, by I. P. Hicks.

Next draw the ground line. This line may be fixed according to the judgment of the draftsman, but very naturally in viewing objects on level ground, the ground line would be from 4½ to 5½ feet below the level of the eye or the horizontal line. Now make the geometrical drawing of the door as shown at A. Draw the door on a scale of 3-16 inch to the foot and 3 x 7 feet in size for convenience. This brings the top of door 1½ feet above the horizontal line. Proceed to outline the door in perspective by drawing from some convenient point on the ground line the first upright line of the door, which remains unchanged by perspective, as at B. Next draw the retreating lines of the top and bottom of the door, and also the top and bottom lines of the panels to the vanishing point V P, as shown. A door placed obliquely to the P L V would be foreshortened in width, because the real width would not be seen owing to its oblique position. In order to determine the amount the door would be foreshortened, it is necessary to establish a measuring point, which is done as follows: Measure out from C V on the horizontal line a distance equal to that from C V to S P, or take the compasses and, with the distance from C V to S P as a radius, strike a semicircle, and the points where it cuts the horizontal line will be the measuring points. In this example only one measuring point is required, as shown at M P. Having now established what is termed a measuring point, it will next be shown how the foreshortening of the door is determined. Take the actual width of the door A according to scale and set off this distance on the ground line from the first upright line of the door B, as shown by G S. This measurement is called a geometric scale. From the end of this scale at S draw a line to the measuring point M P, and the place where the line crosses the retreating ground line of the door, as at D, will be the point from which to draw the vertical line, which will establish the perspective width of the door. All the other perspective widths are found in the same manner by setting off from G on the geometric scale the actual scale measurements, as, for example, the width of the stiles and panels, and from these points draw lines to the measuring point as shown. These lines crossing the retreating ground line determine the perspective widths of the stiles and panels. The horizontal dotted lines show how the hights are transfererd from the geometrical drawing to the perspective.

For the benefit of the learner it would be well for him to draw the perspective of the door in different positions, as it will furnish a very good lesson for practice. The door can be placed entirely below the horizontal line or above it, and to the right or left of the principal line of vision, at any distance desired. The change of appearance through the variation of the position of the door is truly astonishing, and a few carefully made drawings showing different perspective views will soon give the student an idea of the proper manner of proceeding and lay the foundation for further advancement. As the same general rule applies with the door in any perspective position, it is recommended that the position be changed, and the effects thereof studied until the student is a thorough master of this simple illustration of perspective.

(To be continued.)

William Peoples.

Many of our readers will be pained to learn of the death of William Peoples of Allegheny, Pa., well known to the carpenters and builders of the country through his work entitled "Peoples' Stair Building and Carpenters' Handbook." Mr. Peoples was born at Mount Lebanon, Pa., November 15, 1831, and his father dying shortly afterward the family removed to Allegheny, Pa., where they have since resided. Mr. Peoples learned the carpenter's trade when a boy, and in the year 1856 went into business for himself, making stair building a specialty, the firm being known as Peoples & Smith. In 1869 Mr. Smith withdrew and since that time the business has been conducted under the name of William Peoples. In 1894 he retired from active business. He was 65 years old at the time of his death ; and left a widow and seven children. The funeral services were conducted at the family residence and the interment was in the Chartiers Cemetery.

NATIONAL BRICK MANUFACTURERS' ASSOCIATION.

THE National Brick Manufacturers' Association of the United States held their tenth annual convention at Atlanta, Ga., the first week in December, the sessions beginning on the afternoon of Tuesday. There was present a large representation, the delegates gathering from all sections of the country. President F. H. Eggers of Cleveland delivered an interesting address relative to the brick making industry, following which was the report of the treasurer, showing a handsome balance on hand. The officers for the ensuing year were then nominated and the result of the balloting showed the election of R. B. Morrison of Rome, Ga., as president ; George M. Fiske of Boston, Mass., as first vice president ; Raymond C. Penfield as second vice-president ; Prof. Edward Orton of Columbus, Ohio, as third vice-president ; Theodore Randall of Indianapolis, Ind., as secretary, and John W. Sibley of Coaldale, Ala., as treasurer. The newly elected officers were escorted to the platform, where in well chosen words they tendered their sincere thanks for the expression of esteem and confidence manifested by their election. A vote of thanks was then tendered to the retiring officers for their faithful services. Numerous interesting papers were read, the first being that of D. V. Purrington of Chicago, Ill., entitled "Our National Association." The discussion which followed brought out remarks from a number of members, after which the convention adjourned.

The first session of the second day's procodings was occupied largely in the reading and discussion of papers, among which may be mentioned one on the "Market Side of the Brick Industry," by F. C. Manson of Boston, Mass.; "Setting and Burning Brick," by H. L. Jacobs of Suffolk, Va., and "Brick Yard Hobbies," by H. H. McClure of Rome, Ga. Following these papers was a discussion of practical questions relating to brick making and matters pertaining thereto. Among these topics were "What is the Real Distinction Between Fire Clay and a Shale Clay ?" "Methods of Determining Temperatures in Kilns ;" "Mixture of Coal with Clay," and "Repressing Paving Brick." After the discussion the president announced the Committee on Resolutions, after which the session adjourned.

Thursday morning was devoted to a continuation of the discussion of practical questions, among the number being "Salt Glazing Paving Brick" and "Burning Brick with Coal Slack." An essay entitled "The General Manager" was read by F. W. Butterworth of Marion, Ind., after which H. J. Baldwin of Syracuse, N. Y., presented a paper entitled "What I Don't Know About Drying Brick." The discussion which followed this paper brought out a number of interesting remarks from those present. Other papers followed, including "Mixture of Clays," by P. Pellegrini of Atlanta, Ga., and "Standard Specifications and Methods of Testing Paving Brick," by Prof. Edward Orton of Columbus, Ohio.

The afternoon session of Thursday was devoted to the discussion of practical questions and the reading of papers. Among the latter may be mentioned "Red Stains on Buff Bricks," by Ellis Lovejoy of Union Furnace, Ohio, and "Commercial Phases of the Paving Brick Industry in 1895," by W. Beahan of Streator, Ill. The Committee on Resolutions made their report, which was adopted. Secretary Randall made a few remarks on "What to do with the surplus," after which a number of letters were read from absent members. A vote of thanks was tendered to the officers of the association for the able and courteous manner in which they presided over the convention, after which it was voted to adjourn subject to the call of the Executive Committee. The social feature of the convention was the annual "pow wow," which occurred on Tuesday evening in the ball room of the Capital City Club.

The Builders' Exchange

Officers for 1896.

President,
Charles A. Rupp of Buffalo.
First Vice-President,
H. J. Sullivan of Milwaukee.
Secretary,
William H. Sayward of Boston.
Treasurer,
George Tapper of Chicago.

Directors.

Noble H. Creager	Baltimore.
E. Noyes Whitcomb	Boston.
John Feist	Buffalo.
William Grace	Chicago.
Frank L. Weaver	Lowell.
Louis A. Clas	Milwaukee.
Stephen M. Wright	New York.
Stacy Reeves	Philadelphia.
Thomas B. Ross	Providence.
Justus Herbert Grant	Rochester.
Thomas J. Ward	St. Louis.
George J. Grant	St. Paul.
A. S. Reed	Wilmington.
George H. Cutting	Worcester.

Chicago Building Trades Club.

The Chicago builders have followed the example set by their New York brethren and have established a Building Trades' Club. The matter has been under consideration for some time, but active steps toward the formation of the club were first taken shortly after the Baltimore Convention of the National Association. About the middle of December, a sufficient interest was manifested to warrant calling a meeting for the purpose of organizing, several preliminary meetings having been held to test the temper of the builders on the subject. The meeting for organization resulted in the adoption of by-laws and the election of the following officers and board of management: Joseph Downey, president; Robert Vierling, vice-president; E. Earnshaw, second vice-president; Chas. W. Gindele, treasurer; Edward E. Scribner, secretary. Board of Managers: S. S. Kimbell, D. V. Purington, Murdoch Campbell, J. C. McFarland, L. L. Leach, A. Lanquist, M. B. Madden, W. H. Alsip, J. G. McCarthy, Thos. H. Dungan, J. R. Hansell, Wm. Grace, Wm. Mavor, F. S. Wright and W. D. Gates.

A House Committee and standing committees on Finance and Membership have since been appointed from the members of the Board. The following extracts from the by-laws will serve to show the nature of the club and its membership:

Object.—Its object shall be to maintain a club house furnished with all the requirements for the advancement of social enjoyment and encouragement of friendly intercourse between the members thereof.

Who are Eligible.—The membership of this club shall consist of resident and non-resident members, to which any person of good moral character who is or has been an employer of workmen in a business connected with the building industry is eligible.

To be qualified for non-resident membership the person must not reside or have a place of business within a radius of thirty miles of the City Hall in the City of Chicago.

The club became incorporated under the laws of Illinois on December 26 last, and is temporarily quartered in rooms 5 and 6, Nos. 148 to 154 Monroe street. The movement bears every evidence of permanence and success, and a suitable club house is being searched for by the committee having the matter in charge.

Wisconsin State Association.

The members of the Builders and Traders' Exchange of Milwaukee, being the only filial body of the National Association of Builders in the State, has begun the work of organization by electing the officers of the exchange as temporary officers of the State Association pending permanent action. Work is being done to interest the members of exchanges already organized and to awaken interest in associated effort in cities where there is at present no exchange. It is expected that the meeting for formal organization will take place some time in February.

Massachusetts State Association.

The Massachusetts State Association of Builders is the second under the revised constitution of the National Association to establish formal organization. Representatives from the Master Builders' Exchange at Lowell, the Builders' Exchange at Worcester, and the Master Builders' Association of Boston met in the rooms of the last named, on January 15, and organized the State Association created by the new constitution of the national body.

The delegates were called to order at 10 o clock a.m., and selected Wm. H. Sayward of Boston as temporary chairman; D. B. Garnsey, his assistant, acting as clerk. The chairman made an explanation of the purpose of the meeting and the objects and scope of the new association, and the delegates then proceeded to the adoption of the prescribed constitution. A draft of a set of by-laws based largely upon those recently adopted by the New York State Association, and described in *Carpentry and Building* last month, was read and acted upon article by article. The principal change from the by-laws of the New York State Association was the provision for two regular meetings instead of one, an annual and a semi-annual.

The following officers were elected for the ensuing year: President, Chas. A. Vaughan of Worcester; vice-president, Frank L. Weaver of Lowell; secretary, William H. Sayward of Boston; and treasurer, E. Noyes Whitcomb of Boston. The semi-annual meeting was fixed for June 10, in the city of Worcester. Upon the recommendation of the Board of Management a per capita tax of 50 cents was voted. The following are the delegates as elected by the several exchanges to attend the meeting:

BOSTON.

E. Noyes Whitcomb, pres.	Ira G. Hersey,	At large.
W. H. Sayward, secretary.	Wm. H. Mitchell,	

WORCESTER.

C. A. Vaughan, president.	C. W. Walls	At large.
C. C. Brown, secretary.	O. S. Kendall.	
F. E. Goddard, treasurer.		

LOWELL.

F. L. Weaver, president.	Chas. H. Coburn,	At large.
Chas. P. Conant, secretary.	Fred. O. White,	
Geo. H. Watson, treasurer.		

At the adjournment of the meeting the delegates were entertained at dinner by the Master Builders' Association at Young's Hotel.

Arbitration in a New Field.

Street Cleaning Commissioner Waring of New York City has formulated a plan for settling any differences that may arise between him and his employees, based upon the same principles of organization and representation recommended by the National Association of Builders in its form of arbitration. The plan bears all the inherent qualities needful to success, and the result of this effort to extend arbitration into a new field will be watched with interest.

The following is a copy of a portion of the Commissioner's letter setting forth his plan:

In order to establish friendly and useful relations between the men in the working force and the officers of the department, I shall be glad to see an organization formed among the men for the discussion of all matters of interest. This organization will be represented by five spokesmen in a board of conference, in which the Commissioner will be represented by the Deputy Commissioner, the general superintendent, the chief clerk, one district superintendent and one stable foreman. It is suggested that the men who gather at each section station and the men at each stable, with the boardmen from the nearest dumps, each elect one of their number to represent them in a general committee of forty-one (thirty-two from section stations and nine from stables), and that this general committee elect the five spokesmen by whom it is to be represented in the Board of Conference.

The general committee will meet in a room to be provided for them, at 2 p.m., on the second and fourth Wednesdays of each month. The members will not have their time docked for this. Their meetings will be secret, and they will be expected to discuss with perfect freedom everything connected with their work, their relations with the Commissioner and his subordinates, and all questions of discipline, duties, pay, &c., in which they are interested, or which their sections, stables, and dumps may have submitted to them.

The Board of Conference will meet at 2 p.m. on the third Wednesday of each month, or as near to this date as the exigencies of the work will allow. The ten members of the Board of Conference will be on a perfect equality. It will establish its own organization and rules of procedure, and will elect one of its members permanent chairman and another permanent secretary ; one of these to be chosen from the five officers and another from the five spokesmen.

It is hoped that this board will be able to settle every question that may come up to the satisfaction of all concerned, because most differences can be adjusted by discussions in which both sides are fairly represented. Should any matter arise as to which the board cannot come to a substantial agreement, the permanent chairman and the permanent secretary will argue the case before the Commissioner, who will try to reach a fair conclusion upon it.

GEORGE E. WARING, JR., Commissioner.

New Publications.

MECHANICAL DRAWING. A manual for teachers and students. By Anson K. Cross. Size, 5¼ x 8½ ; 197 pages. Published by Ginn & Co., 1895. Price, $1.10.

In the book under review the principles of mechanical drawing are elucidated in a thoroughly satisfactory way, and in comparison with former treatises in this line it is a most excellent work. It begins with a chapter on materials and their uses—that is, drawing tools of all kinds—then one on geometrical problems, while chapter three is given up to working drawings, chapter four is on developments, followed by shadow lines, and then practical instruction on inking. Machine sketching and drawing is the subject treated in chapter seven, and the very important question of orthographic projection is treated in chapter eight. Chapter nine is on sections, ten on intersections, eleven on arrangement and names of views, while chapter twelve is plates and explanations. The work is got up in the form of a text book, and, as stated on the title page, is intended for teachers and students. Those who care to familiarize themselves in a thorough way with the principles underlying mechanical drawing will find this book a most satisfactory treatise.

A TEXT BOOK ON PLAIN LETTERING. By Henry S. Jacoby, Associate Professor of Civil Engineering at Cornell University ; size 10½x7 inches ; 82 pages and 48 plates ; published by the *Engineering News* Publishing Company, 1895 ; price $3.

The volume under review was prepared to meet the need for a text book in technical schools which would give detailed treatment of the Roman, Gothic and some other styles of plain lettering suitable for engineering and architectural drawings. In a prefatory note the author remarks that Roman letters are used in the discussion of the principles of proportioning and spacing because their main elements form the basis of the other sizes shown, and the methods which are developed for the former also apply to the latter with little if any modification. The system of measurement adopted is such that the proportions are expressed in terms of a convenient unit and permit letters of the normal as well as of other relations between width and hight to be constructed with equal facility. The measurements, we are informed, are the result of careful study of the form of each letter in comparison with the others in the alphabet and a critical examination of the best available models. The author believes that this is the first attempt to reduce spacing to a definite system which enables any draftsman to at once make the final location of the letters, the same scale being employed in the spacing as in the proportioning. The contents of the book are divided into five chapters, as follows : The Construction of Letters, Spacing of Letters, Titles, The Selection of Styles, and Mechanical Aids. These five chapters cover 82 pages, comprising the text, and following them are 48 plates giving specimens of lettering and markings for surveys, charts, &c. The book is a very comprehensive treatise for the engineer and architect, and will be found useful for all who wish to study the subject of plain lettering.

Progressive Heating.

"All the methods of indirect heating must have a comprehensive system of ventilation throughout the premises to work smoothly, as it is impossible to force air into a room if no provision is made to carry it out." There is nothing new about the above statement, but it is not as thoroughly wrought into the convictions of the public as it must be to secure generally the provisions recommended and which are undoubtedly of vital importance to the success of the heating plant and the comfort of all who live in houses. The statement quoted was made by an enthusiast on hot water heating as if it was something new, and possibly it was new to him and was the result of laboring with the problem of indirect heating and finding the solution so greatly hindered by the lack of a ventilating system. His deductions are correct, and all who are interested in heating from any standpoint should spread them persistently before the architect, builder and property owner.

Charles B. Atwood, a well-known architect, died a short time ago at his home in Buena Park, Chicago, Ill. He was born in 1849 in Charlestown, Mass., and when 17 years old became a pupil in the office of Ware & Van Brunt, architects, in Boston. After going through the Scientific School at Harvard he established himself as an architect and won many first prizes for designs for public buildings. In 1875 he went to New York, where he designed many notable houses, as well as the interior decorations of others scattered over the country. In 1891 he went to Chicago, where he designed the Art Palace at the World's Fair, now the Columbian Museum, the peristyle and the great terminal station. He formed a partnership there with D. H. Burnham, but withdrew a short time ago on account of ill health.

CONTENTS.

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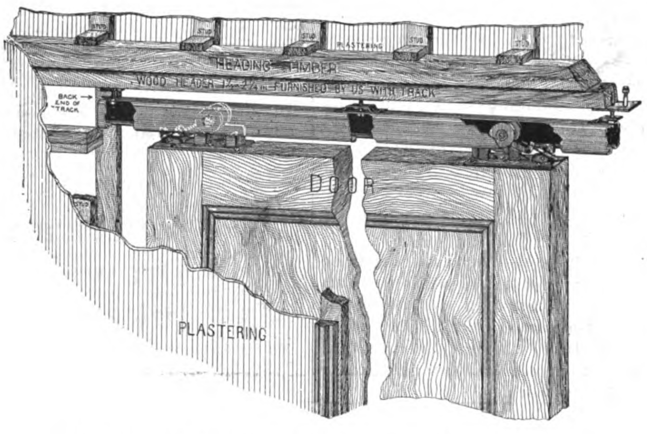
NOVELTIES.

Wilcox Trolley Steel Ball Bearing House Door Hanger.

Wilcox Mfg. Company, Aurora, Ill., are putting on the market the house door hanger illustrated in Fig. 1 of the cuts. The hanger is made entirely of steel, while the wheels are of vulcanized fiber to render them noiseless and are fitted with bicycle bearings. The cones and ball races are of fine tool steel and are case hardened to insure durability. It is remarked that the track by its peculiar construction is given more strength than is ever required to sustain a house door, and that it therefore needs no truss or brace to reinforce it; also that the flat surface presented to the face of the fiber wheels prevents any grinding or cutting of them. The track for each set of hangers is rigidly bolted to a wood header, and each set is finished complete at the factory, having no loose pieces or parts to perplex the carpenter. The fact is emphasized that the hanger has an adjustment both in the hanger and track to prevent any possibility of binding; also that both the hanger and track can be taken down without defacing the door or the finish. The makers state that the maximum adjustment in the hanger is ¾ inch, hence it is necessary only in extreme cases to use the adjustment in the track, and that their aim has been to produce a hanger and track devoid of complications and mechanically correct, so that it may be put up without the services of a skilled mechanic.



Novelties.—Fig. 1 —View of the Wilcox Door Hanger in Use.

The Pew Metal Roof Fastener.

Builders will be interested in the sectional illustration, Fig. 2, showing a patent metal roofing fastener devised by John O. Pew and manufactured by the Youngstown Iron & Steel Roofing Company of Youngstown, Ohio. The fastener is made of lead, the advantages claimed for which are that it will not rust or corrode. It is a top fastener and it is claimed that it will make an absolutely water proof joint which will last for many years, and should any accident occur to the roof it is so simple that it may be easily replaced. It is secured by a No. 9 barb wire nail, and when the nail is driven hard into the wood it forms a water tight joint with the soft metal washer clip. It also forces the soft metal hard against the top of the cap plate and makes a water tight joint between the under side of the washer clip and the cap plate. After the nail has been driven in the cap plate is hammered over it to prevent water from penetrating around the nail head. By the use of this fastener it is claimed that the metal roofing of the Youngstown Iron & Steel Roofing Company will be so firmly secured as to prevent any rattling, nor can the metal roofing become loosened by the action of the wind.

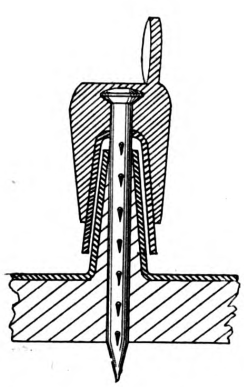


Fig. 2.—The Pew Metal Roof Fastener.

Prescott Trackless Door Hanger.

An illustration is given in Fig. 3 of an improved trackless door hanger which has just been perfected by the Prescott Hardware Mfg. Company, 78 and 80 Randolph street, Chicago, Ill. The hanger is of the brace type, requiring no overhead track, and is not only recommended for new work but is also adaptable to old work, as it is not necessary to tear off either the plaster or wood work to hang a door. The ends of the brace are fastened to the jamb or jamb stud and to the end of the door entering the pocket. A guide strip is used to keep the door perfectly in the center of the running space. The original Prescott trackless hanger was found to work very satisfactorily in principle, but in some of the minor details it was seen to be susceptible of improvement. End wheels were used to give motion to the door, which rolled in short vertical tracks, and they were apt to give way after long use or to get out of order. They have been replaced by short arms, as will be seen in the cut. This necessitated a rearrangement of the brace for holding the weight of the door as well as giving it easy motion. The arms are notched so that when the door is open and the brace folded the parts will come closely together. The hanger is now without any semblance of a track, either horizontal or vertical. Objections were also raised to the appearance of the round headed screws used for fastening the jamb plate covering the fastening of the ends of the hanger to the jamb. This has been corrected by the new method of fastening to the side of the jamb. The old hanger also had a spring to assist in starting the door out of the pocket. It has also been made superfluous. The new hanger is not only easily applied but easily adjusted, and the manufacturers are confident that it will prove even more popular than their old one.

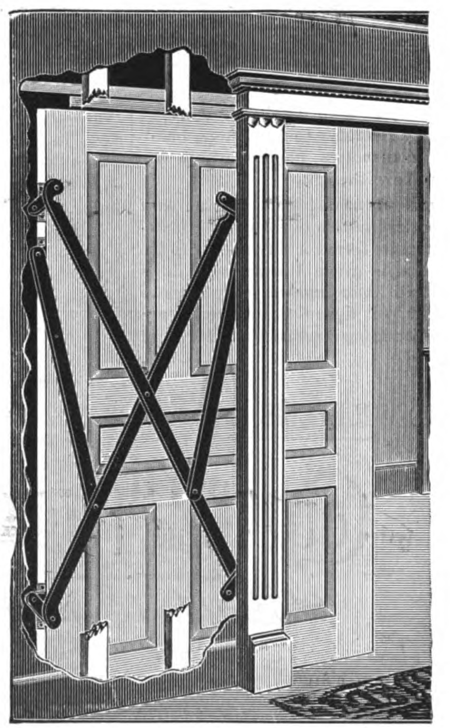
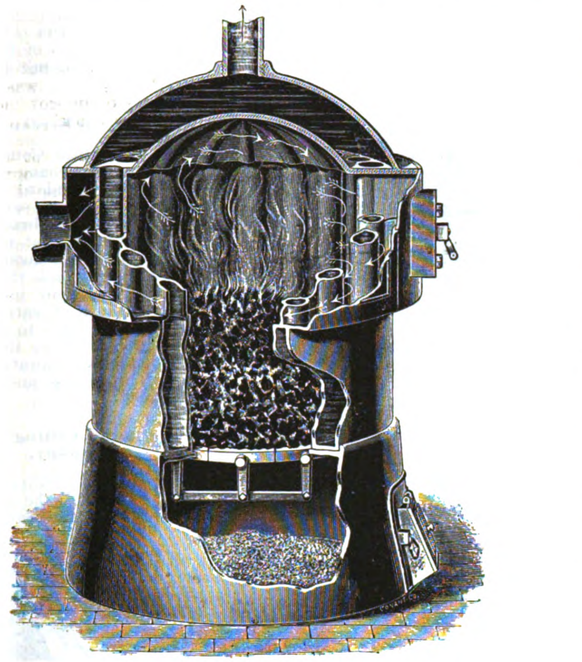


Fig. 3 —The Improved Prescott Trackless Door Hanger.

A DISASTROUS FIRE occurred in New York City on the morning of Sunday, January 19, whereby a number of concerns were burned out. Among the sufferers were Moeslein & Crane, whose office in Forty-second street was slightly damaged but not to an extent sufficient to interfere in any way with the conduct of their business. Hereafter their office will be at the factory, which is located at 420-422 East Forty-eighth street, New York City.

The Doric House Heating Boiler.

A new line of house heating boilers in which builders and house owners generally will be interested has just been put on the market by the Gurney Heater Mfg. Company of 163 Franklin street, Boston, Mass. In Fig. 4 is shown a sectional broken view revealing the internal construction. In directing attention to this boiler the manufacturers allude to the round fire pot, which, they say, is particularly well adapted to household use, as it secures better combustion and permits the fire to be more readily cleaned and avoids dead corners; and furthermore, the circular form gives it much greater strength. The heater is a cored casting, made in one piece without any joints whatever, and is therefore, it is pointed out, durable and cannot leak, while with proper care it will last an indefinite period. The fire pot is made corrugated on the side next to the fire, thus largely increasing the heating surface and having a series of 2½-inch tubes, cast on, which run vertically into the dome. The latter is made with a series of ribs or extended surfaces cast to it, as shown in the illustration, exposed directly to the fire and extending from the center 1½ inches deep by ⅜ inch thick. These are so placed that they increase the direct heating surface and cause a more rapid circulation of water and also receive the flame contact. It is particularly pointed out that the heating surface presented to the direct action of the fire is very effective—that is, the fire shines on every portion of it. The circulation, as shown in the illustration, is vertical and the surfaces, it is pointed out, are practically self cleaning. An important feature is that the tubes connecting the fire pot to the dome or top have a series of flanges or webs cast to them for about three-quarters of the circumference of the fire pot on each side. This makes it impossible for the heat to escape from the fire pot without first coming in contact with all the surfaces inside the heater. The flues are so constructed that they hold the products of combustion, which pass from the fire pot near the front on each side and traverse the tubes on the outside before their final passage through the smoke outlet at the rear of the heater. Iron plate castings lined are provided around the tubes, which, being removed, permit easy access for the purpose of cleaning. The boilers are said to be adapted to any kind of fuel, as they have no surfaces to soot up. The Doric heaters are at present made in one size for hot water with a rated capacity of from 500 to 600 square feet gross, and in one size for steam with a capacity of from 275 to 375 square feet of radiating surface gross.



Novelties.—Fig. 4.—Sectional View of Doric Hot Water Heater.

The Sanitas Ventilating Closet.

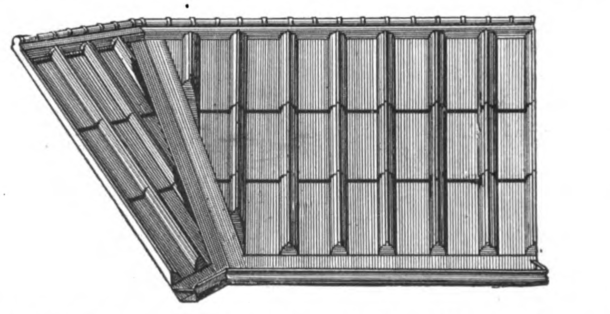
A water closet specially adapted for institutions, schools and asylums has recently been brought out by the Smith & Anthony Company, Boston, Mass., and is shown in Fig. 5 of the accompanying cuts This addition to the Sanitas line of plumbing fixtures is known as the Sanitas ventilating closet. It is made of unusually thick porcelain, and is well adapted to stand the rough usage it is liable to receive in the buildings for which it is designed. It is intended for use in connection with a heating flue, and has large double ventilating flues with a capacity equal to a 4-inch pipe. These flues merge into one vent pipe which runs from the rear of the closet to be connected with the heating flue. A porcelain vent horn is made sufficiently long for a connection to be made with the metal pipe behind the wall. Owing to the unusually large vent flues, it is claimed that a steady downward draft from the seat of the closet passes rapidly, and not only carries all odors from the closet but also from the room. This insures the ventilation of the toilet room independent of any general system of ventilation that may be in the building. The closet is made in an unusually deep seal and a large area of standing water.

Fig. 5.—The Sanitas Ventilating Closet.

AT THE RECENT ANNUAL MEETING of the Canton Steel Roofing Company of Canton, Ohio, the followig officers were elected: President, T. C. Snyder; vice-president, F. Herbruck; secretary and treasurer, C. H. Schlabach, and superintendent, B. C. Belding. The above officers, including W. W. Clark, were elected directors. We learn from the company that the business for 1895 was satis factory, and indications point to a good trade for the ensuing year. They expect soon to have ready a new and complete line of ornamental stamped ceilings.

Turner's Metal Roof Plate.

The roofing trade will be interested in a new form of metal plate brought out by John Hamilton, Pittsburgh, Pa., who has fitted up a portion of his works for the special production of it. The plate is the invention of W. S. Turner, a practical roofer and metal worker, and the name of the roof covering is Turner's flexible Venetian metal roof plate. The illustration, Fig. 6, shows a section of a roof covered with this plate, the design, we understand, having been modeled upon the old Venetian corrugated roof type. It is claimed to be absolutely rain and water proof and at the same time durable, besides having a very pleasing appearance. The roof is prepared for the plates by nailing on strips of wood 10¼ inches apart. The plates are nailed to this strip along one edge, while the other edge and the ends lock with the adjacent plates. The nail holes, being in the upper part of the plate, are entirely covered by the succeeding plate. The cross locks are provided with a drip edge projecting over the shoulder of the plate below, the plates, however, being so constructed that the horizontal locks may be alternated if desired. The plates where fitted to gutters and valleys can be soldered, if desired, so as to make them entirely water tight. An end plate is provided along the gutter which has an extra piece which covers the end of the semi-circular hollow in which runs the strip supporting the plates. The expansion and contraction of the plate are provided for by the peculiar construction of the lock, giving it sufficient play. These plates can be furnished made from Hamilton's well-known roofing ternes, and also in copper.



Novelties.—Fig. 6.—Section of Roof Covered with Turner's Metal Roof Plate.

Pease's Made-to-Order Screens.

C. H. Pease, 124-126 East Water street, Cincinnati, Ohio, has designed a line of sliding window screens which are made to order from measurements sent him. The frames are made with doweled joints, from clear, dry, white pine, which, it is claimed, will keep its shape much better than any of the hard woods. The frames are $\frac{13}{16}$ inch thick, beaded on both sides, and are designed to slide on stops, just outside of the upper sash, to be out of the way and not to interfere with the working of either blinds or sash. Two concealed springs are located, one near the top and the other near the bottom of one side of the frame, in the groove, to render it possible to raise, lower or leave the screen at any desired point. A lift is fastened on the top of the lower cross piece of the frame. The screen is removed by taking hold of the lift and pressing the frame to one side. Twelve-mesh wire cloth is used in the frames. Stationary window screens are made the same as the fore going except that the grooves, springs and side strips are omitted. The manufacturer remarks that the screens combine the price inducements of the cheap hand-me-down kind with all the good qualities of elegant polished screens.

Foot Power Jointer.

The demand for a foot power jointer has been such as to induce L. F. Parks of Cincinnati, Ohio, to bring out a jointing attachment for what is known as his No. 5 Combined Machine. This, so far as the manufacturer is aware, is the first and only complete foot power jointer now on the market having the necessary adjustable support in the back of the cutter head. The table in the back of the cutter head is made to rise a distance equal to the portion taken off by means of a plate which has inclined bearings and is adjusted with a hand wheel. Owing to the fact that in the case of foot power machines it will require too much power to speed the cutter head to do smooth work with only two or three knives, Mr. Parks furnishes a cutter head with eight knives which rest against a shoulder and are turned off true. The illustration shown in Fig. 7 of the cuts represents the No. 5 Combined Machine set for jointing.

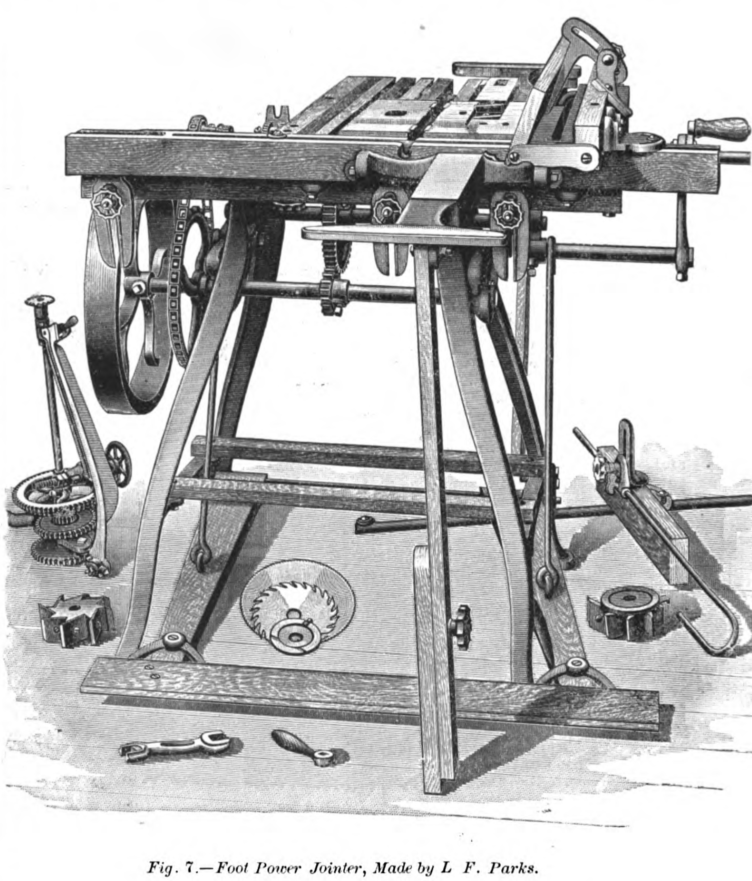


Fig. 7.—Foot Power Jointer, Made by L. F. Parks.

Standard Oil Screen Door.

The A. J. Phillips Company, Fenton, Mich., have changed the pattern of their Standard Oil screen door, by cutting a scroll in the edges of the corner brackets. The company point out that in the door the materials are all good as well as the workmanship, and that the design admits of rapid manufacture, while but one coat of varnish is used. The new design adds to the appearance of the door, while its construction enables the manufacturers to make extra low prices and to give excellent value.

The Penn Metal Ceiling & Roofing Company.

The Penn Metal Ceiling & Roofing Company, Limited, is the new name of the concern for many years known as the Penn Iron Roofing & Corrugating Company, Twenty-third and Hamilton streets, Philadelphia, Pa. This change in the name was decided upon at a recent meeting of the directors, on account of the advancement made by the company in the manufacture of

art metal ceiling plates and side wall finishings, and of the opinion they had formed that their company name did not associate them with the manufacture of art metal plates, although they could claim to be pioneers in the business. They have recently added to their plant and much improved it, and their output is consequently much increased. They claim to have in their plant the largest press ever built for making metal plates. This press is used mainly for turning out deep molding plates, in depths running from 1¼ to 2¼ inches. The company state that they are the sole makers of the deepest plate on the market—viz., 2¼ inches. The press weighs 44,000 pounds, and its cement and stone foundation 27,000 pounds. The fly wheel is 72 inches in diameter, weighs 1¼ tons, and makes 276 revolutions per minute. The pressure tonnage is 675 tons. In hight the press is 11½ feet and in width 4 feet. The lift between dies is 3½ inches. It will stamp plates 32 x 60 inches at the rate of 12 per minute, and this size is the limit of its capacity. It will take plates as small as 9 x 9 inches, stamping them six at a time, at the rate of 72 per minute. It is also adapted to continuous work as wide as 34 inches, to 120 inches in length. The company have just published a 20 page pamphlet showing a few of their new patterns of plates and interiors of several churches, offices, cafés and residences finished with metal ceilings and side walls. This pamphlet is supplied in quantities to the trade. They have also published a 16 page price list covering their general catalogue.

TRADE NOTES.

JAMES G. WILSON of 74 West Twenty-third street, New York City, has introduced his wood lock flooring into a number of buildings in and about the city, one of the latest jobs being the flooring in the Vanderbilt wing of St. Luke's Hospital. The results have been very gratifying in every case and the durability of the flooring is commanding marked attention in the trade. Our readers will remember that an illustrated notice of this system of flooring appeared in these columns not long since.

THE GARRY IRON & STEEL ROOFING COMPANY, Cleveland, Ohio, have been changed from a copartnership to a stock company, with a capitalization of $250,000.

WILLIAM CONNORS, Troy, N. Y., distributes to his friends in the trade a decorated calendar of large size. The sheet measures 13¼ x 21 inches, and half of it contains a handsome colored lithograph of a small company of small soldiers caparisoned for war and marching to the beat of the drum. The scene is made still more realistic by the fair hands dropping flowers in the way. The calendar, which gives the phases of the moon and the times of its setting, is of such large size as to be plainly visible at a distance. Across the top of the calendar is a line, "American Seal Paint," and underneath the calendar sheets are further particulars of roof paints, stove linings, stove putty, cements, &c.

BERGER BROTHERS, 231-237 Arch street, Philadelphia, Pa., are sending to their friends in the trade a very pretty calendar for the year 1896. The decoration is a fine and attractive engraving. The calendar proper is printed plainly with large figures that may be seen at a distance. Incidentally reference is directed to the goods which Berger Brothers manufacture, including tinners' hardware and roofers' supplies. A list of other manufacturers for whom they are agents, with mention of their specialties, is also given.

THE WHEELING CORRUGATING COMPANY, Wheeling, W. Va., issue a tasteful little vest pocket calendar for 1896, in which attention is called to the one-piece galvanized conductor pipe manufactured by them. The addresses of their New York, Chicago and St. Louis branches are also given.

THE F. A. REQUARTH COMPANY, Dayton, Ohio, advise us that they are now installed in their new plant, with an entire new equipment of engines, boilers and many improved machines. They are now in a position to do all kinds of porch and stair work economically and in the highest degree of perfection. The company are following this year the plan they adopted last year of sending out each month a neat card calendar, embellished with advertising matter relative to the goods which they manufacture and illustrated by means of a design of a portion of a double staircase. The printing is in black upon a white ground, and the effect is exceedingly neat and tasteful. A line at the top of the card requests the recipient to hang it up, there being an eye for the purpose.

THE H. W. JOHNS MFG. COMPANY have recently increased their manufacturing facilities in Brooklyn, N. Y., by the addition of a new dryer house, which is built entirely of steel, the work being done by the Berlin Iron Bridge Company of East Berlin, Conn.

THE COX COMPUTER COMPANY have opened an office at 173 Greenwich street, New York City, where they have on exhibition the various computers invented by Mr. Cox, president of the company. The computers are mechanical devices by means of which formulæ of constant use in the mechanical, electrical and other engineering professions can be solved in a very simple and rapid manner. They consist of two or three parts, such as a foundation plate, a revolving disk, and when the formulæ are of more than four factors a revolving segment or arc, upon each one of which are printed scales corresponding to the various factors of the formulæ so combined that by turning the disk or segment round and bringing the values of the different known quantities opposite each other, the values of the unknown are immediately found. The computers are made in various sizes from the smallest suitable for the pocket to the large ones especially designed for the desk or drafting room.

SAMUEL H. FRENCH & CO., York avenue, Fourth and Callowhill streets, Philadelphia, Pa., have issued, with the compliments of the season, a very convenient and useful memorandum tablet, which combines a weekly, monthly and yearly calendar. Each leaf is intended for a week, there being seven spaces for entering memoranda. At the top of the sheet is the name and address of the company with an indication of the lines of goods manufactured. The days of the week and month are printed down the left edge of the sheet, while at the bottom is a suggestion to visit the firm's exhibit at the Master Builders' Exchange and also at the Bourse, a magnificent building recently completed in that city. The leaves forming the tablet are bound to a stiff paper back, upon which are given the rates of postage, both domestic and foreign. The tablet is also arranged with a metal loop at the top so that it may be hung about the desk within convenient reach.

AT THE ANNUAL MEETING of the new Board of Directors of the Kansas City Metal Roofing & Corrugating Company the following officers were elected to serve during the year 1896: Jerome Twitchell, president and treasurer; W. Mason Robinson, vice-president; E. R. Purves, secretary. The company advise us that the year just closed has been a prosperous one, and that the year 1896 gives promise of being still more so.

THE NEW HARRINGTON HOIST is described in a catalogue received from J. Q. Maynard of 114 Liberty street, New York, who is the New York and New England manager of Edwin Harrington, Son & Co. of Philadelphia. The following are some of the new features of this hoist: The worm gear, formerly of iron, is now made of bronze, with square hubs instead of clutches, and is driven by a steel worm; the load wheels are now made with square holes fitted to worm gear, instead of clutches, thus increasing the strength and avoiding the liability of breaking clutches; the load hook is provided with swivels, so that any twist of the chain may be removed at once; a thrust screw and bronze washer are placed at the end of the worm, instantly adjustable, to provide greater safety in lowering, as is desirable in some cases; an improved and closely fitted housing for the worm and gear protects them from dirt and retains the oil. The catalogue fully describes the several forms of hoists, overhead tramways, traveling cranes, &c.

THE MOESLEIN & CRANE CEILING COMPANY of New York City have been organized, with a capital of $30,000. The directors are Valentine Moeslein, Robert E. Graham and William Menkhoff of New York City.

THE COLUMBIA PAD CALENDAR FOR 1896, issued by the Pope Mfg. Company, Hartford, Conn., has made its appearance, representing the eleventh annual issue, and handy and convenient as it has been heretofore, the new issue surpasses any of its predecessors. The new calendar contains a much better arrangement than in previous years, more space having been allowed for memoranda, while a greater charm has been added by liberal illustration and convenient grouping of dates, calculated to meet the hurried needs of business men.

R. C. BARTLEY & CO. of Bartley, N. J., have recently installed one of their B size Salmon heaters in the residence of B. A. Melick, at Lebanon, N. J.

WE ARE INDEBTED to P. Pryibil of 513 West Forty-first street, New York City, for a copy of the 1896 calendar which he is distributing to his friends in the trade. The card measures 11 x 14 inches, and is provided with an eye for the purpose of hanging it upon the wall. It is embellished with a design autumnal in character supplemented with printed matter relative to the lines of business in which Mr. Pryibil is engaged. Reference is made to wood working machinery, especially that for piano manufacturers, shafting, pulleys, hangers and gearing. Some of the productions of the establishment are illustrated, the goods being arranged at the right and left of the leaves forming the calendar proper. These leaves are attached to the lower portion of the card, there being 12 for the different months of the year and one for the entire 12 months.

THE AMERICAN BOILER COMPANY of New York and Chicago favor us with a four-page circular illustrating and describing the Florida Junior steam heating boiler, which is intended for warming private dwellings, small hotels, greenhouses, stores, &c. It is referred to as being compactly built, and where space is limited the heater can be placed in an out of the way corner of the basement or in an adjacent shed. It is constructed entirely of cast iron, the parts being perfectly fitted together and the joints few in number. Before leaving the factory the boiler is thoroughly tested, being subjected to a pressure of 80 pounds to the square inch. The manufacturers refer to the heater as being positive in its action and by reason of the arrangement of flow pipes it is convenient for any system of piping.

W. JACKSON'S SONS, with offices and salesroom at 246 Front street, New York City, have issued from the press a very tastefully illustrated catalogue, showing some of the designs of fire places, grates for open fire places, spark guards, gas logs, andirons and fire sets which they manufacture in great variety. Among the designs of fire places may be mentioned one in which the frame fender and andirons are of hand wrought work with fleur de lis iron lining and rustic front rolling grate. The tile hearth and facing may be of any color preferred. Another design of open fire place has a brass frame fender, with cast panels, fluted ball andirons, fleur de lis iron linings and swell front nickel grate. Still another design has a rope frame, rope andirons and fender, nickel plated grate and iron linings. The firm also make a specialty of tiles for bathrooms, vestibules, fire places, walls and floors.

WE HAVE RECEIVED from the Glen Cove Machine Company, Limited, with office at 50 Broadway, New York City and works at 22-30 Clay street, Brooklyn, N. Y., a poster illustrating two of their specialties in the way of wood working machinery. The upper part of the poster carries a general view of what is known as the Company's No. 56 Heavy Hardwood Flooring Machine, having five heads, eight feed rolls and weighing 10,000 pounds. The other view represents the Company's No. 200 Automatic Self Feed Knife Grinder, weighing 1300 pounds. The company make a specialty of improved fast feed sizing machines, planing and matching machines, flooring and ceiling machines, inside molders, double surfacers and also the well-known Glen Cove Double Decker and the Glen Cove Special.

AMONG the many prominent buildings that have recently adopted the well-known system of reflectors manufactured by I. P. Frink, 551 Pearl street, New York, are the following: Sacred Heart Hall, Indianapolis, Ind.; Presbyterian Church, Oneonta, N.Y.; Masonic Hall, Summit, N. J.; St. John's Lutheran Church, Tamaqua, Pa.; Friends' Church, Indianapolis, Ind.; Opera House, Bristol, Conn.; Centenary M. E. Church, Binghamton, N. Y.; Tenth Battalion Armory, Albany, N. Y.; First Congregational Church, Everett, Wash.

THE LUDLOW-SAYLOR WIRE COMPANY, St. Louis, held their annual election on January 15 and the following Board of Directors were elected to serve during the ensuing year: W. P. Duncan, Geo. D. Dana, H. M. Meier, C. L. Dean and Frank Lowe. The following officers were elected: President, W. P. Duncan; vice-president, C. L. Dean; secretary and treasurer, Frank Lowe; superintendent of manufacturing department, E. J. Gould.

THE BANGOR WEATHER STRIP COMPANY, Bangor, Maine, have been organized, with $25,000 capital stock. The officers are: H. C. Reynolds, president and F. W. Gilbert, treasurer.

THE LUFKIN RULE COMPANY, Saginaw, Mich., advise us that they have just completed the most prosperous year of their existence. With increased facilities, having recently finished a large addition to their plant and installed new and improved machinery, they state that they are in better shape than ever to meet the wants of their customers. They refer to the completeness of their line of steel and metallic measuring tapes, to which they are intending to make further additions, while every effort will be made to maintain the standard of these goods.

— JUSTICE: "What is the charge against this prisoner?"

Officer: "Having an infernal machine in his possession, yer Honor."

Justice: "Anarchist or bicyclist?"—*Brooklyn Life.*

— VIOLET: "I've just had a letter from George, and he says he's going to be married."

Vivienne: "Going to be married! Why, I thought—— Well, you seem very cool about it. Who's he going to marry?"

Violet: "Me."—*Judy.*

— NOTHING TO RECEIVE. — Judge: "What is the use of appointing a receiver for this corporation? There is nothing left to receive."

Lawyer: "Your Honor, I will show by numerous cases that it is not customary to appoint a receiver while there is anything left to receive."—*Brooklyn Life.*

CARPENTRY AND BUILDING

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
96-102 READE STREET, NEW YORK.

MARCH, 1896.

Architectural League's Exhibition.

The eleventh annual exhibition of the Architectural League of New York, which opened under favorable auspices on February 15 in the building of the American Fine Arts Society, West Fifty-seventh street, is interesting in many ways. The exhibits are varied in character, representing the efforts of architects in many sections of the country, and affording a valuable lesson for the student of architecture. The displays are carefully arranged in the various galleries of the building, the first being devoted to decorative work, the middle galleries to sculpture, and the large Vanderbilt gallery to sculpture and architectural drawings, the latter occupying the various alcoves. The archtectural work is of a very interesting nature, covering elaborate drawings in colors of sky scraping office buildings, palatial residences in city and country, club houses, &c. Probably the student of architecture will linger longest in the alcove devoted to the works of the late Richard M. Hunt, where, guarding the entrance, are two life size figures for a French walnut mantel at Biltmore. On the wall are original drawings, while on the screens are photographs of his original work. One of the noticeable features of the gallery, where are hung nearly 375 drawings, is the apparent effort to arrange the work of each architect by itself, instead of scattering the drawings through the gallery. In addition to the architectural drawings are displays of decorative work, cartoons for stained glass, wrought iron work, mosaic, carvings in stone and wood, bronze work, &c. The exhibition continues until March 9 and should prove highly successful. A radical departure from previous years is that the exhibition is free to the public with the exception of two days in the week.

Mechanics' Lien Law in New York.

Thomas J. Dowling, Labor Commissioner for New York State, lately conducted in New York City an exhaustive investigation into the practical working of the mechanics' lien law. As a result of his inquiries, Mr. Dowling reports that from testimony given at the investigation, the mechanics' lien law is of no benefit to the workmen engaged in the building trades. He regards it as evident that the existing statute has been a great failure because of the great cost and trouble of collecting unpaid wages from contractors and builders who have failed to comply with its provisions. It is also contended that irresponsible builders are accustomed to take contracts at the lowest possible figure, with the evident intention of defrauding the workmen out of their legitimate earnings by evading the lien law through the loop holes which are left open. It is furthermore complained of that mortgages take precedence over the claims of wage earners; and for that reason it has been often the case that workmen have found it impossible to collect their wages even after going to the trouble and expense of filing liens. Not being protected by the lien law, Mr. Dowling says that the wage earners have been frequently obliged to go on strike in order to recover back pay; and on some occasions the amount lost in wages because of these strikes has largely exceeded the amount of the unpaid wages. During the nine years ending 1893, in which the Labor Bureau investigated labor disputes, there were 331 strikes in New York State caused by the non payment of wages. There were 8007 people engaged in these strikes, and the losses entailed by them and their unions amounted to $72,452. In addition to this it has been found that during the past two years there was an unprecedented number of strikes to compel the payment of wages, while the pecuniary loss resulting from them has been very large. Mr. Dowling justly remarks that it seems radically wrong to put working people to such annoyances and loss in order to obtain their just demands, and that they should have adequate relief in an efficient and equitable law based upon principles of justice and right. He recommends the passage of a law in New York State providing that when any building shall be erected in whole or in part by contract, such building and the land whereon it stands shall be liable to the contractor alone for work done; that at the time of making the first payment of the price stipulated to be paid thereon, and every installment of it, the contractor shall produce and deliver to the owner proof that all journeymen and laborers employed in the work of construction have been paid in full.

Exchange Benefits.

Many of the members of builders' exchanges in various parts of the country seem to labor under the impression that admission to an exchange is a guarantee of additional work without further effort on their part. They seem to think that the payment of the initiation fee is a transaction whereby their bank balance will be immediately increased without any effort of their own. They seem to fail utterly, in many cases, to understand that the fee they pay for membership is simply and solely their share toward the maintenance of an institution which offers them the privilege of joining with their fellows for mutual benefit. Every builder expects to work to secure contracts until he joins an exchange, and then he seems to expect them to be brought to him unsolicited. When he finds that such is not the case his disappointment is generally so great that he condemns the whole institution and entirely ignores the fact that it is much more beneficial and profitable to work in harmony with his competitors and patrons than it is to work by himself and often against all others.

Ventilating Gas Lighted Rooms.

At the recent meeting of the American Gas Light Association, at Philadelphia, the importance of ventilating rooms lighted by gas was discussed. It was remarked that one of the claims made in the interest of electric lighting was that as there was no combustion there was no attending vitiation of the air. In meeting this claim it was asserted that the pollution of the atmosphere by a gas flame was greatly overrated, and that the circulation of the air caused by the high temperature of the flame was beneficial. It was also pointed out that in some buildings the gas was burned under flues leading to ventilating shafts and a change of air was secured in that way. It was generally recognized that ventilation should be provided for, and several suggestions to that end were made, all pointing to the need of an outlet for foul air near the ceiling and an inlet for fresh air near the floor. The prevailing opinion was that the architect who designed the building should be held responsible for neglect to provide a proper system of ventilation. The architect generally has all of the preliminary talk with his client deemed necessary before the plans are begun, and if the advantages of a good system cf ventilation were explained better ventilated buildings, and buildings that can be much more readily heated, would be the result. Often the owner does not understand the necessity of ventilation until he comes in contact with the heating contractor, who reports himself in difficulties to secure successful results with the provision made for the heating system in the building. The Gas Light Association will have done a good work if they assist in bringing about better ventilation in the buildings of the future.

Shop Economies.

In a systematic study of possible economies with a view to reducing tne cost of production, a young and clever engineer employed in a manufacturing establishment near New York lately hit upon an idea which might be adopted with advantage by manufacturers in all lines. Convinced that the large economies had been well looked after, and that his greatest usefulness lay in the discovery of opportunities for small savings, the young man made a diagram showing a ground plan of the works. On this diagram he traced, in colored lines, the course of the various materials employed in the industry. The results were surprising. The path of each material entering into the finished production of the works suggested nothing so much as an admiralty chart tracing the course of a derelict at sea. Instead of moving steadily forward from stock pile to shipping room it was found that the material zigzagged around the works, twisting, turning and doubling on itself until its path was 12 or 15 times the greatest length of the plant. Obviously this meant unnecessary handling. Looking more closely, the investigator discovered that instead of being a continuous process the business consisted of half a dozen or more separate processes, each in the hands of a little group of workmen whose special skill had for years been overvalued, but who had taken good care to see that no one of their number set a pace which the others found inconvenient. Over each of these groups was a foreman whose ambition it was to erect his branch of the industry into a distinct department. To this end he had got it as much as possible by itself, and was not satisfied until he had a closed door between his room and the one adjoining it. No one realized the evils of this system until the diagram of which we have spoken made it evident at a glance. To effect the reform needed, recourse was again had to the graphical method, and it was found that with very little expense the amount of moving and handling of material in process of manufacture could be reduced one-half. One or two new doors were cut, and the machinery was rearranged with a view to bringing the several processes as nearly as possible into line. As a result it was found that a good deal of the unskilled labor formerly employed about the works could be dispensed with. It was further found that the problems of the management were materially simplified, and that the unequal working of the several departments was early and permanently corrected. What had been half a dozen processes became one continuous process. By a discreet shifting of labor the special skill of each little group of mechanics became common property, and the cliques which had been a brake on the wheels of the industry were effectively broken up. The weekly pay rolls were materially reduced, the output was increased in quantity and improved in quality, and a very pronounced tendency to "dry rot" was checked and corrected.

Competition Among Contractors.

The ruinous competition among contractors in the smaller towns and villages is due in a great measure to the fact that workmen, when out of employment, are ready to snap at anything that gives promise of remuneration of any kind. Men who may be good mechanics in their several callings, but who know little or nothing of estimating, and less of the management of men or work, put in bids for contracts that are either away above the mark or ridiculously low. The former does little harm, as the overgrown tender is never considered, but the low tender injects its poison into the whole transaction and leads the owner to believe that the legitimate tenders are much too high and that an attempt to take advantage is being made. This state of affairs generally ends in either awarding the contract to the incompetent low bidder or a second call for tenders, says the *Canadian Architect and Builder*. If the first, the contractor usually bungles the whole matter, partly from lack of knowledge and partly from the fact that he soon discovers there is no money in the job for him ; then comes a series of schemes and efforts to slight the work and cram in inferior material, against which the architect or inspector "kicks," with the result that the contractor gets deeper and deeper into the mire, until at last, in despair, he either throws up the work or lowers his head to the inevitable, which is often ruin to himself and family. If new tenders are called for the legitimate contractors, in their efforts to keep out the "workman," will cut down their estimates to starvation rates, while the "incompetent," in his eagerness to get work, makes further reductions in his tender, thus dropping into the "trap" prepared for him by the regulars, and as a rule his low figures catch the owner, in spite of the advice or protests of the architect, and the result is trouble and confusion all round and oftentimes severe loss to the owner. This is a sad and injurious condition, but it exists in every town in Canada and should be brought to an end. Can it be controlled? With proper management we think it can.

A Unique Heating System.

The system of heating and ventilating provided for the new Pabst Theater, at Milwaukee, Wis., is elaborate and possesses some unique features. All the heat will come in through openings in the proscenium arch, which appear to be part of the decorative scheme. Each is oval and filled with a wrought iron screen. The heating apparatus is in the roof, but there is no fire there, the steam used for heating coming from the Pabst power house, from which place the electricity used for light and power also comes. The air is taken from above the building and is "washed" by being conducted through a shower of water. After being purified it goes through steam coils which heat it to any degree that may be desired and two big fans, each 13 feet in diameter, force it through the openings in the arch and into the auditorium. While the heating is done through the ceiling, so to speak, the ventilating is through the floor. Under each seat, or rather behind each seat, is a ventilating hole, which lets the foul air through into the basement, which is a big ventilating chamber. In one corner are two more big fans of the same size as those in the roof, and they suck out the foul air below as fast as the others force fresh air in. An electric motor of 50 horse-power drives the fans, but a very gentle action will accomplish the desired end, and Architect Strack says that he could produce a draft with the machinery at his command strong enough to take the ladies' hats off their heads.

At Bassorah, in Asiatic Turkey, where they have no timber but the wood of the date-tree, which is like a cabbage stalk, they make arches without any frame. The mason, with a nail and a bit of string, describes a semicircle on the ground, lays his bricks fastened together with a gypsum cement on the lines thus traced, and having thus formed his arch except the crown brick, it is carefully raised and in two parts placed upon the walls. They proceed thus till the whole arch is finished. This part is only half a brick thick, but it serves them to turn a stronger arch over it.

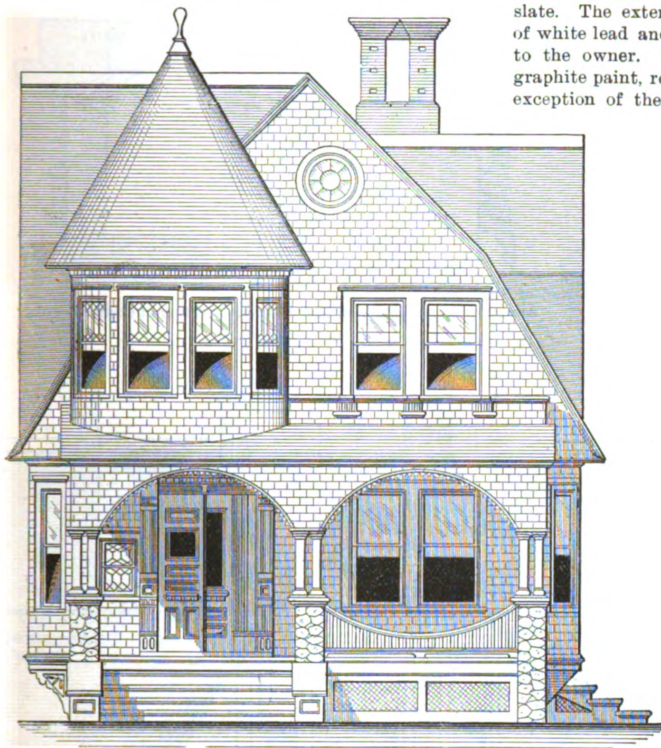
RESIDENCE OF MR. GERHARD DEPKENS, AT HASBROUCK HEIGHTS, N. J.

STANLEY ARTHUR DENNIS, ARCHITECT.

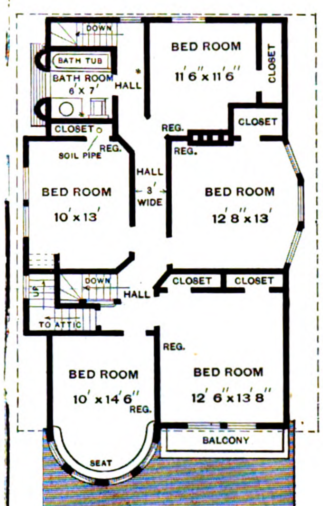
SUPPLEMENT CARPENTRY AND BUILDING, MARCH, 1896.

COTTAGE IN A NEW YORK CITY SUBURB.

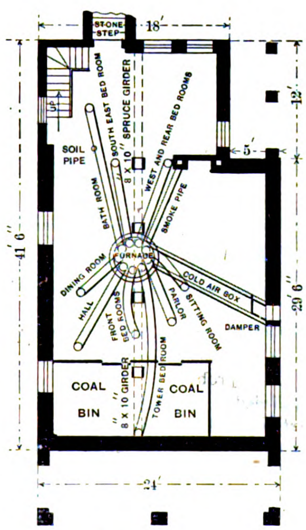
THE cottage of neat and effective design which we illustrate by means of the elevations, floor plans and constructive details presented herewith, is pleasantly located in one of the many suburbs of which the City of New York can boast. An idea of the appearance of the completed structure may be gained from an inspection of the half-tone supplemental plate, which is a direct reproduction from a photograph taken specially with this object in view. The house has a frontage of 28 feet over all and a depth of 48½ feet. There is a cellar 7 feet in the clear under the entire building, and a cement bottom composed of 4 inches of concrete, over which is a separate coating 1 inch thick, composed of equal parts of Portland cement and sand. The cellar walls, 18 inches thick, are composed of local brown stone, and pointed on the outside above grade with black cement mortar. The structure is of balloon frame, well spiked together. The sills on the foundations are 4 x 8 inches, the first and second story floor beams 2 x 10 inches, attic beams 2 x 8 inches, rafters 2 x 6 inches and studding 2 x 4 inches, all placed 16 inches on centers. The corner posts are 4 x 6 inches, mortised for ribbon boards, and all the plates are made of 2 x 4 inch wall strips doubled and well spiked together. Window and door studding are doubled, also the floor beams for trimmers and headers, as well as under all partitions. The outside walls at the first story, with the exception of the bays, are covered with narrow square edged planed clapboards, while the bays and gables are covered with dimension white pine shingles with fancy assorted butts. They are laid 4 inches to the weather and put on with wire nails. All other exterior wood work is of white pine. The main roof, tower and the front porch are covered with single ply tar paper and No. 1 8 x 16-inch Chapman slate. The exterior wood work is treated with two coats of white lead and linseed oil paints of colors satisfactory to the owner. The tin work is treated with Dixon's graphite paint, red in color. All the windows, with the exception of the attic and cellar, are fitted with outside blinds and hung with Streeter's automatic blind hinges. All sash are glazed with double thick American sheet glass and cathedral marginal lights where shown. Across the front of the house is a broad porch, which is finished



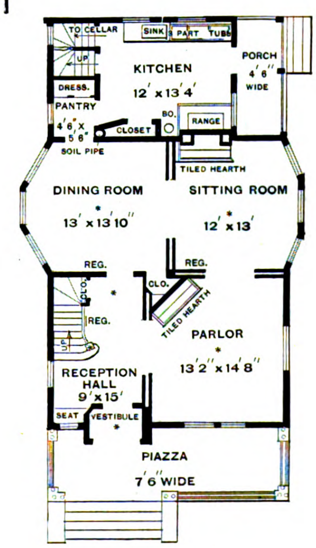
Front Elevation.—Scale, ⅛ Inch to the Foot.



Second Floor.



Foundation.



First Floor.

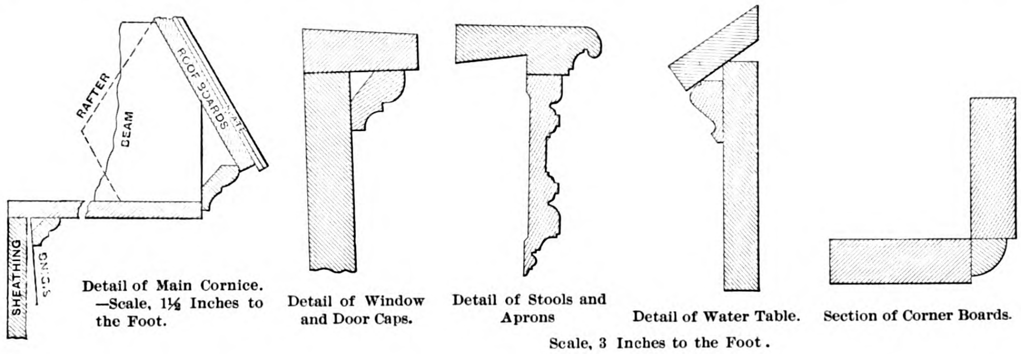
Scale, 1-16 Inch to the Foot.

Cottage in a New York City Suburb.—Stanley Arthur Dennis, Architect, Arlington, N. J.

under the roof with North Carolina pine ceiling boards. The arches and roof of the piazza are supported by several pairs of 6-inch turned yellow pine columns, with caps and bases of the same material, resting on high stone piers constructed in the same manner as the foundation walls and fitted with 4-inch fine axed blue stone caps.

The first story of the house, which is 10 feet in the clear, has a double floor, the top one being of narrow ⅞-inch North Carolina flooring boards laid on top of of sand and lime mortar, well haired. It is white finished with white mortar, white sand and plaster of paris, well troweled down straight and hard.

In the cellar is a cold room with ample shelves, &c. two large coal bins, made dust tight and with a large and small door to each, and a Thatcher portable hot air furnace with pipes leading to the registers, which are set in the side walls, with the exception of the one in the main hall, which is in the floor. The pantry, which affords commu-



Detail of Main Cornice.—Scale, 1½ Inches to the Foot.

Detail of Window and Door Caps.

Detail of Stools and Aprons

Detail of Water Table.

Section of Corner Boards.

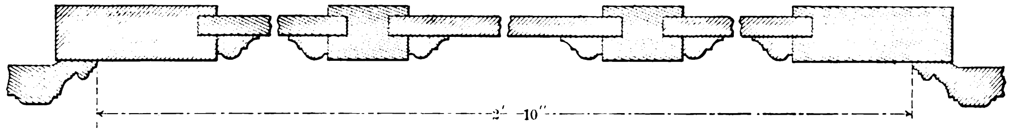
Scale, 3 Inches to the Foot.

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

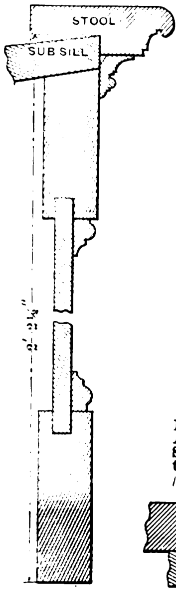
Cottage in a New York City Suburb.—Side Elevation and Miscellaneous Details.

two-ply Empire sheeting paper and lath and blind nailed. The second floor, which is 9 feet in the clear, is covered with ⅞ x 4 inch North Carolina pine flooring boards. The attic is covered with the same kind of flooring, although the best was selected and used on the second story. The trim throughout the house is of selected kiln dried white pine. The kitchen and the bath room are wainscoted 3½ feet high with narrow North Carolina pine ceiling boards with a rabbeted molded cap on top. The whole interior is finished in the natural wood with one coat of Berry Brothers' liquid filler and three coats of their hard oil finish. The front doors are grained to resemble oak and are fitted with large lights of bevel plate glass, as is also the vestibule door. The house is plastered with three coats

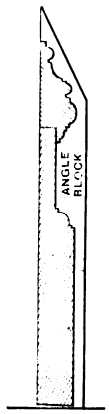
nication between the kitchen and the dining room, contains a large dresser fitted with adjustable shelves and glass doors running to the ceiling, while under the counter shelf are several drawers and closets. The kitchen is fitted with a range boiler, washtubs and sink with open plumbing. The back stairs lead from the kitchen to the second story rear hall, and there are also stairs leading down from the kitchen to the cellar. In the parlor is an open fire place with tiled hearth. The main stairs leading up from the reception hall are fitted with turned oak newels, balusters and rails. The space between the stair string and floor, as well as the angle underneath the stairs, are laid off into neat 6-inch molded panels of white pine. On the second floor are five sleeping rooms contain-



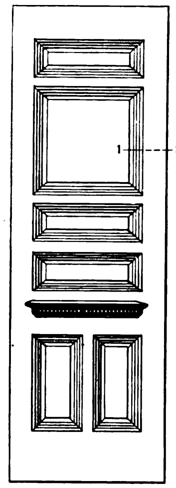
Horizontal Section of Panel Backs.—Scale, 3 Inches to the Foot.



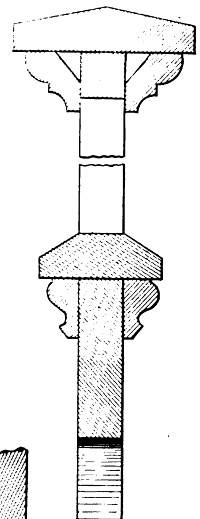
Vertical Section of Panel Backs.—Scale 3 Inches to the Foot.



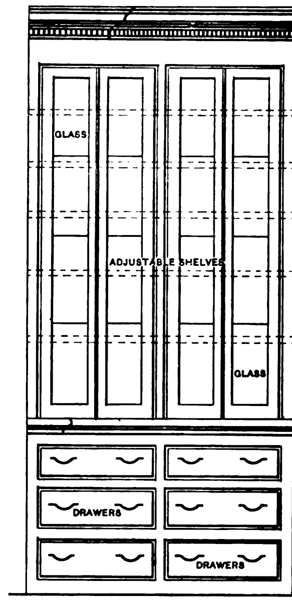
Section of Base Molding and Angle Block.—Scale, 3 Inches to the Foot.



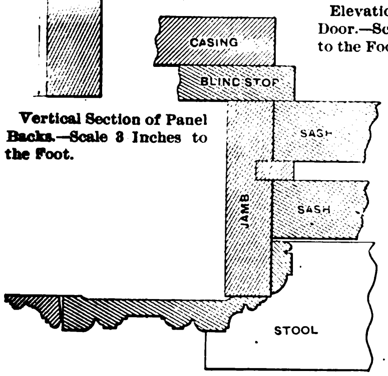
Elevation of Front Door.—Scale, ⅜ Inch to the Foot.



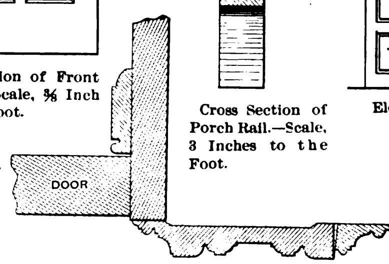
Cross Section of Porch Rail.—Scale, 3 Inches to the Foot.



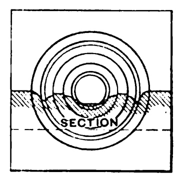
Elevation of Dresser in Pantry.—Scale, ⅜ Inch to the Foot.



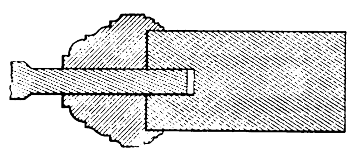
Detail of Window Finish on the First Floor.—Scale, 3 inches to the Foot.



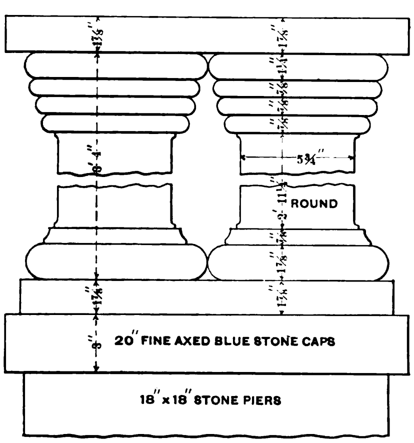
Detail of Door Finish.—Scale, 3 Inches to the Foot.



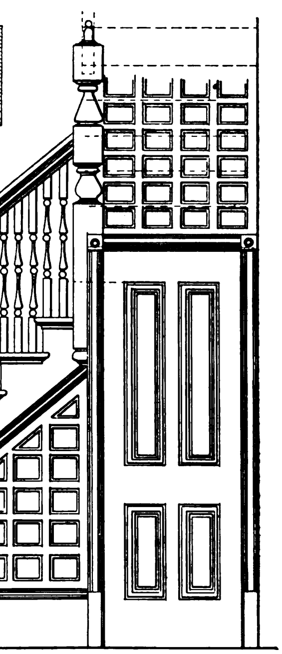
Corner Block.—Scale, 3 Inches to the Foot.



Section through Panel of Front Door at 1 2.—Scale, 3 Inches to the Foot.



Detail of Yellow Pine Columns on Front Porch.—Scale, 1½ Inches to the Foot.

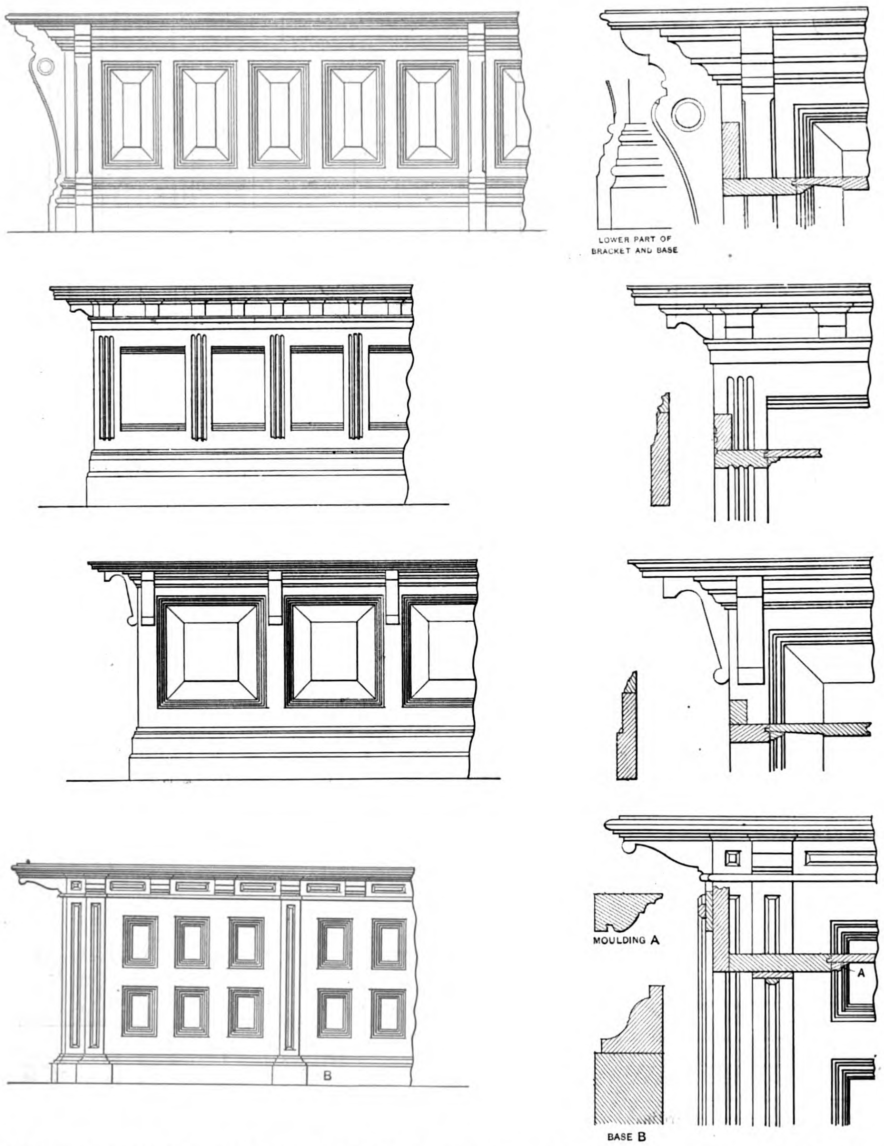


Detail of Main Stairs.—Scale, ⅜ Inch to the Foot.

Miscellaneous Details of a Cottage in a New York City Suburb.

ing large closets and a bathroom, which is located over the kitchen and is provided with a 6-foot steel clad bathtub, large oval porcelain washbowl with marble back and sides and ornamental porcelain wash down water closet. The plumbing is of the exposed type and the fixtures are nickel plated.

The house here shown was erected last summer, at Hasbrouck Heights, N. J., for Mr. Gerhard Depkens, from drawings prepared and construction superintended by Stanley A. Dennis, architect, of 486 Chestnut street, Arlington, N. J. The work was done under one contract for $3700, by builder Thomas J. Byram, also of Arlington, N. J.



Elevations of Four Styles of Counter Fronts.—Scale, ½ Inch to the Foot. Details of Counter Fronts.—Scale, 1 Inch to the Foot.

Designs of Store Counters —Illustrations of Four Styles of Counters with Details.

Designs of Store Counters

Those of our readers who have been making inqiries for designs of store counters, shelving, &c., will be interested in the illustrations here given, representing, as they do, four designs of counters suitable for use in stores. In connection with each design is given a detail to a scale of 1 inch to the foot, showing the sections, moldings, panels, &c. The designs are of such a character that they may be modified with slight trouble and are presented in the hope that they will be found to contain suggestions for those having work of this kind to do. Interest in the subject will be still further augmented if our practical readers will contribute additional designs, either of work already executed or of that in prospect.

Some very interesting stair work is to be found in the King Building, in Boston, Mass., where the treads are of iron made in hollow pan shape, with ribs spaced about 2½ inches apart in both directions with the tops of the ribs about one-fourth below the rims of the pans. The pans are filled with equal parts of best Portland cement and sharp sand troweled down to a smooth surface. The treads thus made promise to be durable, are almost noiseless, afford a firm foothold and can be easily and quickly repaired or patched in case of wear or injury by accident. In case of wear in the middle of width of tread, only so much of tread as is worn down need be replaced, while a marble or slate tread would have to be replaced with a full sized tread.

Novel Cycle Rink at Paris.

There has been established at Paris, France, on the site of the battle panoramas of Detaille and de Neuville, a novel cycle rink, called the "Palais Sport." *Le Génie Civil*, gives a detailed account of the new structure, from which we take the following data and our engravings: The building site is 131 feet square, and was occupied by a structure of 16 sides, elliptical in shape, the diameters being 123⅛ and 118 feet. Our section shows the structure, which is devoted principally to wheeling, the most novel feature of it being a spiral track. The lowest floor is used for the storage of wheels and for repairs. The one above has one larger elliptical room for teaching beginners and a smaller one for giving lessons to individuals privately. The main hall has a large floor for all kinds of athletic sports, but for bicycling in particular. From it ascends the spiral track of four complete turns, the grade being 2.7 in 100, the total hight being 36 feet. This track is divided by a board screen into an outer up track and an inner down track, the whole course being just 1 km. or 1094 yards. The wall has been decorated by famous landscape painters. That part of the circle which is below the second half of the first spiral is arranged for the audience.

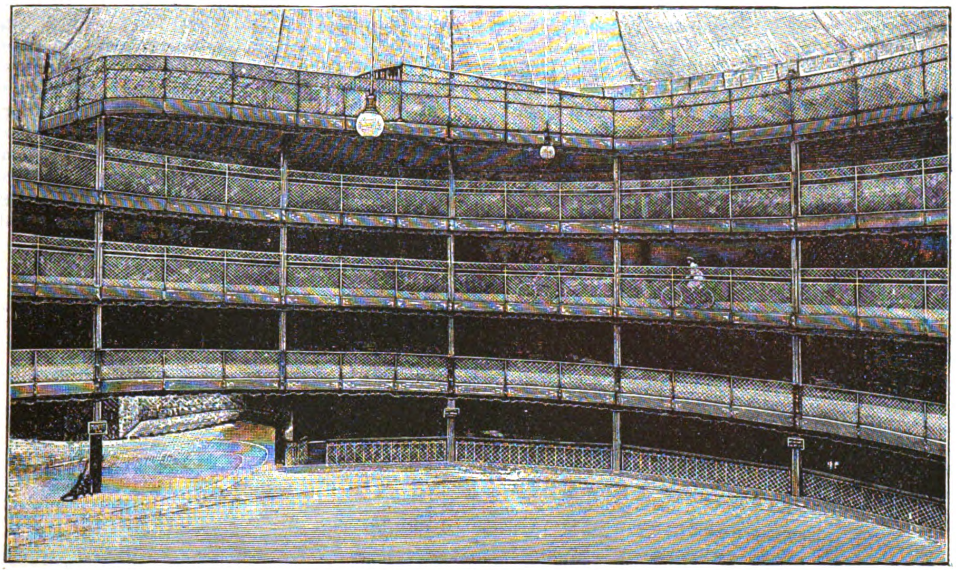


Fig. 1.—Interior View of Spiral Cycle Track.

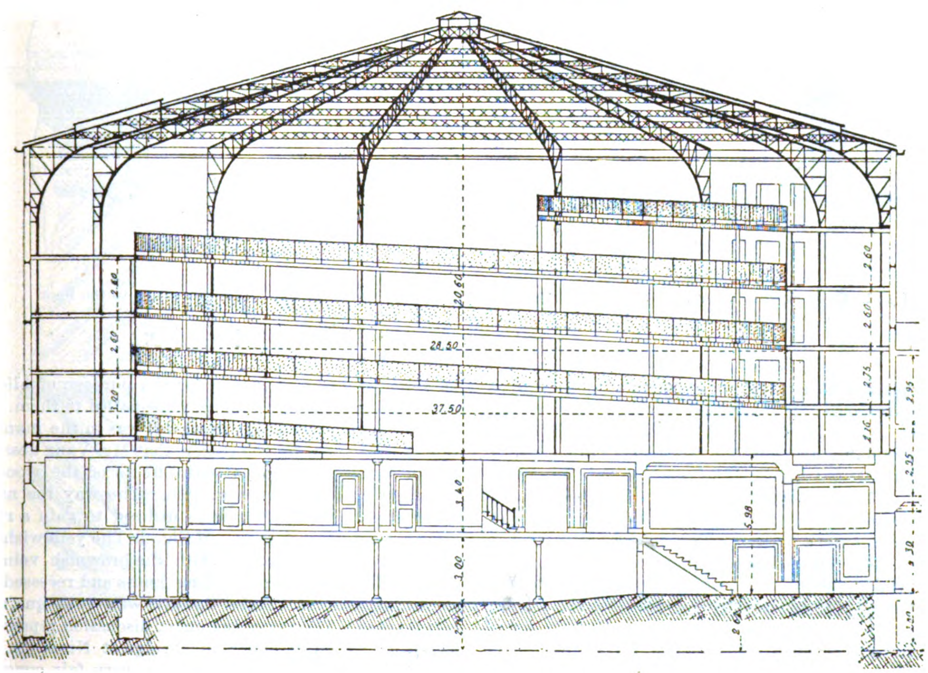


Fig. 2.—Section of the "Palais Sport" Building.

Novel Cycle Rink at Paris, France.—Views Showing Interior Arrangement and Construction.

SOME RUSTIC CARPENTRY.

BY OWEN B. MAGINNIS.

IN the course of the improvements which have lately been made in the northwestern section of Central Park, in New York City, some exceedingly fine carpentry work of a rustic character was executed, a description of which may be found of interest and value not alone to mechanics, but to those carpenters living in the country, where there is usually plenty of small timber which can be used to advantage either in the garden or the home. That which is here illustrated was designed by the late Calvert Vaux, landscape architect to the Department of Public Parks in the City of New York, and was carried out under his direction by the author of this article. In Fig. 1 of the illustrations is represented a cross section of the interior of the new rustic bridge at 110th street and Central Park West. The work consists of two fixing the rustic work. The first operation consisted of securely spiking to the rubble walls 2 x 4 inch spruce joists, spaced 16 inches between centers. Where the upright stiles which formed the panels occurred the strips were doubled and kept sufficiently far apart to give a margin outside the stile on which to nail the 2 x 6 inch lagging. This being done, 4 x 8 inch spruce timbers were set on top on each side for the purpose of receiving the thrust of the curved rafters, which were notched to fit over them in the manner shown in Fig. 1. The curved ceiling rafters, 60 in number, measuring 3 x 12 inches, were of spruce and made in two sections. They were secured in the joint by two cleats, one on each side. The top vertical joints rested against 4 x 8 inch spruce timbers running the entire length and thoroughly spiked throughout. The ceiling rafters

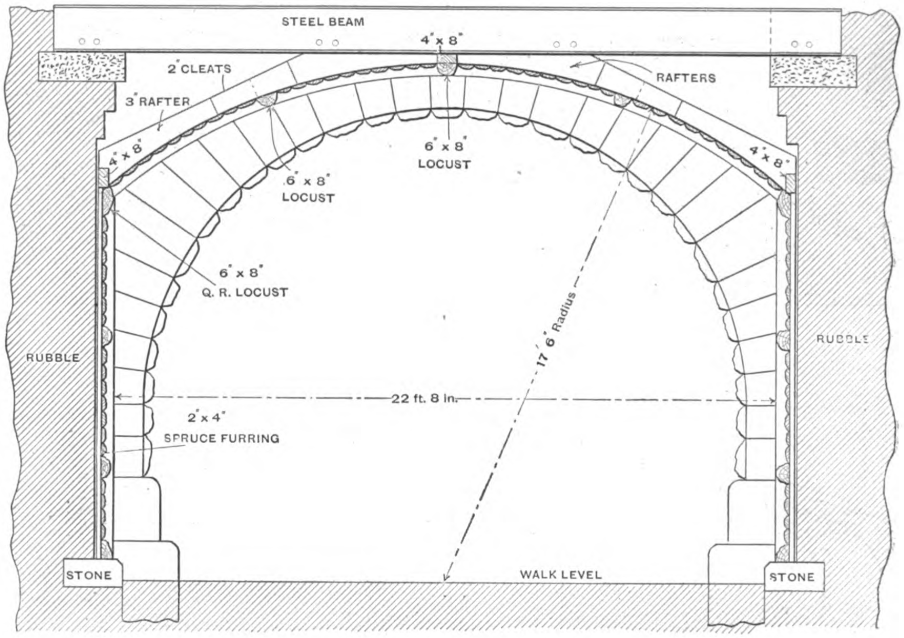


Fig. 1.—Cross Section of Archway in Central Park at 110th Street, New York City.—Scale, 3-16 Inch to the Foot.

Some Rustic Carpentry.

stone arches and wing walls, one at each end of the bridge. The sides are carried up in coursed rubble stone work laid in cement. On top of the rubble walls and resting on granite templates are set 20-inch steel I-beams, ten in number, distributed through the space of 45 feet between the walls. These span the archway in the manner shown and are secured laterally by 1¼-inch tie rods, shown in Fig. 2, which represents a portion of a longitudinal section of the work. Between the beams are brick arches the skew-backs of which rest on the bottom flanges of the beams. Special centers were constructed to permit of these being lowered so as to drop clear of the tie rods. On top of these arches and beams is a 12-inch bed of concrete, above which is the roadway.

The intereior of the archway is, with the exception of the stone abutments shown in Figs. 1 and 2, entirely finished in acacia or locust wood work of a rustic character. The wood was sawn and worked to the shapes and dimensions desired in its natural state, the bark being stripped off, and of the outer surface exposing only the last annual ring. The round surfaces were of a yellowish color interspersed with brown veins and of a knotty character, some of them being of a peculiar and unusual form. In Figs. 1, 2 and 3 will be seen the method of placing and were spaced 2 feet on centers for the purpose of allowing the locust lagging to be securely toe-nailed to them.

The real workmanship, however, was in the manipulation of the locust, for the reason that Mr. Vaux desired to obtain the best and most artistic effects of the wood consistent with the best construction. The way the natural variations of the timber were utilized to gain a rugged and unusual effect is shown in Fig. 3. The yellowish tinge of the wood, intermingling with the brownish veins and dark shadows of the protruding knots and recessed veins or shakes, served to make the archway both quaint and picturesque. The engraving under discussion represents a two-panel archway under the bridge at Ninetieth street and Central Park West and gives a very fair conception of the nature of the work. In the Ninetieth street bridge the rustic work is two panels high on the side walls and two panels on the ceiling, while at 110th street the work is three panels high on the side walls and four panels on the ceiling. This archway, however, is small in comparison with the one first mentioned, where the timber bill footed up as follows:

LIST OF LOCUST TIMBERS.

12 pieces, half round, 6 x 12 inches x 13 feet in length.
16 pieces, half round, 6 x 8 inches x 5 feet in length.

8 pieces, half round, 6 x 8 inches x 3 feet in length.
16 pieces, half round, 6 x 8 inches x 6 feet in length.
20 pieces, quarter round, 6 x 8 inches x 9 feet in length.
8 pieces, quarter round, 6 x 8 inches x 6 feet in length.
4 pieces, quarter round, 6 x 8 inches x 13 feet in length.
210 pieces of 2 x 4 to 2 x 7 inch locust lagging 8 feet long.

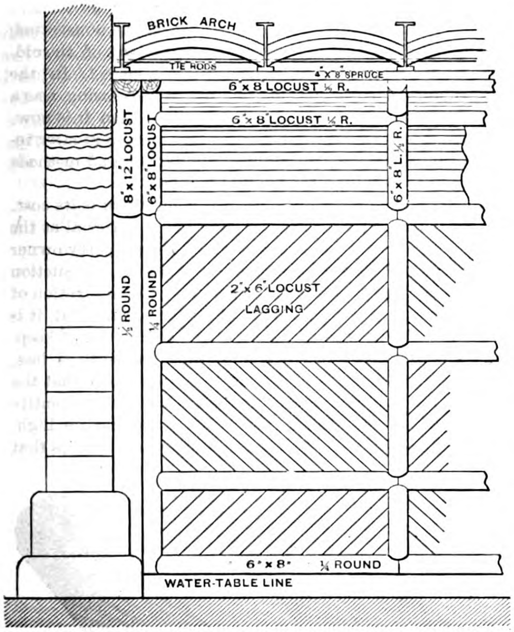


Fig. 2.—Partial Longitudinal Section.

tools, I would state that its weight per square foot board measure is 3.7 pounds, and as there were 26,000 square feet the total weight handled amounted to over 40 tons. Its hardness, too, caused a continuous sharpening of the tools. The specific gravity is 0.701 and its shearing strength with the grain 700 pounds per square inch. From these figures it will readily be understood how tediously the work progressed and the amount of patience and extra labor entailed in the execution of it. According to M. Hartig locust is second only to oak in durability, and it is comparatively impervious to atmospheric changes. Another authority states that it will last 40 years in the ground. The trees rarely exceed 12 inches in diameter and average about 44 feet in hight. The strength of locust as compared to oak is as 135 to 100.

The stiles were coped to the rails as indicated in Fig. 3 of the illustrations, the cross section outline of the stiles being fitted over the outline of each rail and brought to a close and accurate joint, thus forming the panels. On these panels, and blind nailed to the 2 x 4 inch spruce wall furring, were inserted diagonal lagging or slabs of locust, averaging 2 inches thick and from 4 to 6 inches wide, these being fitted to a close joint against the edge of the stiles and rails. The direction of the slabs was reversed in each succeeding panel, as represented in the engravings. A still more difficult job was the paneling of the ceiling. Here the stiles being carried up on the same line as below and following the arc of the ceiling, struck to a radius of 17 feet 6 inches, required that the ceiling stiles should be bent to the arc. This was done in the following manner: The locust pieces were cut to the desired length and then spaced for kerfing, the kerfs being 3 inches apart. The piece was then placed on two bearers which rested on four barrels filled with sand, and kerfs were then made with a hand saw. After being once kerfed the piece of locust

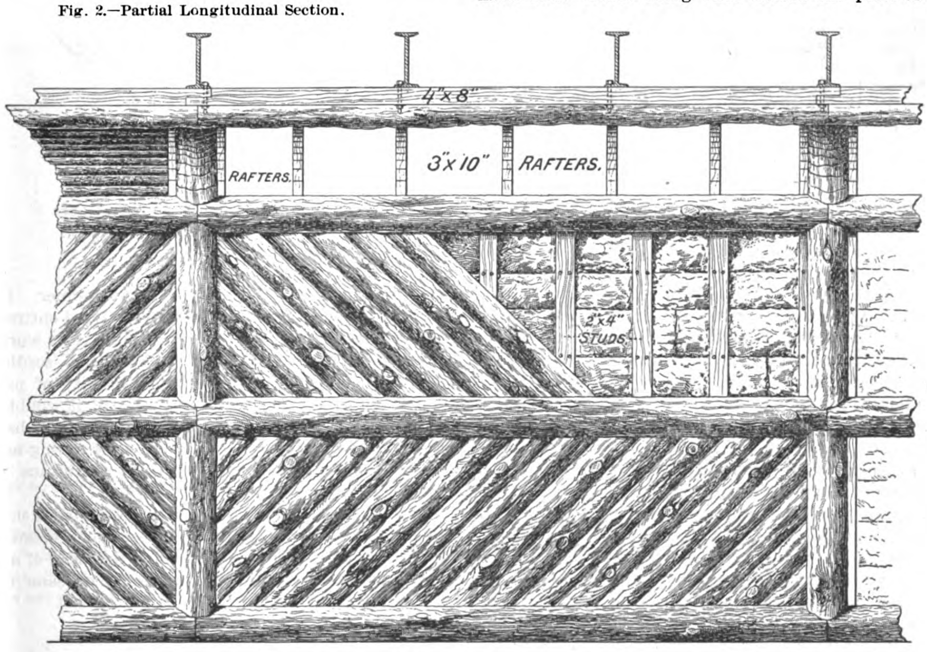


Fig. 3.—General Appearance of Locust Finish.

Some Rustic Carpentry.

280 pieces of 2 x 4 to 2 x 7 inch locust lagging 6 feet long.
100 pieces of 2 x 4 to 2 x 7 inch locust lagging 4 feet long.

SPRUCE TIMBERS.

75 spruce joist, 2 x 4 inches x 13 feet in length.
9 spruce beams, 4 x 8 inches x 16 feet in length.
65 spruce curved rafters, 3 x 12 inches.
130 cleats for the same.

The working of the locust involved much labor, both in the shaping with tools and the fixing in place. In order to have some idea of the trouble in shaping this wood with

was shored down from an I-beam above till the kerfs closed and the piece curved. It was then kerfed again and the second time closed, and this operation continued until the back of each piece was of the same curve as the soffits of the rafters. A clear comprehension of this method will be obtained from an inspection of Fig. 4. The locust sweeps were also shored from the ground when they were placed in position.

The three views presented in Fig. 5 show how the locust logs were sawn by the lumberman in order to obtain the sizes called for in the bill of material. The dotted lines and letters show the direction of the ripping saw. The work of sawing these logs was both tedious and difficult, and like the rest of the undertaking required both time and money. The completion of this unusual and somewhat unique piece of carpentry work was regarded with satisfaction by all concerned.

The Sanitary Value of Paint.

The common idea respecting the purpose of paint is hardly a correct one, says A. Ashmun Kelly, and is certainly not a fair one as regards the true function of that universal and indispensable article. Paint is much more than simply a protector and beautifier, though if it were not more than these it would still be entitled to our warmest commendation. In other words, it possesses a distinct value from a sanitary point of view. Where it contains no appreciable quantity of poisonous matter, it is one of our best aids to the conservation of the public health. Several years ago, the State Board of Health of Massachusetts, made an investigation into the effect of variously constructed houses upon health, and it was found that the proportion of consumptive patients was greatest in brick houses and smallest in wooden houses. Frame houses are usually dry, not only because they are constructed of naturally dry materials, or rather of moisture resisting materials, but also because they are coated outside with paint, which resists the moisture of the atmosphere or rain. Of course, if brick walls are kept equally well protected there will be no trouble from dampness, especially where the foundations are right and where the walls are built properly with good material put together in a workmanlike manner, with air spaces, &c. No question about it at all, a proper brick wall well made and kept painted is a good wall, and most people will prefer it to frame walls, especially as the work is more durable, brick being more lasting than even stone and costs but little more than wood. A brick has somewhat more affinity for moisture than wood, but it can be kept dry. The thing to do is to paint the brick wall and keep it painted, whether in town or country. Indeed, paint may be beneficially used on all masonry work, for our climate, though dry, is somewhat trying on all exposed surfaces. A century ago it was more commonly the practice than now to paint brick houses. The old-time white painted brick country mansion, or city mansion, for that matter, was a thing of beauty delightful to contemplate, and some of these structures still stand to attest the value of their early painting as a preservative. The paint had its æsthetic value also, as the white walls served as a splendid foil to climbing vines and shrubbery about them.

Consumption has increased of recent years, we are told. Why? Damp houses are, perhaps, a most prolific cause. Now, if it can be shown that painted brick houses preserve their occupants from this and other pulmonary diseases, and we believe that it can be so demonstrated, who will not hail with satisfaction a revival of the old-fashioned practice of painting brick houses? In the twelfth and thirteenth centuries exterior coloring was a more important accessory to architecture than it is now, and this is to our discredit, because we possess greater resources in the way of materials, appliances and methods than the decorators of that period enjoyed.

One popular objection to painting on brick is its cost. The bricks absorb so much oil and paint material at the first that visions of bankruptcy stare the property owner in the face. But after the prime or first coat, the suction having been pretty effectually overcome, the absorption of paint is greatly reduced, until, after the second coat, it is no greater than on wood. After which the cost of keeping walls repainted is about the same, or perhaps less, than that of wood. And let us remember also that the doctor's bills are no trifles, often amounting to the entire cost of painting a house. Undertakers also charge high, so that illness and death amount almost to luxuries that no wise man should encourage in any manner. But if it were so that doctors and undertakers lived entirely upon the inspiration of exalted motives, doing their work gratis for humanity's sake and not for the usual sordid honorarium, and not being under the necessity of providing bread and butter for their families, still it would be far better to have good health and its attendant happiness than the unsanitary dwelling, made so by saving money(?) on paint and painting, and with the gratuitous services of the doctor thrown in.

Inside and outside the dwelling house paint should be used without stint. No better investment, certainly from a sanitary point, could be made by the head of a family, and as for the economic value of paint no sane man ever did dispute that point.

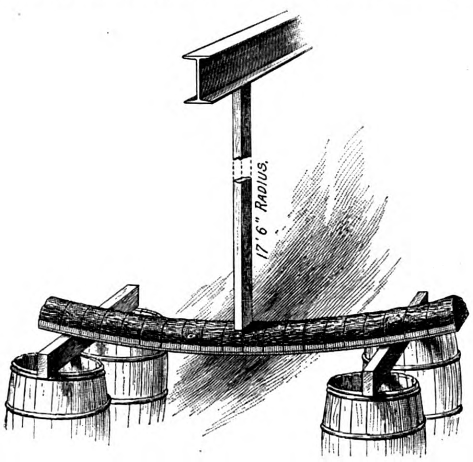


Fig. 4.—Bending the Stiles for Ceiling of the Archway.

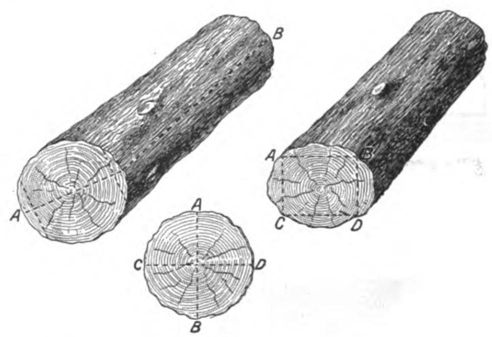


Fig. 5.—Method of Cutting the Locust Logs.

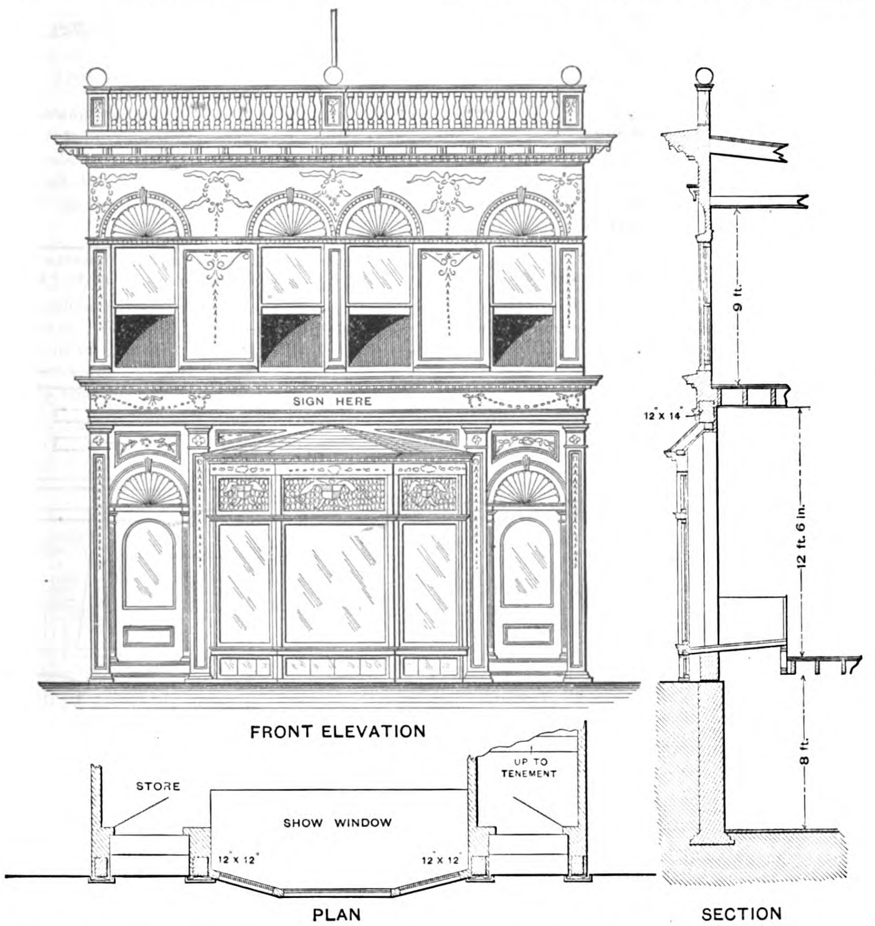
Some Rustic Carpentry.

We are in receipt of the first issue of a monthly paper entitled *Home Study*, published by the International Correspondence School, Scranton, Pa., in the interest of the work they are carrying on. The first copy of this journal is a very instructive paper. Some of the departments are entitled Steam Engineering, Architecture, Geometry, Drawing, Mining, Popular Science, Civil Engineering, Plumbing, Electricity and Mechanics. In each of these departments primary information is given on fundamental questions. Illustrations are also presented which make plain the text. There is likewise a supplement giving specimens of mechanical drawing, the particular example being a Corliss engine cylinder.

CORRESPONDENCE.

Design for a Store Front.

From WALTER P. CRABTREE, *Holyoke, Mass.*—In a late issue of the paper "G. T. H." of Berryville, Ark., asks for designs of store fronts and in reply thereto I inclose one herewith. It is constructed wholly of wood, having a white wood finish over rough boarding and decorated with neat ornaments, which can be obtained very cheaply already made. The main cornice may be of wood or galvanized iron, as the owner desires. Stained leaded glass would look well with plain glass leaded pattern, as indicated in the front elevation. The windows and doors have fan tops, while the front of the building is surmounted with a balustrade having heavy balusters. The roof over the store bay window is covered with red slate. The doors of the store and to the living rooms on the second floor are recessed and the show window is 5 feet wide.



Design for Store Front.—Walter P. Crabtree, Architect, Holyoke, Mass. Plan, Elevation and Section —Scale, 1/8 Inch to the Foot.

Columns for Outside Work.

From H. E. W., *Santa Barbara, Cal.*—Will some one give for publication a record of his experience in getting out columns for outside work? A house to be erected here will have 32 Tuscan columns to carry a long porch roof. The columns are 12 inches in diameter at the base and about 9 feet high. If gotten out in wood what kind is best for the purpose, and should they be bored from end to end to allow them to season from the inside as well as from the outside in order to prevent cracking? Would it be possible to make substantial and lasting columns by using a 6 x 6 square pine stick for the core and fitting around it at every 30 inches circles cut from 3 inch pine plank and then covering all with metal lath, which in turn will be covered with a 5/8-inch coat of Portland cement, the moldings being worked on in the same material? Which plan would prove the cheaper?

Area of Pipes.

From T. H. W., *Stroudsburg, Pa.*—The solution of "Young Chip's" problem of area of pipes in the February issue is not correct as regards figures, although the statement and rule are right. I work it out under a different rule—namely, squaring the diameter and multiplying by the decimal 0.7854. But for the benefit of others who may not have thought of it, I will give a simpler rule. A pipe having double the diameter of a smaller pipe has four times the area. For example, three 6-inch pipes would carry only three-fourths as much water as one 12-inch pipe, two 6 inch pipes one half as much and one 6-inch pipe one-fourth as much. Understanding this, what seems to me a very simple rule. I would hardly have thought of writing of it, but for "Young Chip" claiming that he never had a correct solution but once, and that people probably were not as generally informed relative to such matters as might be supposed.

Note.—In the computation of the area of pipes given in the February issue a typographical error made the area of the 12-inch pipe appear as 103+ inches instead of 113+ inches, and the increase of the 12-inch pipe over the three 6-inch pipes was changed in proof to correspond with the 103-inch basis, making it read 18¼ instead of 28¼ inches.

From L. A. D., *Montreal.*—Referring to page 40 of the February issue of the paper, I believe "Young Chip" is going very far for simple information. Allow me to say that a 6-inch circle = 28.27 × 3 = 84.81 inches; a 12-inch circle = 113.10 = 113 10 inches; also doubling the size of a pipe is increasing its capacity four times. 4 × 6 inch circle equals an area of 113.10 and a circumference of 75.40. 1 × 12 inch circle equals an area of 113.10 and a circumference of 37.70.

Four 6 inch pipes will not carry as much water as a 12-inch, because the circumferences being doubled the frictional surface is doubled and consequently the water in the 6-inch pipes will lose more of its velocity due to that difference in friction, the loss increasing as the velocity increases.

From C. N. C., *Decatur, Ind.*—In answer to "Young Chip" of Montreal, Canada, I would say that the area of circles are to each other as the squares of their diameters, thus: $6^2 = 36$; $12^2 = 144$, and $144 \div 36 = 4$. Therefore the 12-inch pipe will carry four times as much water as the 6-inch pipes.

Flashing Around a Chimney.

From P. S., *Hammonton, N. J.*—Will some of the readers tell me through the columns of *Carpentry and Building* how large and how many pieces of tin to use in flashing around a chimney at the peak of a roof, say 16 inches square ?

Attaching Wind Mill to Pump.

From F. M. I., *Decatur, Ill.*—In answer to the request of "J. G. S.," I submit the sketch, Fig. 1, which explains

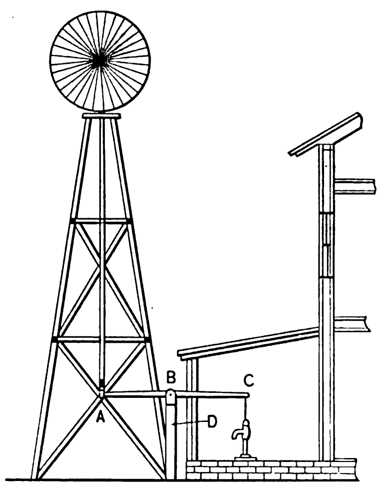


Fig. 1.—Plan Suggested by "F. M. I."

Attaching Wind Mill to Pump.—Methods Suggested by Various Correspondents.

itself. The letter D indicates an upright post with two pieces fastened to the side of the top, through which a bolt passes to hold the beam at D. The place where the beam fastens to the pump rod of the wind mill is indicated at A, while C is the point at which it connects with the pump. The stroke at the pump end can easily be lengthened by moving the post toward A, or shortening it by moving the other way on the center. Any blacksmith can do the necessary iron work.

From E. J. B., *Belleville, Ill.*—I take an interest in the notes and queries of my fellow chips, although this is my first communication. I have every number of the paper from the first to the last issue and find it a valuable library. I inclose a sketch in answer to "J. G. S." of Norristown, Pa., showing how he may attach wind mill power to his pump almost any distance from the well. I have just erected one myself and it works perfectly. Referring to Fig. 2 of the sketches, B B are 5 x 5 oak posts set firmly in the ground ; C C are angle brackets, which are bolted to the posts, as shown. I made my brackets from ⅜ x 1½ inch iron. The main piece is 24 inches long with right angle 12 inches long connected with heavy wire, as shown. The mill I employ is 15 feet from the well, which is 38 feet deep.

From R. B. C., *Petaluma, Cal.*—In answer to "J. G. S.," whose inquiry appeared in the October number of the paper, I inclose a drawing of the best manner I have found of transmitting power of a wind mill for pumping. It consists of two elbow levers, A A of Fig. 3, connected by two No. 8 steel wires fastened into clips B B B B. Cross

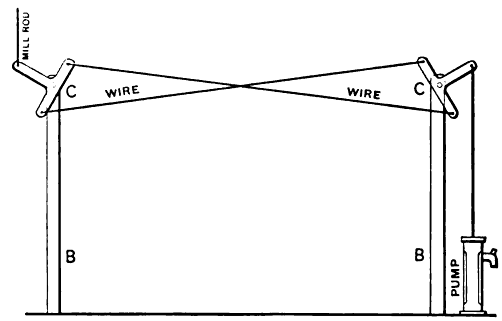


Fig. 2.—The Method Recommended by "E. J. B."

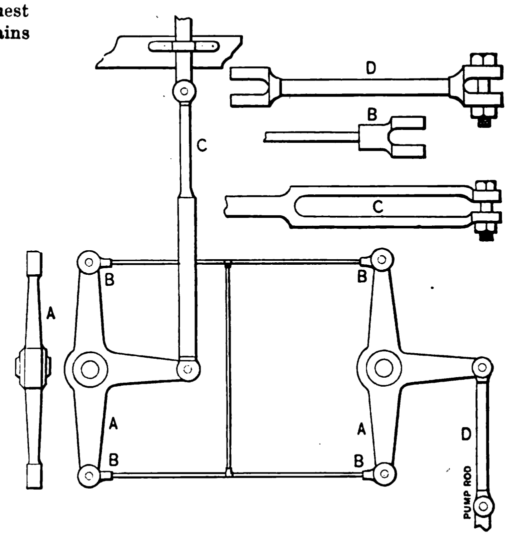


Fig. 3.—Manner of Transmitting the Power as Described by "R. B. C."

wires are used to keep the wires from whipping. The forked connecting rod C connects the wooden rod of the wind mill to the lever arm under it. D is the connecting rod over the pump connecting it with the lever. Holes in the lever hubs are ¾ inch in diameter. The holes for connecting the rods as clips are ½ inch in diameter. The bearings should be close, the wires tight and the timbers to which the elbows are bolted should be firm.

Asphalt for Flat Roofs.

From E. W. H., *Santa Barbara, Cal.*—Will some one who has had experience in covering flat roofs with asphalt kindly give his method and results ? I have two large flats to cover, one a porch roof 12 feet wide by 90 feet long and the other 40 feet square at the apex of a one-third pitch shingled roof. We are right in the asphalt belt here and can get what is denominated as "bituminous sand," which is a fine clean sand thoroughly impregnated with asphalt so that under a microscope every grain is seen to be coated all around. It makes fine streets, being laid hot in 3 or 4 inch layers and rolled compact with a hot roller. Doubtless some of the readers of the paper know the material and have had experience with it. Now my flats are to be covered longitudinally with 6-inch fir flooring, tongued and grooved. I propose to lay the flooring with joints open, say $\frac{1}{8}$ inch, then give the surface a coating of $\frac{1}{2}$ inch of this bituminous sand put on hot and rolled down smooth. I figure that the open cracks in the flooring will give it a good hold on the roof and prevent any sagging or running. The pitch of the flats is $\frac{1}{8}$ inch to the foot. Why will not this make a tight, satisfactory and everlasting roof? Can any one tell me if it will taste the rain water flowing over it? If so, will this be only at first, while it is new? Will a paint adhere to asphalt? The black color would be objectionable and I should want to paint it green. Would the hot sun cause the bituminous sand to sag or run? It does not on the street, where the grade is much steeper; but the conditions are not the same, as there is the cool earth under the street.

Wood for Sink and Drip Board.

From J. J. D., *Cornwall Station, Cal.*—What kind of wood is the most suitable for a sink where much water is used and wasted? I would also like to know what kind of drip board can be used which will not always remain wet.

Elevations for a Workingman's Home.

From O. J., *Los Angeles, Cal.*—I send inclosed front and side elevations for a workingman's home, as planned by "Apprentice," Buffalo, N. Y., and published in the September issue of the paper. The cornice of the house is made of $\frac{7}{8}$-inch stuff, nailed face down on the jacks, which are spiked to the rafters of the roof. The panel top of the front door is designed to be of stained glass, on which the number of the house might be placed. The upper sash of the front window of the circular bay is also designed to be of stained glass. It seems to me that a circular bay included in the soffit of the cornice and extending the whole width of the parlor would be a more tasteful and easily constructed design. The chimney of the house could be more centrally located, so that the building could be more easily and economically heated.

Working to Plaster Grounds.

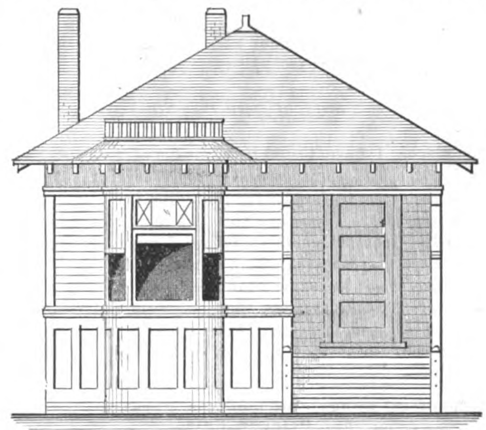
From H. E. W., *Santa Barbara, California.*—I have a large building to plaster with adamant on metal lath. It is to be two-coat work, flooded smooth and true for paper. A former experience was unsatisfactory in endeavoring to get a perfectly true surface. In spite of the utmost care there were numerous cat faces, some of them wide and shallow, so that the paper hangers complained that it was impossible to make good butt joints. Will some one who has had experience give me the method of putting up and working to plaster grounds. Some of the rooms are 18 x 20 feet in size and 10 feet 6 inches high.

Design of Sideboard.

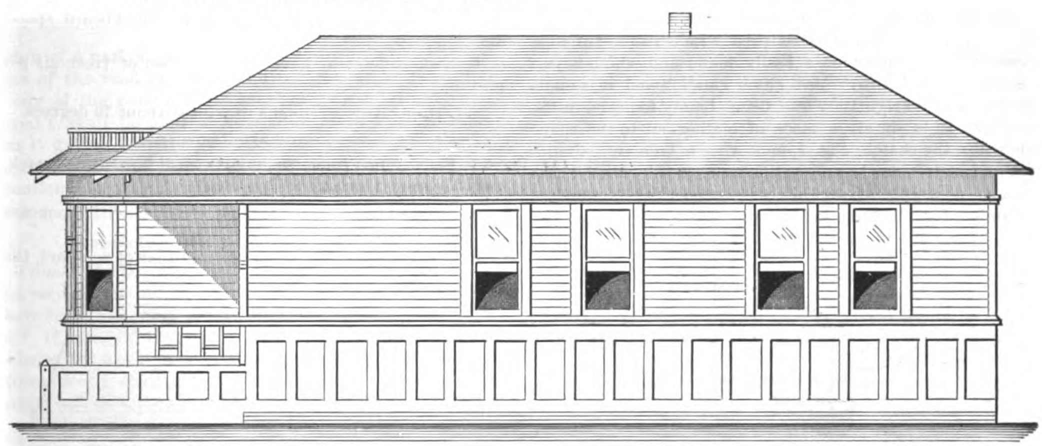
From W. J. S., *Ambler, Pa.*—I would like some of the readers to give designs of sideboards; something that is artistic, and in connection with the designs give the sizes of the material used.

A Problem in Kerfing.

From YOUNG CHIP, *Montreal, Canada.*—I have been an interested reader of the articles which have appeared from time to time on the subject of saw kerfing moldings for circular openings, &c. All the answers which have appeared have been for circles or segments of circles, so that if one has a bend that is not a segment of a circle he is all at sea, so to speak. Last spring I made a set of stairs, illustrated in the September number of the paper, which had in them several such bends. After puzzling my head about the best way to do the job I went to work and the first thing I did was to place upright on the edge of the stair string a board about 8 inches wide; then with the compasses I scribed the shape of the string upon the board. Lifting the board on to the bench I took the molding that I intended to use and placed it on the board. With the help of a boy I bent it until it touched the line, making the saw kerf at that point. I placed it again on the board and bent it to the line, making another saw kerf at that point, and so on until the curve was finished. I made such a good job by this method that I felt well pleased with myself and invited an old fellow from whom I had gained many points to give his opinion of it. He admitted that it made a very good job, but stated that if I had taken a thin rip saw and ripped the molding into three or four pieces, and then nailed them one on top of the other, I would have secured just as good a job and with much



Front Elevation.



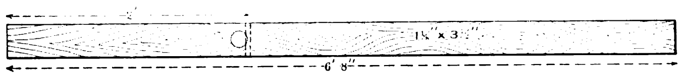
Side (Right) Elevation.

Elevations for a Workingman's Home.—Scale $\frac{1}{8}$ Inch to the Foot.

less trouble. That is always the way; after a fellow has finished a job there are always a score of people who have a better way of doing it.

A Spirit Plumb Ruler.

From M. L., *Warren, Ohio.*—I inclose herewith, for the benefit of my brother chips, a sketch of a spirit plumb rule such as we use nearly every day in and about the building. It was made and used three years ago, and is still employed by a firm of carpenters and contractors in



Sketch of Spirit Plumb Rule, Contributed by "M. L."

this place. I have tested it by means of an 8-foot plumb rule with a lead plummet and found it correct. It is very light and easy to handle for plumbing the frame, setting partitions, &c. There are three ⅛-inch pieces nailed on one edge near the ends to be used when raising. The other edge may be used when necessary for the purpose. The glass is set the same as in a spirit level, using plaster of paris. I would suggest that the rule be tested occasionally. I find it a most excellent tool and suggest to my brother chips that they try it, for any carpenter can make one.

Carpenters' Gauge and Tool for Marking Miters and Octagon Cuts.

From C. S., *Los Angeles, Cal.*—Some time ago there appeared in the Correspondence Department of the paper an illustration showing a piece of tin so made as to serve as a gauge in connection with a 2-foot rule. I inclose something which is more easily made and which is just as good. I call it my "anti-sliver gauge" and it is made to fit the rule tightly, while being handy to carry in the pocket. It is simply a piece of leather cut to the shape shown in the sketch, Fig. 1, and with a hole in the middle of just the size to allow slipping over the rule. I also inclose a sample of another handy tool, Fig. 2, which is intended for marking miters and octagon cuts on the

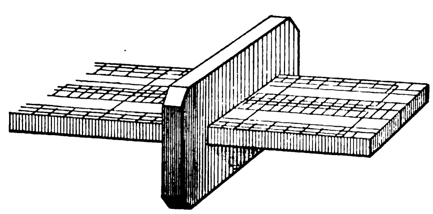


Fig. 1.—"Anti-sliver Gauge."

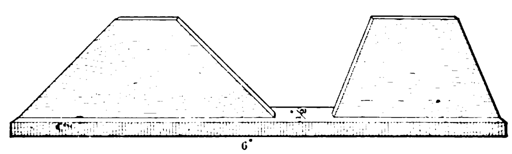


Fig. 2.—Too for Marking Miters and Octagon Cuts.

Carpenters' Gauge and Tool for Marking Miters.—Illustrations Made from Sketches Submitted by "C. S"

edge of a board. The ½ inch width of the long piece to which the others are attached serves to gauge the margin on the fascia. In putting on cornice it will be found very convenient, for it takes the place of a miter square and the bevel to get the two cuts. It is small and can easily be carried in the pocket. I think if some one would engage in the manufacture of tools of this kind and take out a patent on the idea, making the tool in one piece, either of steel or aluminum, he could find a profitable sale for it.

Ventilating a School Building.

From S. W. D., *Ashland, Pa.*—A few months since one of the correspondents of the paper asked how to ventilate a school building, and I then sent a rough sketch of a building, of which I was preparing the plans, but had not the time to properly take up and consider the matter. It is such a vital question to us all that I now write to bring out a few general pointers that may be of interest to the correspondent named and a help to many readers of the paper as well as a benefit to our children that are now penned up in school rooms with absolutely no proper ventilation. We are at present just passing out of the badly ventilated school building, of air tight stoves and rooms and steam heating. Even our forefathers with their large open fire places had better ventilation than we find in most school buildings to day. "They built better than they knew," drawing the foul air, mostly carbonic acid gas, from the floor line up their generous fire flues. I have not the space to go into the weights of air, gas, water, &c., but one can imagine a schoolroom as a tank and each exhalation of the scholar so much water. How quickly would the flood rise to the breathing line and drown them out. But as this gas is invisible and its effect slow the danger is not so apparent. Nevertheless the settled poison is there and to get rid of it is to ventilate a schoolroom.

Volumes have been written on ventilators and hundreds of patents issued and held by our large companies of sanitary engineers and skilled architects whereby they mystify the public at large and secure fancy prices for plans from our school boards. They could be made by any practical builder who would give the subject a little attention, follow the laws of nature and assist them by mechanical means where necessary. In this article I wish to present only the main points to be considered and not advocate any special heating and ventilating system, but to state from my experience that which has been found to best suit the purpose of a modern ventilated school building. I classify them in rules as follows:

1. Fifty scholars to a classroom.

2. Each to have 18 square feet of floor space, allowing for recitation benches, teachers' desks, blackboard space, &c.

3. Each scholar to have 30 cubic feet of fresh air per minute.

4. Temperature of rooms in winter about 70 degrees.

5. Each schoolroom to have its own cloak room.

6. Each schoolroom to have a wash bowl, towel rack, soap tray and filtered drinking water.

7. Each room to have teacher's closet with bookcase and supply drawers.

8. Good sized windows on left and rear of scholars, the rest of the wall to be unbroken blackboard surface, so far as possible.

9. If a large building, then a directors' room and library to be added.

10. The boys and girls to have separate playgrounds, partly in the cellar and separate sanitary closets in the cellar.

11. Perfect plumbing and drainage throughout, the building to be strongly constructed with at least two exits in case of fire.

From the above we have:

Room for 50 scholars × 18 square feet = 900 square feet = a room 30 x 30 feet.

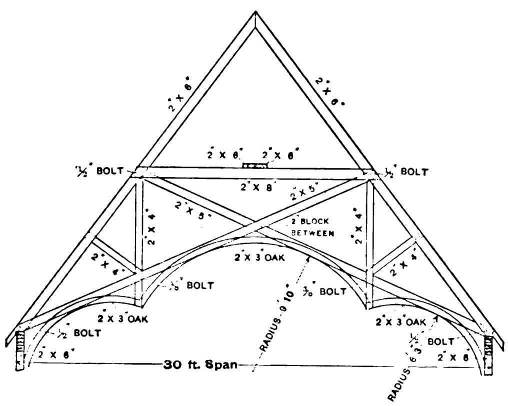
Fifty scholars × 30 cubic feet air per minute = 1500 cubic feet × 60 = 90,000 cubic feet per hour of fresh air necessary for proper ventilation.

Nine hundred square feet floor area × 12 feet clear ceiling = 10,800 cubic foot contents.

Ninety thousand cubic feet ÷ 10,800 = 8.3 changes per hour, which equals a change in 7.2 minutes, say a change every 8 minutes. These are the conditions requisite to the proper ventilation of a schoolroom, and at another time I will try and show how it can be carried out in a one-room country school to an eight room city building.

Truss for Self Supporting Roof.

From J. E. L., *Ida, Ark.*—I have been very much interested in the diagrams of self supporting roofs submitted by the many readers of the paper ; also the discussion that has followed. I think the subject is by no means exhausted and, therefore, offer a slight addition to what has already been said. I consider the plan submitted by "F. W." as the best of that class of self supporting roofs which has yet been published. I send a



Truss for Self Supporting Roof, Contributed by "J. E. L."

sketch of a roof of the same class and would like to have some of the readers express an opinion as to its merits. If any of the readers have ever seen a similar truss employed I shall be glad to have them state what satisfaction it gave. I would also like to see the wood turning suggestion of "J. C. W." of Pine Hill, Pa., receive attention at the hands of some of the practical men in the trade.

Replacing Old with New Flooring.

From J. J. D., *Cornwall Station, Cal.*—What is the best way of putting in new and taking out old flooring, where there are many partitions crossing in rooms, halls, &c.? If some of the readers who have had practical experience in work of this kind will furnish the desired information I shall be greatly obliged to them and the matter will doubtless prove interesting to many others.

Heating a Workingman's House.

From N. H. D., *Newburg, N. Y.*—I notice in the February issue a letter from "J. P. S." of Hazleton, Pa., giving his idea for heating the main portion of the house of which the floor plan was published in the January number, and which I forwarded as a good design for a workingman's cottage. I like his idea as far as the heating is concerned, but would be glad to hear further from him on the subject. I would like to ask him how he proposes to finish around the pipe, locating it as the chimney was in the center of the partitions. How will the 10-inch pipe take up less room than a chimney with 8-inch flue? The pipe should not come in contact with the wood work of the floors, but should have a 2-inch play all around, with a tin collar or other light metal to hold the pipe steady. Does the correspondent propose to stud off for the breast or to set double partitions across the rooms, or does he propose to finish it in such a way as to cover up the pipe? If he studs off the breast how does he save any room, especially as the pipe is 10 inches and the hole in the first floor 4 inches, which, with the pipe, makes a total of 14 inches? This will leave a projection of the breast into the room of about 5 inches, whereas the chimney projects only 6 inches. We can get a chimney built in this section with an 8 x 8-inch or an 8 x 12-inch flue for about $22, without fire place, and by using a Baltimore heater we can get the same results as "J. P. S." obtains with the furnace. How far above the register on the second floor does he carry the 8-inch pipe? If he will be kind enough to answer the questions and send a sketch of the location on the floor plans he will oblige me, seeing that I am like the old man of 95 who was always willing to learn. It may, perhaps, interest other readers, as it is a subject which will please many. If some of the readers will furnish a neat and cheap elevation to the plan it will be appreciated by the writer. Let the readers continue to give their ideas as to the usefulness of the plans, as well as their good and bad points. I thank "J. P. S." very much for his suggestions and will ask him what make of furnace he considers the best for heating as suggested.

Proportions of Cupolas.

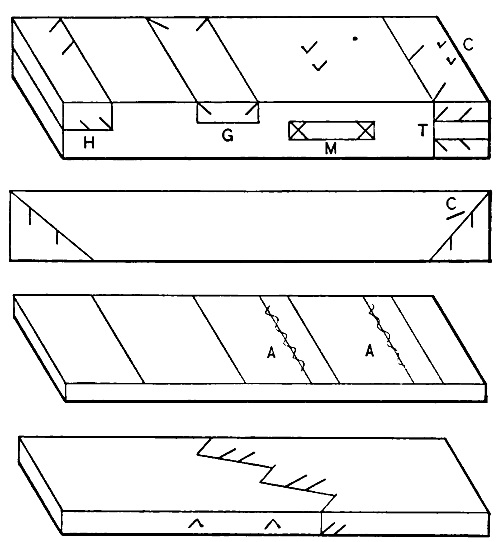
From E. E. C., *Whitesboro, N. Y.*—In the January issue of the paper "J. D." of Chester, Conn., asks for a rule by which to determine the proportions of cupolas. I would say that if the cupola is intended for a barn or building of that character a good rule is to allow 1 foot for every 10 feet in the size of the building. That is, if the building is 40 x 60 feet, make the cupola 4 x 6 feet.

Floor Plans for an Eight-Room House.

From J. W. L., *Hastings-on-Hudson, N. Y.*—I would like some one to send for publication the plans and specifications of a two-story cottage with tower, 22 x 30 feet in size, having parlor, dining room and kitchen on the first floor, two bedrooms and a bathroom on the second floor and two rooms in the attic. I want the house to cost from $1500 to $2000 when completed.

Witness Marks in Timber Framing.

From J. J. D., *Cornwall, Cal.*—I send herewith sketches showing the witness marks which I employ in timber framing. In the first sketch T is a tenon ; M, a



Witness Marks in Timber Framing.

mortise ; G, a gain, and H, a halving. In the second sketch I give the witness marks for a brace, the mark at C indicating the short bevel. The letters A A in the third sketch are used to indicate the manner of marking out lines, which are not to be used. In the last sketch I show the marks which I use in scarfing, the inverted V's showing the holes for the bolts.

What to Do with Back Numbers of "Carpentry and Building."

From WOOD WORKER, *Brattleboro, Vt.*—I have been a subscriber to *Carpentry and Building* for a number of years and prize it very highly. In fact I should hardly know how to get along without it, but I am in some perplexity with regard to the disposition of the back numbers. I do not wish to destroy them, as I am continually referring to them and I can hardly afford to have them all bound. I would like to hear from other subscribers with regard to this matter. I have been much interested in the many practical notes which have appeared from time to time in the columns of the paper, as, for instance, "Hick's Builder's Guide," "Architectural Drawing for Mechanics," "Hints on Wood Carving," "Domestic Electrical Work," &c., and would be glad to have some one bring out in a similar practical and comprehensive manner rules and theories for estimating loads carried by foundations of buildings. I would like to know the proper size of foundations to safely carry estimated loads, strength of iron and wooden beams, girders, &c., as well as the method of estimating the safe load for different sized supports of different spans. I feel safe in saying that a treatise on this subject, handled as carefully and as plainly as some of the former articles in *Carpentry and Building*, will prove of more than passing interest to others than myself.

Repairing a Hat Rack.

From F. J. G., *Denver, Col.*—Having had occasion to repair a hall tree or hat rack and being without the necessary dies with which to cut the thread on the pin, I adopted a method which proved entirely satisfactory, and a description of it may be of interest to readers of *Carpentry and Building*. A new pin of the proper size was turned, as shown in Fig. 1 of the sketches. The supporting end of the broken pin was removed from its bearing

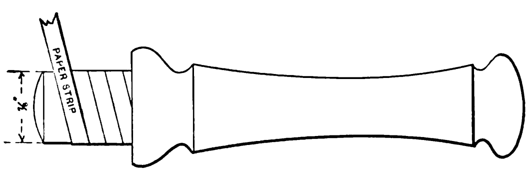


Fig. 1.—Pin Turned to the Proper Size.—Scale, 6 Inches to the Foot.

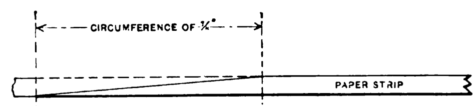


Fig. 2.—Circumference of Pin laid out on Strip of Paper. —Scale, 6 Inches to the Foot.

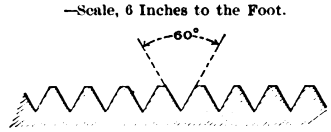


Fig. 3.—Section of Finished Threads.

Repairing a Hat-Rack.—Sketches Submitted by "F. J. G."

and the pitch or distance between the threads taken as the width of a piece of paper to be used in obtaining the thread. The circumference of the pin, which was 7/8 inch diameter, was spaced and the horizontal distance laid out on a strip of paper, as shown in Fig. 2 of the sketches. The paper was then cut at the diagonal formed in this length and the width taken. The diagonal line was then placed against the shoulder of the new pin and the paper secured with a small tack, after which the paper was wound around the pin to the end, a soft pencil being employed in marking the line of the thread on the wood as the paper was unwound. A knife was then used in cutting out the wood between the lines, care being taken to cut at about an angle of 60 degrees, as shown in Fig. 3, and to leave the original lines with a flat surface of about 3-32 inch. When the groove was completed with the knife, a common three cornered file was run into the groove smoothing the sides, after which a little soap was applied and the pin screwed neatly into place, making a finished piece of work and completing the necessary repairs.

Suggestions for Sash and Door Makers.

From H. E., *Massachusetts.*—I have been a constant reader of the paper for some time and am much interested in the Correspondence Department. I would like to suggest that a little space be devoted to a discussion of sash and door making, this being a trade which I have followed for 12 years. I would like to have those experienced in the work discuss all kinds of circular and fancy sash as well as doors. I know it would benefit many others besides myself.

Note.—The suggestion of our correspondent is a good one and we trust those readers of the paper who are engaged in the manufacture of sash and doors will send us letters describing their methods of turning out the work, accompanying the communications with sketches, if such may be deemed necessary. Finished drawings are not essential, as pencil sketches will fully serve the purpose.

Design for a Lime Kiln.

From J. F. M., *Pocatello, Idaho.*—I want to build a kiln for burning lime, the capacity to be about 400 barrels. I have never seen a lime kiln and do not know exactly how to turn so as to make it a success. I am positive I have good stone to burn and I wish to ask the readers to give me diagrams and instructions for building the kiln. An early reply through the columns of the paper will be greatly appreciated.

Hot Water for Bath.

From R. A. C., *Elgin, Texas.*—I would like to learn the cheapest way of installing some kind of a hot water system in connection with a box stove for supplying hot water in a bathroom.

Answer.—We suppose, from our correspondent's inquiry, that he already has a water supply, and that he now desires to have hot water in connection with it. The simplest method, and the one that has proven most satisfactory under wide use, is what is commonly known as the kitchen boiler used as a storage tank for the hot water, with which is connected a water back located in the fire chamber of some heating apparatus. The cold water enters the boiler at the top, and is delivered near the bottom by means of a tube running down inside. Such a boiler is ordinarily provided with an opening on the side about 18 inches above the bottom and another opening in the bottom. If the stove to be used has no water back, a common method of supplying one is to make it out of ¾ or 1 inch wrought iron pipe. Sometimes a return bend is used so that one pipe lies just above the other in the fire chamber; and holes are drilled in the stove so that the ends of these pipes project through it. Then, by means of either lead or iron pipe and couplings, the upper pipe of the heating coil is connected with the side opening in the boiler, the boiler being so located that the bottom of it is level or slightly above the top of the water back. A pipe is run from the lower pipe in the heating coil to the bottom of the boiler, with a cock placed in it so that in case of necessity the boiler may be entirely drained of water. Ordinarily, 2 lineal feet of 1-inch pipe exposed in the fire chamber will be sufficient to heat a boiler of 25 to 30 gallons capacity. From the top of the boiler a hot water pipe can be run to the faucet in the bathroom. After the boiler is filled with cold water and the fire burns for about three-quarters of an hour there should be no difficulty in drawing a good supply of hot water.

Cornice for Roofs of Different Pitches.

From M. M. M., *Gravelton, Mo.*—I am a reader of *Carpentry and Building* and would like some of the many contributors to give me the best plan of joining cornice of different pitched roofs where the plate and fascia lines are the same on each part of the building. I am speaking of railroad cornice, as it is called in this part of the country; that is, the cornice which is put on the foot of the rafter. I shall be glad to have illustrations of the planceer joint, &c.

Size of Sash for Plate Glass.

From W. H. K., *Santa Barbara, Cal.*—Will you please tell me the thickness of polished plate glass 3 x 3 feet and 4 x 4 feet; also how thick should sash in oak and in pine be made to carry plates of this size? What does such plate glass weigh per square foot?

Answer.—The thickness of plate glass is ¼ inch, and, while it is not sold by the square foot, its weight per square foot is 4 pounds. The sash should be made from 2½ to 3 inches thick.

WHAT BUILDERS ARE DOING.

THE prospect for the coming year, among the builders of Boston, Mass., grows more promising as the opening of the season draws near. The amount of work already projected indicates that there will be plenty to do this year. There has been little or no disturbance among the labor unions during the past month, and there seems to be no prospect of any action that would be likely to retard work when the seasons opens.

A petition has been presented to the Massachusetts Legislature for the reorganization of the building department of Boston, signed by the joint standing committee on building laws of the Master Builders' Association, Real Estate Exchange, Associated Board of Trade and the Boston Society of Architects. The bill looks to the consolidation of the building departments into one; the chief of the new department to receive a yearly salary of $7500, and to be appointed by the mayor for a term of five years. The bill also provides for three assistants, each in charge of a division to be appointed by the commissioner with the approval of the mayor, whose salary is to be $3500 each per year. The bill also calls for a number of things in connection with building in Boston for private and public structures, and to give the commissioner the power to stop the use of any building, when such use is dangerous to the community.

Buffalo, N. Y.

At the annual meeting of the Builders' Association Exchange of Buffalo the retiring President Henry Schaefer, called the 100 odd members to order to listen to the reports of the officers and committees for the year. Secretary Almendinger reported 201 members in the association, 14 lost by death and resignation and 20 new ones gained. Treasurer Carter reported $7707 in the treasury. President Schaefer then relinquished the gavel after a short speech, thanking the members for the courtesies extended him.

President Lyth was duly installed and thanked the members for the honor, urging the members to work together as this is to be an important year owing to the meeting of the National Association of Builders. He named the following committees:

Rooms: F. T. Coppins, B. I. Crocker, Henry E. Boller.

Admission: James S. Stygall, Jr., William M. Savage, Fred. A. Menge, R. E. Burger, C. B. Huck, F. T. Reister, George E. Frank, Carl Meyer and William H. Pinch.

At a regular meeting of the Buffalo Association of Master House Painters and Decorators, held in their rooms at the Builders' Exchange, February 4, the following officers were unanimously elected for the ensuing year: President, William Pinck; vice-president, Edwin Bunny; recording secretary, Lyman T. Coppins; corresponding secretary, William Cherry; treasurer, D. F. Rust. Measures: F. T. Coppins, D. J. Donavan. Trustees: Charles Amos, E. Vandercoy and V. Coll.

On February 13 a strike was declared against the Ellicott Square Building, the largest structure ever undertaken in the city; and about 800 workmen, including carpenters, iron workers, plumbers, plasterers and all others under the jurisdiction of the United Trades and Labor Council, quit work. The principal cause for the strike was the objection of the council to the action of the sub-contractor for the iron work, in regard to the class of workmen employed on certain parts of the work.

The trouble, however, was soon settled and the men returned to work on the 17th of the month.

The present prospect for the season of 1896 is considered fairly satisfactory.

Chicago, Ill.

The prospect for the coming year in the building trades of Chicago, while more hopeful than it was a year ago, is still uncertain. There seems to be a general feeling that more work will be done in 1896 than in 1895, but many of the largest contractors are of the opinion that competition will be unusually keen and the net results to the builders will be relatively small.

The Builders and Traders' Exchange at its annual meeting elected the following officers and directors for the ensuing year:

President, James Hogan; first vice-president, Wm. M. Crilly; second vice-president, Wm. L. Hoffman; treasurer, John Mountan; directors, Wm. H. Alsip, Andrew Corcoran, Geo. H. Fox, Wm. Gavin, Geo. Tapper; inspector of election, Frank J. Johnson.

Secretary Frank Conrick was reappointed by the Board of Directors. The exchange is in excellent condition, financially, and is looking for new rooms more centrally located than those now occupied.

The union painters of Chicago are seeking action by the city authorities which shall insure the payment of not less than the union wage scale for all painting on public work. The United Labor Congress is seeking representation on the School Board; and with some show of success. It is stated that the Carpenters and Builders' Association and the Carpenters' Executive Council have adopted an agreement for wages and working rules for the coming year. The wages are fixed at 35 cents per hour. The most important provision of the agreement is as follows:

> Union carpenters affiliated with the Carpenters' Executive Council shall work for no one who is not a member of the Carpenters and Builders' Association or one having signed the agreement and paid into the treasury of the said association the sum of $15 per annum in advance (the city of Chicago, State of Illinois and United States Government excepted). And be it further agreed that the Carpenters and Builders' Association shall issue a working card to its members and those who have complied with all the provisions of this agreement, and such card shall be recognized by all union carpenters affiliated with the Carpenters' Executive Council.

The above section is modified by the following: "This article to be put into full force from time to time as agreed upon by the Joint Arbitration Committee." This clause is a safeguard for the employees. Without it the employers could force the union, it is claimed, to build up their organization by declaring strikes.

The new Building Trades Club is progressing favorably and will soon be occupying its own quarters at 118 Monroe street, where rooms are being fitted up for its use. The membership has already reached 100.

Cincinnati, Ohio.

Dissension is cropping out in the ranks of the building trades of Cincinnati, owing to the fact that there are in the city two organizations which aim to attain supremacy among the laboring classes. The contending factions are the Building Trades Council and the Amalgamated Council of Building Trades, both of which have the same object in view. The former organization holds the controlling influence by reason of having among its number delegates from the chief building trades. Recently, however, James Stout, secured a charter and organized the Amalgamated Council of Building Trades, and was later elected president of that body. The latter organization took in all classes of trades, and a struggle as to which body should dictate in event of trouble was the consequence.

Trades affected have experienced much difficulty in adjusting their grievances, because one body would advise for and the other against any action decided upon.

All the union bricklayers in the city quit work February 1. For many years the unions fixed the scale of wages, and up to the beginning of the present year it was 56¼ cents an hour for a day of eight hours. The Boss Bricklayers' Association resolved to pay only 45 cents an hour after January 1 last, and they say they were forced to do this on account of competitors from other cities bringing cheaper men there.

The bosses agreed to pay only 45 cents on all new work, but to finish all old jobs under the old scale of wages. When the last of the old work was completed none of the union men would go to work under the reduced scale of wages. There are about 65 bosses and each employs about ten men. The unions have forwarded their grievance to the National Committee, and they are waiting for a reply. They are merely holding off at present, and no strike can be ordered until the National Committee is heard from. "Up to January 1," said one of the bosses, "the scale of wages in Cincinnati for bricklayers was higher than in any other city in the United States."

Detroit, Mich.

Present indications in Detroit point to a much more prosperous year in 1896 than in 1895. There is an unusual amount of work projected already and if carried into operation the opening of the season will be busy. It is feared, however, that the upward tendency of the prices of building material may prevent the erection of some of the buildings on the ground of excessive expense. A number of the workmen's unions are agitating the question of increased wages and shorter hours. The carpenters say that from now until next spring they are going to do some agitating. Since 1892 wages have been continually going down, so that to-day they are but little better than those paid common laborers. The contractors readily admit that wages are too low, and say that if the carpenters will perfect their organization they will be willing to meet with the journeymen to the end that both parties concerned may get better prices.

Erie, Pa

Reports from Erie are to the effect that building operations during the past year are about on a par with those existing in many of the other cities, the amount being large enough, but the work being done at so low a figure as to leave little or no profit. In a great many cases the work was done at a figure so low that it did not cover the estimate and a number of jobs are being finished by the bondsmen. Builders in that locality are of a hopeful disposition, however, and are looking for something better in 1896. It is rather early as yet to say much, but it looks as though considerable building will be done as architects report that they are busy on plans for buildings of various kinds. One thing seems to be certain, and that is that responsible builders are not going to take work as low as they have for the past few years.

Louisville, Ky.

There was a very large attendance of representatives of Louisville building interests at a meeting held February 6 in the Exchange Hall of the Board of Trade. The meeting was under the auspices of the Builders, Traders and Manufacturers' Association, and was held in behalf of a movement to secure amendments to the constitution and lien statutes favoring builders. Henry Koehler presided, and Charles Piper acted as secretary. There were represented in the meeting over 250 firms.

What the builders want especially is a law that will not leave sub-contractors in jeopardy. It is held now that there are cases where they are responsible to the full extent for wages, &c., when the contractors from whom they assume contracts cannot be reached. An extension of the limitation for liens is also wanted. More than the 60-day limit now in force is asked. It was agreed that a committee should go to Frankfort to lay the matter before the Legislature and urge its action. It is held that the amendments sought are of general benefit all over the State, and are not merely a local need. Other States, like New York and New Jersey, have for some time had what is now sought by the builders. No opposition is anticipated, except, perhaps, from the trust companies, which are after a bill giving them a lien on everything where they loan money for building.

New York City, N. Y.

The agitation of the question relative to the hights to which modern office buildings shall be erected has been such that it has led to the introduction in the State Senate of a bill providing, that the hight of buildings in New York City shall not be greater than 15 times the square root of the width of the street. Where the street is over 100 feet in width the width of the street shall be taken at 100 feet in making the calculation. Where the building is to be on a corner the streets of which are respectively 100 feet and 60 feet wide, the buildings may be higher than the bill first provides, but the plans must be approved by the Health Department, Superintendent of Buildings and a member of the Fine Arts Federation. The bill does not apply to plans already made and filed, but work under such plans shall be commenced within 60 days

The Mechanics and Traders' Exchange on January 28, elected the following officers for the ensuing year :

President, John L. Hamilton ; vice-president, Isaac E. Hoagland ; treasurer, Edmond A. Vaughan ; secretary, Elliott Smith; trustees, John J. Tucker, John J. Donovan, Lewis Harding, Henry W. Redfield, John J. Roberts, Francis N. Howland, Thomas M. Mulry; examiners (department of buildings), Warren A. Conover, Edwin Dobbs; inspectors of election, Ronald Taylor, William B. Corney, Michael Larkin.

On February 10 the Building Trades Club, which has become one of the most influential and beneficial instutions in the building trades of the city, held its annual election in its rooms at 117 East Twenty-third street, with the following result :

President, Charles A. Cowen ; vice-president, Henry A. Maurer ; second vice-president, Henry M. Tostevin ; secretary and treasurer, Stephen M. Wright ; managers for three years, Edwin Outwater, Ronald Taylor, William T. Ritch, George J. Wills, William K. Fertig ; manager for one year, Frank M. Weeks.

The report of the Board of Management showed the club to be in excellent condition ; both financially and numerically. The following resolution, which explains itself was adopted :

Whereas, The Building Trades Club, having passed the crucial period of uncertainty as to the needs of its existence, is now thoroughly established and occupying a conspicuous position as the most representative, influential, and progressive body allied to the great commercial interest represented by the contracting builders, and their kindred trades ; and while the full measure of its possible usefulness has not been realized, yet sufficient has been accomplished to show the good to come in the future from association along the lines which judiciuosly infuse the social element into business methods, and

Whereas, The best possible results can only be obtained when the organization feels itself to be domiciled within the walls of its own home, and that, too, in a prominent location, therefore, be it

Resolved, That the president be and hereby is requested to appoint a committee of ten members, which shall be charged with the duty of carefully considering the subject of erecting a club house, in all its phases, particularly as to location, character and cost of building, including a site, as well as the ways and means for securing the necessary funds, and it shall report at a special meeting called for such purpose, the best possible scheme for accomplishing the purposes desired, and be it further

Resolved, That it is the sense of the club, that such club house shall be moderate in its proportions, but of such a distinct and substantial appearance, as to fully portray the solid and dignified character of the building trades of the city, as comprehended in the membership of this club.

The following are the names of the committee appointed under the foregoing, to which, upon the vote of the members of the club, the president and secretary were added :

Frank M. Weeks,	Edwin Outwater,
Augustus Meyers,	Frank E. Conover,
Henry A. Maurer,	Alfred Beinhauer,
William K. Fertig,	William W. Kenly,
Thomas J. Byrne,	Fred. Usher.

The Builders' League of the city of New York held their annual dinner on Friday evening, February 21, at the club rooms, 24 East 125th street. Judson Lawson presided and the affair was an enoyable one in every way.

Omaha, Neb.

Omaha builders are looking forward to a better season in 1896 than those of the past few years. It is believed that the depression which has prevailed so long has reached the turning point and that business will begin to pick up from now on. At present there is but little building under way. There is, however, considerable new work in sight which it is expected will be begun at the opening of the building season.

The State Board of Transportation has decided to order the Omaha Bridge & Terminal Company to proceed and build the new Union Depot, which will cost some $2,000,000. The depot will be situated at Tenth and Farnam streets, and will be a handsome structure when completed. This, together with other improvements, notably the addition to the post office, for which a new appropriation of $800,000 has been made, making the total cost about $2,000,000, will insure, at least, a fair beginning for the year.

The amount of money invested in building in 1894 as represented by 757 permits, was $611,800. In 1895 the amount was $564,187, under 653 permits ; a decrease for the past year of $47,613. The Builders and Traders' Exchange is reported as having held its own through the adverse conditions of the past few years, and at the last regular meeting several applications for membership were acted upon.

Philadelphia, Pa.

The members of the Master Builders' Exchange of Philadelphia have given recently an additional proof of their interest in the welfare of the city and the standing of their organization among the business bodies of the city. The urgent need of improvements in the waterway between the city and the sea has long been felt, and by its recent action in pressing the question upon Congress by appearing before the committee having the matter in charge, the exchange has rendered most valuable service. A special committee was appointed to visit Washington, and after exhaustive preliminary work a special train was chartered and the committee accompanied by a large delegation of members appeared before the Committee of the House, to urge the plan of improvement advocated.

The report of the Board of Directors of the exchange, which was presented at the annual meeting, states that the various departments are in good financial condition. All the offices in the building, with the exception of two, are occupied at the present time. The Exhibition Department, being in the nature of an advertising medium, has been considerably affected by the general depression in business, but steps are being taken to bring the department up to its former efficiency, as the public interest still continues, as shown by the large attendance of visitors. The trade schools have been transferred to a separate organization, duly chartered, and are now being supported by a State appropriation. The total membership is 250.

At the annual election the following officers were chosen for the ensuing year : William B. Irvine, president ; Charles G. Wetter, first vice-president ; Charles H. Reeves, second vice-president ; John Atkinson, third vice-president ; William Harkness, secretary and Charles H. Reeves, treasurer. George Watson, Stacy Reeves and John S. Stevens were elected trustees.

The Board of Directors have elected D. A. Woelpper superintendent of the Exhibition Department.

A stock company, with a capital of $20,000, it is reported, is shortly to be formed by a number of contractors who raze buildings and clear out cellars. The object of the company is to secure a legitimate profit on the old iron which becomes the property of these firms in the course of the work.

The 106th annual meeting of the Bricklayers' Company of Philadelphia was held recently at the Builders' Exchange, when the following officers were elected for the ensuing year : President, Joseph B. Hancock ; vice-presidents, John Atkinson, Michael Magee ; secretary, W. J. Gillingham. Measuring Committee : Henry Einwechter, George W. Payne, John C. Atkinson, Charles P. Hart, William Smyth. The meeting was followed by the annual banquet, at which about 200 members participated and spent an evening of rare enjoyment, in which songs, speeches and stories were given by different members. John B. Hancock presided, and was ably assisted by R. C. Ballinger, F. M. Harris, Murrell Dobbins, John Atkinson and other members. There was a full representation of the Board of Building Inspectors, of which Secretary Gillingham is an honored member.

The Master Painters and Decorators' Association has elected the following officers for the ensuing year : President, F. A. Ballinger ; vice-president, S. W. Rudolph ; secretary, Francis F. Black ; financial secretary, Charles H. Fowler ; treasurer, Joseph B. Scattergood. The directors elected were : Alfred Shur, Charles Able and Frank A. Nicholls. Auditors : John Maxwell, J. H. Clifton and Julius Mountney.

The Operative Builders' Association has elected the following officers for the ensuing year : President, William T. B. Roberts ; vice-presidents, Edward J. Darby, William C. Carman and James E. Dingee.

Pittsburgh, Pa.

Early in February steps were taken by the housesmiths and bridge builders of the country to form a national association, the preliminary meeting being held in Moorehead Hall, Pittsburgh. The leading cities of the country were represented by delegates and at the opening session President M. M. Garland of the Amalgamated Association of Iron and Steel Workers addressed the delegates on the benefits of organization and gave some helpful suggestions. David McKelvey, president of the Bridge and Structural Iron Workers' Union of Chicago, presided over the convention and P. J. Dalton of the Chicago union was secretary. At the first session only preliminary work was accomplished, but on the second day the organization was completed and by-laws and constitution adopted. The question of wages was discussed at considerable length, and as it was found that wages differed in each city it was proposed to establish a uniform rate for the United States. It was decided to place the matter in the hands of the Executive Board and from its findings the minimum rate will be established, after which the unions of each city will make their own scales of wages based upon the minimum rate stated by the Executive Board. It was decided to make Chicago the national headquarters and to hold the next convention in Buffalo in February, 1897.

Rochester, N. Y.

At the annual meeting of the Rochester Builders' Exchange the following directors were elected for 1896 : Henry Watjen, John Luther, William Carson, Joseph Barr, Charles Vogel, F. P. Stallman, J. J. L. Friederich, J. B. Pike, J. A. Smith, Frank Miles, H. H. Edgerton, J. H. Grant, F. L. Heughes, F. C. Seitz, J. C. Barry.

The directors elected the following officers : President, John Luther ; first vice-president, John J. L. Friederich ; second vice president, Fred. P. Stallman ; secretary, J. Herbert Grant ; treasurer, William Carson ; superintendent, H. Fred. Parrish.

The unions composing the Building Trades Council are agitating the advisability of refusing to work with non-union men after March 1. It is stated that such a position by the unions would be supported by the American Federation of Labor.

St. Louis, Mo.

A large and enthusiastic annual meeting of the Builders' Exchange was held recently. The report of Secretary Walsh showed the exchange to be in a prosperous condition, having 210 members and $3600 balance in the treasury. The members say that if the prosperity in the building industry for the year 1895 is any criterion, the year 1896 will be a banner one. The annual election of officers of the exchange resulted as follows : P. J. Moynihan, president ; Thomas F. Fitzpatrick, Jr., vice-president. Thomas J. Ward, William J Baker, P. Mulcahy, Stephen O'Connor, Philip C. Ring, Thomas F. Hayden, directors.

The following officers have been appointed by the Board of Directors for the ensuing year : Richard Walsh, secretary ; Thomas Mockler, treasurer ; Edward Powers, doorkeeper. Thomas J. Kelly, Philip C. Ring and Stephen O'Connor were appointed Committee on Membership. P. Mulcahy, Joseph L. Guedry and Henry Fairback were appointed delegates to the National Board of Trade.

For some little time past a movement has been on foot to form an organzation, with the result that 100 of the most responsible building contractors of the city have joined hands under the name of the Master Builders' Association of St. Louis, with a capital stock of $10,000, for the furtherance of the interests of the general contractors. Membership in the association is limited to 100 members at $100 a share. The initiation fee has been fixed at $35, and annual dues at $25. Any master builder desiring to join the association after the 100 mark is reached may be admitted as a non-incorporate member. Sub-contractors may be admitted as associate members, but none outside of the corporation will be allowed a voice in the proceedings.

ARCHITECTURAL DRAWING FOR MECHANICS.*

By I. P. HICKS.

THE difference in the appearance of objects placed in various perspective positions is shown in Fig. 52, by contrasting the perspective view of the post B, which is to the left of P L V and which extends above the H L, with the perspective view of the post A, which is to the right of the P L V and which has its top below the H L. In this diagram there are two measuring points, the reason for which is that one perpective is to the left of the P L V and the other to the right, which requires that each view shall have its own measuring point, as shown. These two posts are so placed that all retreating lines are parallel to the P L V, therefore but one vanishing point is required for both. When objects are placed in this position they are said to be in parallel perspective. The post B extends above H L, which is the level of the eye, consequently we cannot see the plane which represents the top of it. All that can be seen of B in its position from the station point are the two sides, as shown. The post A is much shorter than B, and its top falls below the H L; therefore we are able to see two sides and the plane which represents its top. By going further and supposing A to be a transparent figure, and representing by dotted lines those which we could not see in an opaque object, we are able to correctly center of vision and requires one at the right and left of the center of vision to enable the draftsman to correctly represent the retreating lines. The latter still remain horizontal, consequently their vanishing points will be found in the horizontal line, their positions depending upon the amount the object is turned from the ground line. When an object is turned at an angle from the S P it is said to be in angular perspective. Referring now to Fig. 54, let it be required to draw a figure, for example, 2 feet square and 3 feet high in angular perspective, turning the figure at an angle of 45 degrees with the station point. First draw the H L and the P L V, as in the preceding diagrams. Determine the S P, and with it as a radius describe the semicircle, as shown. Measure off on the semicircle the degree representing the angle at which it is desired to have the lines retreat. Now, as previously shown, a line drawn from the S P at an angle of 90 degrees finds at its intersection with the H L a vanishing point for

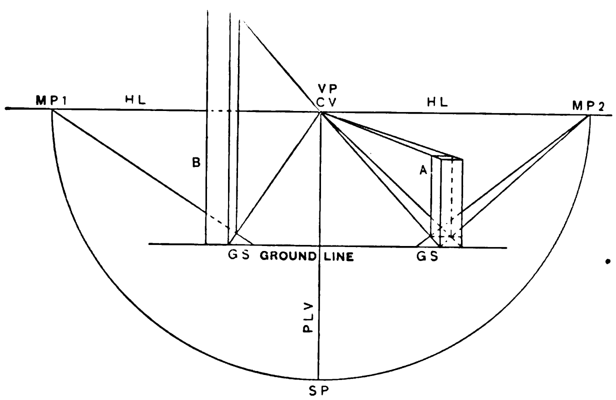


Fig 52.—Diagram Showing Difference in Appearance of Objects Placed in Varying Positions.

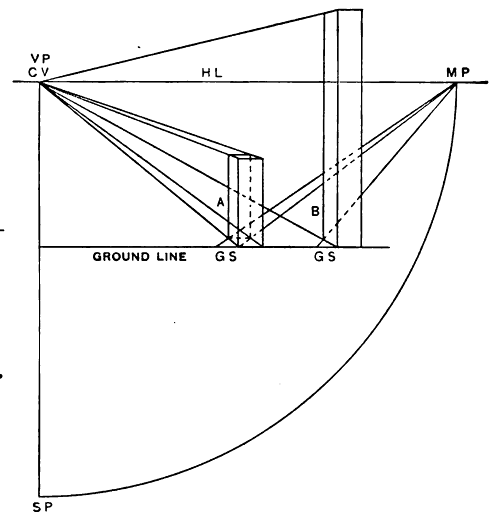


Fig 53.—Showing Different Positions of Perspective, and that only one Measuring Point is Required for Objects Drawn in Similar Positions.

Architectural Drawing for Mechanics —Architectural Perspective.—Scale, 3-16 *Inch to the Foot.*

outline every plane in the figure—the four sides, top and bottom, as shown. The principles and methods of drawing Fig. 52 are essentially the same as those of the previous diagram and need no further explanation.

For the purpose of showing the same objects in a different position of perspective, and so that but one measuring point will be required, another diagram is given representing both posts to the right of the P L V, as shown in Fig. 53. The explanation of the two preceding diagrams will enable the learner to readily comprehend the ideas presented in Fig. 53, as the principles are the same as already delineated. We will now leave these diagrams to the practice of the student, recommending that they be made larger than here given, and that the object to be placed in perspective be disposed in different positions until the principles involved are thoroughly understood.

We have thus far only considered objects in such positions that the retreating lines were parallel with the P L V, which is on an angle of 90 degrees, and therefore made the center of vision—the vanishing point for all retreating lines. If an object is turned either to the right or left, as indicated in Fig. 54, then the retreating lines are not parallel to the P L V, and the center of vision is no longer the vanishing point. When an object is placed at an angle to the P L V it removes the vanishing point from the itself and all lines parallel to it; so a line drawn from the S P at any angle in intersecting the H L finds a vanishing point for all lines running in that direction. Hence the lines directed from S P at an angle of 45 degrees in intersecting the H L determine the vanishing points, as shown. It will also be observed that lines drawn from the S P at an angle of 45 degrees strike the measuring points. This may be proven by taking C V as a center and S P as a radius and striking the circle, as shown in this and the preceding diagrams. If the object to be drawn is turned at any other angle than 45 degrees, then the vanishing points and measuring points no longer occupy the same positions, but this point will be explained in the next illustration of perspective. To complete Fig. 54, draw the ground line at some convenient distance from C V, as shown, letting A represent the geometrical size of the bottom of the figure and also the angle at which it is turned from the ground line and station point. To place the entire figure in perspective, draw from the ground line at some convenient distance from the P L V the first perpendicular line which remains unchanged by perspective, as shown by B′ C′. Next draw the retreating ground lines from B′ to the vanishing points, then the retreating lines of the top from C′ to the vanishing points, all as shown. Next set off on the ground line the geometric scale from B′ in order to determine the foreshortening of the retreating sides. The scale taken is the actual scale measurement of one of the sides of the square A, and it is laid off on the ground line from B' in both directions because there are two retreating sides. From the end of these scales draw the remaining two retreating ground lines to the vanishing points, and the points of crossing the first retreating ground lines will be the points from which to raise the perpendicular lines, which will determine the perspective width of the figure. The remaining top retreating lines complete the figure and will be easily understood from the diagram. The learner should observe the reduction that takes place in the size of objects when placed in perspective positions, and that the perspective view changes as the object is moved either to the right or left of the P L V. An object may also be drawn partly in the P L V, as will be shown in the next diagram.

(To be continued.)

Rapid Structural Work.

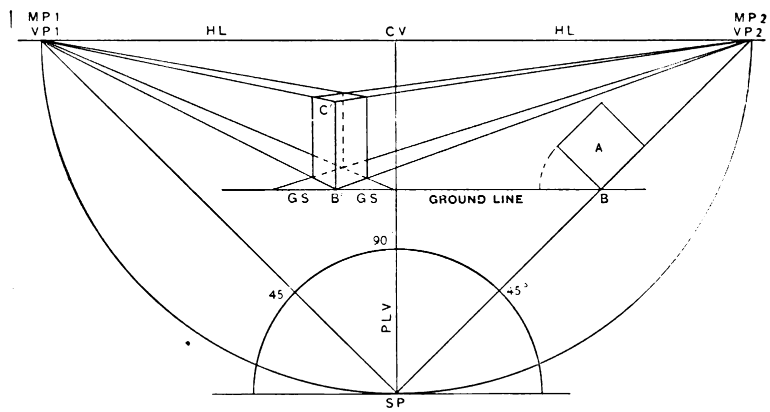
A notable example of rapid erection of structural iron and steel work, indicative of the great progress made within the past two or three years in the erection of skeleton fire proof buildings, was afforded on February 5 in the completion of the setting of the frame work of the large Siegel-Cooper building, Eighteenth and Nineteenth streets and Sixth avenue, New York City. The foundations for the building were delivered to the iron contractors on November 1, complete. During November the owners offered the contractors a bonus in consideration of their anticipating the contract time requirements for the erection of the frame work, including the roof tier complete. Notwithstanding the strike on the building, from November 18 until December 18, the contractors were enabled to complete the setting of the last beam, column, bolts and tie rods on the roof tier on Wednesday afternoon, January 28, the time in which they were to complete this work in order to win the bonus being February 1.

Excepting a portion of the columns and beams in the first tier, which were put up by hand owing to the previous incompleteness of the foundations, the work has been entirely erected by machinery, the actual working time being exactly nine weeks since the foundations were finally completed, deducting the strike period. In this time seven complete tiers of work, amounting to between 7000 and 8000 tons of material, have been erected. As illustrating the close attention even in Chicago to the progress of this work it may be mentioned that a telegram of congratulation was received from that city within one hour after the last beam was in position.

The second annual exhibition of the work of the Brooklyn Manual Training High School was held the third week in January at the school building, Court and Livingstone streets, Brooklyn, N. Y., and was largely attended. The school occupies four floors and the basement of a roomy building, and in the past season 200 boys were given instruction therein in various handicrafts. The exhibits of their work included mechanical drawings and designs, inlaid work in wood, wood carving and turning, sheet metal work, repoussé work, Venetian iron work, cabinet making, electric wiring and machine shop practice. These crafts are taught in the school in addition to the usual high school studies. The entire course is three years, and the present exhibition marks the close of one term's work. Prof. Charles D. Larkins is the principal of the Manual Training High School, and is assisted in his duties by an efficient corps of ten instructors.

Gum Flooring.

There never was a time in which a hard, smooth, durable flooring was so much in demand as in recent years. A competition has sprung up between the different hard woods adapted to flooring. Yellow pine, though not deemed in the category of hard woods, is sufficiently hard to make substantial flooring, and when quarter sawed cannot be beaten for durability. Rock or sugar maple has come to the front as an admirable flooring material, and for smoothness and solidity it is thought by many to exceed anything in use. Oak is largely used for fine floors, especially those which are to be covered with rugs instead of carpets. Pacific coast fir is to become an important competitor of the other woods in the flooring line. There is another wood that is making little stir, and is not obtrusive, neither are its praises much sounded abroad. We mention gum with confidence, but fully aware that some will sneer at the name. Yet gum flooring is making headway, and a larger quantity of it is being manufactured and going into use than many are aware. Gum, or hazel as it is called in some portions of Missouri and Arkansas, is a wood eminently adapted to a smooth, solid and durable flooring. The genuine red gum of the lower Mississippi bottoms runs well to heart wood, and is less liable to warp than the white gum which abounds further north. When sawed into narrow strips, rightly piled and dried, it is handled without much trouble from warping. There is apparently no reason in the world why gum should not be extensively utilized for flooring, says a recent issue of the *Northwestern Lumberman*. It presents a rich color tone, and is susceptible of high polish, if that is desired. It can be used plain or quarter sawed. Mr. Prentiss prefers the plain sawed strips for flooring The whole log can be converted into flooring, as it runs largely clear of knots or other defects. When plain sawed, both heart and sap can be used for flooring. In price it can compete with any wood extant.



Architectural Drawing for Mechanics.—Fig. 54.—Diagram Showing Vanishing and Measuring Points when the Object is Turned at an Angle of 45° with the Station Point.—Scale, 3-16 Inch to the Foot.

A house has been taken by the Young Men's Christian Association of Bridgeport, Conn., adjoining their building and has been fitted up for teaching trades to young men. Carpentry, plumbing and blacksmithing shops have been fitted up and a chemical laboratory has been equipped, the latter for the demonstration of such problems as are of importance to the skilled artisan. Classes in photography, mechanical drawing and several useful arts have been formed in the association for the benefit of those who desire to study at night.

SCAFFOLD KNOTS AND HITCHES.

THE use of pole and other forms of scaffolding which require the employment of rope as a means of fastening calls for a knowledge on the part of the builder of the more common, at least, of the knots and hitches used in connection with such work. It is essential that he possess more than a general idea of the way in which the knots are made, for the reason that a mistake in tying the rope may lead to the collapse of the scaffold and result in serious injury to the men who may be upon it. As being of interest to the builder we present herewith a number of illustrations of knots and hitches commonly employed in connection with scaffold work. Referring to the cuts, Fig. 1 represents what is known as a simple or overhand knot, Fig. 2 a figure eight knot, Fig. 3 a double knot, Fig. 4 a boat knot, Figs. 5, 6 and 7 a bowline, Fig. 5 indicating the first step, Fig. 6 the second step, and Fig. 7 the completed knot. The bowline is probably one of the most useful knots, for it will not slip, and after being strained is easily untied. In Fig. 8 is shown a square or reef knot, which must not be mistaken for what is known as the granny knot that slips under a strain. Fig. 9 represents a sheet bend or weavers' knot, while in Fig. 10 is the same kind of knot with a toggle. Fig. 11 shows what is known as a carrick bend, and Figs. 12 and 13 a stevedore knot. The latter is very useful when the rope passes through an eye and is held by the knot, for it will not slip and is easily unfastened after being subjected to strain. In Fig. 14 is a slip knot, Fig. 15 a Flemish loop, Fig. 16 a chain knot with toggle, Fig. 17 a half hitch, Fig. 18 a timber hitch, Fig. 19 a clove hitch, Fig. 20 a roll hitch, Fig. 21 a timber hitch and half hitch, Fig. 22 what is known as a Blackwall hitch, Fig. 23 a fisherman's bend, Fig. 24 a round turn and half hitch, and Figs. 25, 26, 27 and 28 a wall knot. The latter has a rather complicated appearance, but is of comparatively easy formation, as may be seen from the following description: In the first place form a bight with strand 1; pass strand 2 around the end of it and strand 3 around the end of 2, ending by passing it through the bight of 1, as shown. When the ends are hauled taut the appearance is as shown in Fig. 26. The end of strand 1 is now laid over the center of the knot, strand 2 is laid over 1 and 3 over 2, when the end of 3 is passed through the bight of 1, as shown in Fig. 27. Hauling all the strands taut gives the appearance indicated in Fig. 28 of the illustrations. An article on this same subject was published in the issue of *Carpentry and Building* for June, 1890, and may be interesting in this connection.

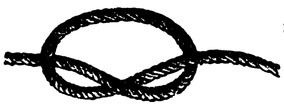


Fig. 1.—Overhand Knot.

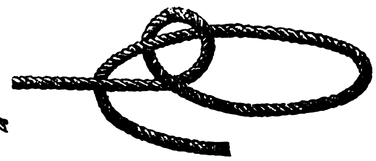


Fig. 6.—Second Step in Making a Bowline.

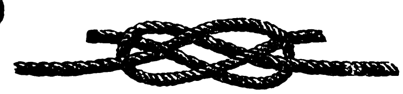


Fig. 11.—Carrick Bend.

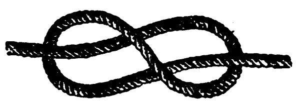


Fig. 2.—An 8 Knot.

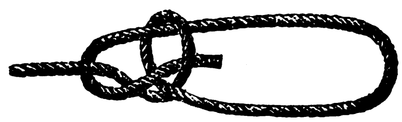


Fig. 7.—Bowline Completed.

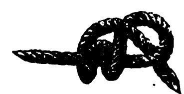


Fig. 13.—Stevedore Knot Completed.

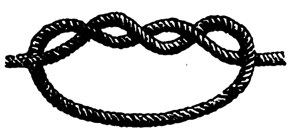


Fig. 3.—Double Knot.

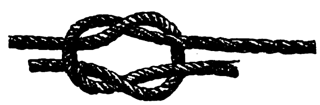


Fig. 8.—Square or Reef Knot.

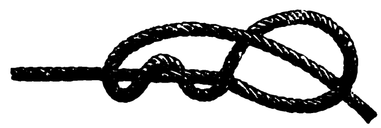


Fig. 12.—Commencement of Stevedore Knot.

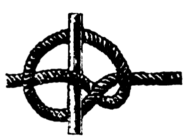


Fig. 4.—Boat Knot.

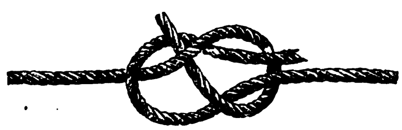


Fig. 9.—Sheet Bend or Weavers' Knot.

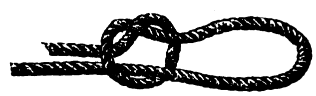


Fig. 14.—Slip Knot.

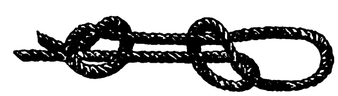


Fig. 15.—Flemish Loop.

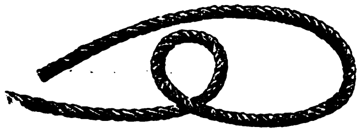


Fig. 5.—First Step in Making a Bowline.

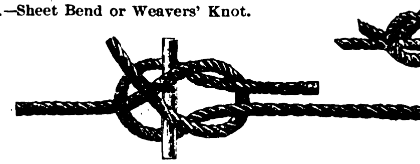


Fig. 10.—Sheet Bend with a Toggle.

Scaffold Knots and Hitches.

Slate for Roofing.

In an interesting article discussing the various forms of roof coverings employed since the early history of the world, G. B. Benford gives in a late issue of *Stone* some remarks on slate which are worthy of repetition in this connection. Among other things he refers to the color of a slate roof and presents remarks which may be of some use to those who have not heretofore taken that into consideration when painting their house. When one has a great body of a decided color on a roof, as green, purple, or red is, they should carefully select some shade that will harmonize generally with their roof. That is the reason that some green slate looks brighter, some purple richer and some red more lively, because either knowingly or unknowingly there has been a judicious harmony carried out by a correct juxtaposition of color. On the other hand, a man may paint his house with precisely the same colors as his neighbor, but there is a something about it that he does not understand; it does not look so well as neighbor Brown's. Let him look at his roof. Five times out of six the roof kills the job. Not because anything is amiss in the roof itself, but because of the want of a little artistic taste in color harmony. Neighbor Brown's house was the right color to match the slate. I have just called attention to this because it is one of the peculiarities I have noticed.

A slate roof lends itself very easily to decoration. I have seen mosaic borders and bands of parti-colored slate which were artistic and striking as a method of advertising. No large firm who have an extensive run of slate roofs should fail to put in their name and trade in lighter colored slates than the body of the roof. It stands as long as the roof, because it is a part of it. No iron or wooden signs to blow down, no paint to wash off, an imperishable signboard. Hence to sum up, a slate roof combines the greatest strength with the greatest endurance; slate if good and put on well lasts longer than the proverbial lifetime. The writer knows of a roof that was slated about the year 1680 in one of the royal dockyards of England. About 25 years ago it was found necessary to pull down the building and build a larger one. The greater portion of these slates were placed on the new building. It was also remarked at the time that very little repairs had been done on the roof during the nearly 200 years it had stood. In any of the old churchyards can be found gravestones, anywhere from 1 to 1400 years old, made of slate, and some of the letters seem to keep as fine an edge as when first cut. Then, summing up still further, slate is fire proof and vegetable matter does not easily attach itself, and hence all water running off it is, as far as the slate is concerned, chemically clean, is free from offensive smell of decayed wood or moss, as is the case with wooden roofs when old. It requires no paint to keep it water proof as does iron, tin or felt. In truth, it is a roof that protects without a constant and continual outlay of money to keep it so that it will protect.

Fig. 16.—Chain Knot with Toggle.

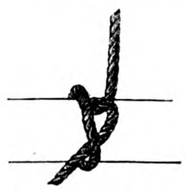


Fig. 17.—Half Hitch.

Fig. 20—A Roll Hitch.

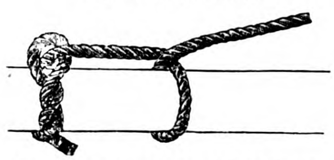


Fig. 21.—Timber Hitch and Half Hitch.

Fig. 25.—Commencement of Wall Knot.

Fig. 26—Wall Knot Completed.

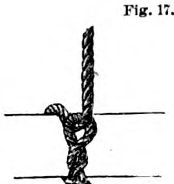


Fig. 18.—Timber Hitch.

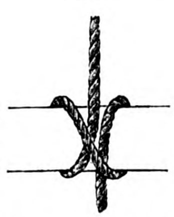


Fig. 19.—Clove Hitch.

Fig. 22.—Blackwall Hitch.

Fig. 23.—Fisherman's Bend.

Fig. 24.—Round Turn and Half Hitch.

Fig. 27.—Beginning of Crown in a Wall Knot.

Fig. 28.—Completion of Crown in Wall Knot.

Scaffold Knots and Hitches.

Church Built by One Man.

There was lately dedicated at Hepburnville, Pa., as unique a Presbyterian church as exists anywhere in Pennsylvania. It is a beautiful stone structure, 60 x 38 feet, with a square tower 60 feet high, and the walls were not only laid by one man, but he also hewed out the stones from great bowlders on Brobst Mountain. He labored more than six years, never drawing pay for his work, and when he died, recently, he bequeathed his unpaid wages to the church. This man was George Taylor. In the church he reared is a pretty memorial window erected by a grateful congregation composed mainly of well-to-do farmers and their families. About a year ago, when he had just about finished the tower and his long labor seemed about to end, Mr. Taylor grew ill and died from cancer at the age of nearly 70. When he died, a will was found, in which the story of his devotion to the church was made complete. All his wages, amounting to many hundred dollars, were bequeathed to the congregation. There remained a small debt, which was practically wiped out by those gathered in the pretty house of worship to see it dedicated.

As a result of its investigations the Committee on Standards appointed by the American Society of Heating and Ventilating Engineers, at its second annual meeting, held in New York in January recommends: 1. That for all buildings, such as schools and asylums, occupied almost entirely by children and youths under 15 years of age, the minimum amount of air for ventilation should be 1800 cubic feet per hour per person; 2, that for all buildings occupied by persons over 15 years of age the minimum of air for ventilation shall be 2000 cubic feet per hour per person; 3, that for buildings lighted in part or wholly by gas, the minimum amount of air supplied for each gas light shall be 3000 cubic feet per hour.

The Builders' Exchange

Directory and Official Announcements of the National Association of Builders.

Officers for 1896.

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First Vice-President,
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Secretary,
William H. Sayward of Boston.
Treasurer,
George Tapper of Chicago.

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Justus Herbert Grant	Rochester.
Thomas J. Ward	St. Louis.
George J. Grant	St. Paul.
A. S. Reed	Wilmington.
George H. Cutting	Worcester.

Missionary Work.

During the past month a missionary visit on behalf of the National Association of Builders was made by the secretary's assistant to exchanges in Toledo, Columbus and Springfield, Ohio, for the purpose of urging co-operation in the formation of a State association and affiliation with the national body. The question of a State association of builders for Ohio met with unanimous approval as offering much benefit in itself and as a means for re-awakening activity in the local exchanges. In each of the cities mentioned the exchanges are undergoing the most discouraging period of their existence—that which results from the waning of the general enthusiasm existing at the time of organization. The effect of the complaints of those members who expected the exchange to accomplish all desired ends without any particular effort on their part is depressing, and the disinclination of such members to assist action prevents those who are willing to give time and energy to the work, from accomplishing more than they do.

The Builders' Exchange of Toledo is in excellent financial condition and has a membership in good standing of about 90. Its headquarters in the Blade Building are light and desirable, though not exactly in the location desired by some of the members. The attempt to establish the custom of meeting during a 'Change hour has not been successful, although many of the members make a point of visiting the exchange at some time during the day. The present outlook for the exchange is much more favorable than it has been for some time, the members being ready to take up the State Association as soon as a uniting of other similar organizations in the State can be reasonably assured. A determined effort in behalf of greater efficiency of the exchange is promised, owing to a desire on the part of the mill men and carpenter contractors to do away with some of the onerous conditions that govern their relations with the architects and with each other. A present indication of a prosperous year for builders is considered favorable to the renewal of a systematic effort to bind the builders together for the general good through the exchange.

The secretary's assistant was cordially received, and addressed the members present at the regular meeting of February 12 on the benefits of organization and of becoming identified with the State and National associations. The presentation of the subject by a stranger seemed to create a newer interest in the question, which had already been presented to the exchange, and it was hoped by those present that the "talk" may bear fruit. A misunderstanding seemed to exist in the minds of some of the members in regard to the disposition of the funds of the National Association, it being thought that part of the per capita tax was used to pay for the entertainment of the delegates to the annual conventions. Objection was made to the amount of the per capita tax under the impression that this use was made of the contributions of the filial bodies. The explanation that none of the association funds were used for any such purpose, but that all entertainment of delegates was the contribution of the exchange in the city in which the convention is held, apparently did much toward removing the objection to the amount of the assessment.

The exchanges in Columbus and Springfield are both suffering from the reaction of a wrong conception of the nature of the work of such a body, that prevailed at the time of their organization. The former exchange is in good condition to go forward, however, having an "old guard" that realizes the need of unremitting individual effort to bring the institution to a position where it can demonstrate by practical example the nature of benefit it should confer. Considerable interest in the National and State associations was shown, and the experience of other exchanges that have successfully survived a similar period in their experience was listened to with interest.

The exchange in Springfield seems to be in favor of a State Association, having already taken steps to ascertain the attitude of other exchanges throughout the State in regard to such an organization. The exchange is small and beset with some unfavorable local conditions which the "faithful" are striving to overcome The main obstacle to success in these exchanges is the difficulty the members experience in accepting the exchange as a piece of business machinery and using it as such. The possibilities of specific, practical usefulness, day by day, seems to be limited to expression in theory, few being willing to put the theory to a test.

Chicago Building Trades Club.

The new Building Trades Club of Chicago is steadily gaining in membership, as its objects and purposes become more widely known. The attempt to draw the builders together upon primarily social lines is a new one in Chicago, and it is satisfactory to note that the attempt gives every prospect of permanence and success. The club is largely composed of members of the Builders and Traders' Exchange, and is therefore peculiarly well qualified to become a conserving influence in the protection and advancement of the best interests of the exchange and of the building interests of the city generally. One of the ultimate objects of the club is a building in which the exchange shall also have a home, thus combining the business and social sides of the builder's life under one roof. Convenient and desirable rooms are being fitted up for the club as rapidly as possible at 118 and 120 Monroe street, and it is hoped that they will be ready for occupancy by the middle of March. Facilities for all the enjoyments of club life are being provided, and the rooms promise to be very cozy and inviting. A housewarming is planned to occur as soon as the rooms are ready, and all are looking forward to a most enjoyable time.

Effects of Ill-Advised Enthusiasm.

One of the most difficult features to deal with in the development of an organization is the after effect of ill-advised enthusiasm. Many organizations have experienced the cold wave of depression that follows the cooling of the first enthusiasm of those members who looked for radical and beneficial changes from the mere establishment and existence of the organization, and without any effort on their part. When organization is first proposed the distinct object is the correction of unfair and damaging customs that, through years of neglect, have become too intolerable for endurance. All are unanimous in desiring reform, and are conscious of the effectiveness of working together. They recognize the strength of organization over disorganization and discord, and all are eager to join their fellows in working for the common good; but, generally speaking, after the first month or two nobody works. The enthusiasm created by the desire to do away with conditions which make the transaction of business difficult and disagreeable, results in the belief, by those who do not think deeply on the subject, that all that is needful to correct existing evils is to organize, and the organization will do the rest without further help from them. Many men fail to realize that the success of an organization depends upon the efficiency of all the parts. Being made up of individuals, it is necessary to success that each individual do his part; otherwise those who strive for success by doing their share are compelled to do, in addition, the share of work that belongs to others, and to carry along as deadwood the members who seek the benefit, but who will not work to obtain it. The only reason an organization founded on true principles and having worthy objects fails of success is because of the failure of the members as individual parts to do their duty.

Many builders' exchanges throughout the country have fallen into a state of inocuous desuetude within six months of their formation, because of the impatience of the members for results without effort on their part. These exchanges have been established with great enthusiasm under the impression that their simple establishment would frighten the evil customs complained of out of existence. As soon as it has become apparent that the evils still exist the members conclude that the exchange is of little value, and the enthusiasm wanes until the work, if any is done, falls upon the few who realized in the beginning that persistent and intelligent work is the only thing that will show results. When the enthusiasm begins to wane the unthinking begin to condemn the exchange for not accomplishing the objects desired, totally ignoring the fact that they themselves are solely to be blamed for the failure. Those who complain of the inefficiency and failure of an exchange are in reality complaining of their own inefficiency and failure to do their part in creating success. Lack of success is in no wise a sure indication that an exchange may not be a necessity in the community, or that it may not be founded on wise and proved lines; it is much more likely to be the result of the failure of the members as individuals to make it a success.

Form of Acceptance of Sub-Bids.

The subjoined notice from a principal contractor to the sub-contractor, whose bid has been used in making up the estimate of the total cost of proposed work, is in use by one of the members of the Master Builders' Association of Boston. The notice serves the dual purpose of being an acceptance of the sub-bid and of making that acceptance and the stipulation regarding extras and deductions a matter of record.

It would be well if all principal contractors used this or some similar form in dealing with the acceptance of sub-bids.

BOSTON..............................*189*

M..

I have been awarded the contract for the..........................

....

....

M..*Architects,*

M..*Owner,*

and have used your bid of $.......................................*for*

....

....

....

in making up my estimate. Any work done by you that you consider as extra, or for which you intend to charge in excess of the above amount or any deductions which lessen the same, you must have my order for before starting it, and price agreed upon.

Yours truly,

....

New Publications.

HEATING AND VENTILATING BUILDINGS. By Rolla C. Carpenter, M.S., C.E., M.M.E., Professor Experimental Engineering, Cornell University. Size, 9¼ x 6 inches; 411 pages. Published by John Wiley & Sons. Price $3.00.

As indicated in its supplementary title, this new work is an elementary treatise. It professes to be the first of its kind relating to the general principles and methods of construction in vogue since the publication of the early works of Tredgold, Hood and Péclet. The endeavor of the author, as related in the preface, has been to present: "1, A statement of the general principles and laws of pure science which apply; 2, a collection of important tests which give data and figures showing the relation of theoretical principles to practical construction; 3, a description of the various practical methods which are in use in heating and ventilating buildings; 4, a description of the methods of designing various systems of heating and ventilating; 5, a collection of topics which will be useful in the practical application of the principles stated."

This definite outline appears to have been conscientiously adhered to. The opening chapters are devoted to a consideration of the nature and properties of heat and various instruments of measurement, to the properties of the atmosphere and the fundamental principles of ventilation. The subject matter is clear, of sufficient extent to serve the purposes of the supposed reader and encumbered to only a slight degree with formulæ. The amount of heat required for warming and the heat given off from radiating surfaces receive careful consideration, the remarks upon the latter subject being sensibly reinforced by numerous results of tests. The purely practical portion of the work is comprised in chapters relating to pipe and fittings, radiators, steam boilers, hot water heaters, boiler settings and appliances, concluding with a few remarks upon the care of boilers. To a great extent much of this descriptive matter is of a nature perfectly familiar to the average steam fitter, and yet it cannot be denied that for the sake of completeness it should be incorporated. More vital interest centers, however, in the chapters on systems of piping and the design of steam and hot water systems. Under the latter heading has been gathered much data of interest. There are presented in tabular form numerous thumb rules for the proportioning of radiating surface to meet given requirements, from which are deduced simple rules which seem best to fulfill the conditions. The sizes of supply and return pipes are likewise carefully treated. Heating by exhaust steam receives its show of attention, as does the use of the hot air furnace and the manner of its application. With forced blast systems of heating and ventilating the author certainly does not show marked familiarity, to say the least. A considerable portion of the chapter relating to this subject is, as stated, from the pen of another, while most of the information regarding fans is from the makers' catalogues. Heating by electricity is touched upon in passing, while temperature regulators are discussed and illustrated at considerable length. The closing chapter is dedicated to specifications, proposals and business suggestions, and contains much that is of interest and value. Fifty pages are devoted to an appendix, covering a list of books upon the subject of warming and ventilation, together with 21 important and well arranged topics of assistance to the reader. The work concludes with an excellent index.

CONTENTS.

Carpentry and Building

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The Builders' Exchange

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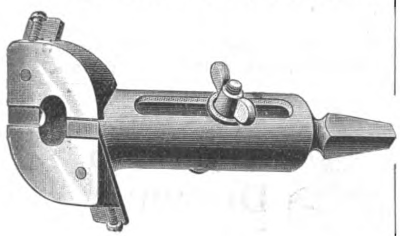
— ALL IDENTIFIED.—Jack Ash: "Did you have an exciting time with the trolley party?"
Ethel Knox: "Very; we ran across ever so many people I knew."

NOVELTIES.

Ives' Improved Novelty Hollow Auger.

The Hamden Mfg. Company, late W. A. Ives & Co., Hamden, Conn., are offering Ives' Improved Novelty hollow auger, as shown in Fig. 1 of the cuts. The improved shape of the head, it is explained, admits



Novelties.—Fig. 1.- Ives' Improved Novelty Hollow Auger.

the use of a straight cutter, whereby each cutter will fit all sizes of augers, and that the set screw at the back of the knife prevents all possibility of slipping when in use. Attention is called to the new depth gauge, which, as now made, allows the operator to set it at the required length of tenon, to do much more work in a given time and to be sure each tenon will be of the same length. The makers state that the auger shown combines all the good qualities of the new pattern auger, and that prices remain unchanged.

Improved Corner Brace.

Du Mont Mfg. Company, Buffalo, N. Y., for whom John H. Graham &

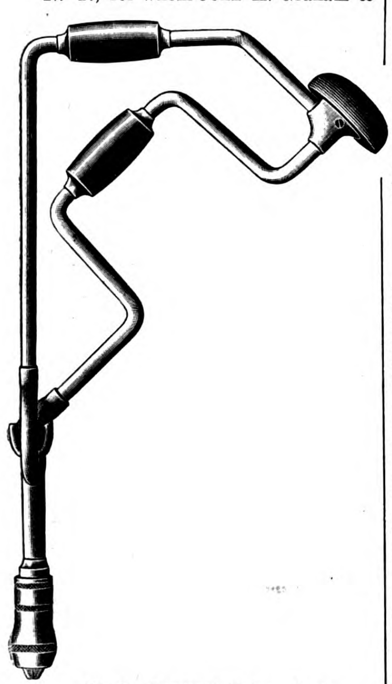


Fig. 2.—Improved Corner Brace.

Co., 113 Chambers street, New York, are agents, are offering an improved corner brace, as shown in Fig. 2. The improvement consists of a malleable iron socket in which the end of the sweep or crank turns, and to which the head is secured. This, it is explained, relieves the head from the danger of becoming split or broken; also that it forms a rigid and secure means of attachment for the angular frame, so that should the head become split the effectiveness of the tool would not be seriously impaired. The point is made that the change leaves the head free to be firmly grasped by the operator, whatever the position in which the tool is operated may be, and that it permits the use of lignum vitæ heads and cocobola handles, thus increasing the beauty and value of the tool. The steel rods and other parts are well nickel plated, and the price of the tool remains the same as before. The braces are made with 8 and 10 inch sweep.

The Luxury Bath.

One of the necessary fixtures of every well equipped house is a bath-tub, and the illustration presented in Fig. 3 represents a new porcelain lined tub which is being put on the market by McVay & Walker, Braddock, Pa. A portion of the side of the

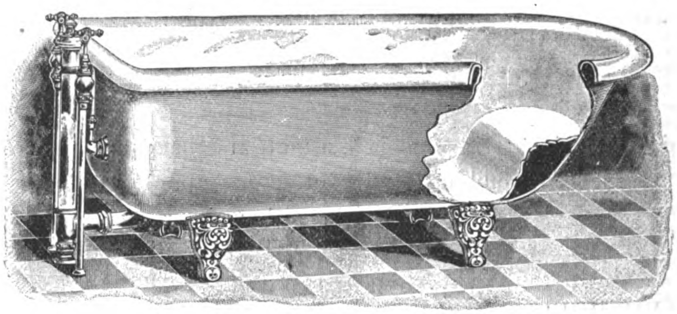


Fig. 3.—The Luxury Bath.

tub is broken away in the illustration, exposing a seat in the tub, for which a patent is being taken out. This feature is designed as a convenience when the tub is used as a foot bath. It is furnished in connection with a roll rim tub of the French pattern, and is arranged for a combined overflow and waste, and for nickel plated supply pipes.

Exhibits at the Philadelphia Bourse.

Among the prominent exhibits in the new Bourse Building, which was completed and formally opened at Philadelphia, Pa., a few weeks ago, may be mentioned a number of special interest to our readers. Henry Disston & Sons have a handsome case display of saws, files and tools ; Berger Brothers show galvanized piping and guttering, pipe hooks and a general line of tinners' hardware and roofers' supplies ; the Penn Metal Ceiling & Roofing Company have a room treated with their celebrated sheet metal ceiling and side wall finish, the exhibit being painted and arranged in an artistic manner and showing very forcibly the adaptability of steel plates for the interior decoration of buildings. Isaac A. Sheppard & Co. display a line of their paragon furnaces and Fidelity and Royal Fidelity ranges ; William P. Walters' Sons exhibit foot power wood working machinery ; the Thomas, Roberts, Stevenson Company display Active Fortune and gauze door ranges ; John C. Oeters has on exhibition a water proof mineral paint called Zementine, especially applicable to brick, stone and cement ; S. Bowens' Sons have a brick pedestal showing the finishing effect of their Pecora mortar stains ; J. L. Gaumer & Co. exhibit hand wrought iron work ; Cyrus Borgner, a variety of fire brick adapted for all purposes; the Alpha Portland Cement Company have a large exhibit of Alpha Portland cement ; Merchant & Co. show Star ventilators, plain and combination skylight patterns, Merchant's metal Spanish tiles for square or circular roofs, domes, conical towers or turrets, the square tiles being shown upon model roofs, while a conical tower is used to show their graduated tile ; the Eastern Hydraulic Pressed Brick Company have an oak stall containing samples of pressed bricks ; the LeRoy Safety Window Company show the LeRoy safety window in connection with a full sized window casing ; S. H. French & Co. have a handsome exhibit covering finished wainscoting and flooring, a mantel with open fire place in which plain and ornamental tiles are introduced, for the purpose of showing the effects obtainable from their use. All the above named concerns are of Philadelphia, Pa. E. T. Burrows & Co. of Portland, Maine, have on exhibition a window casing showing their movable fly screen ; Stevenson & Co., Limited, of Chester, Pa., exhibit Stevenson's air tight door for lime houses, refrigerators, storm doors, &c., and the Atlas Cement Company of New York and Coplay, Pa., make a display of Atlas cement.

The Caldwell Screen Door Check.

A screen door check, which is being offered by the Caldwell Mfg. Company,

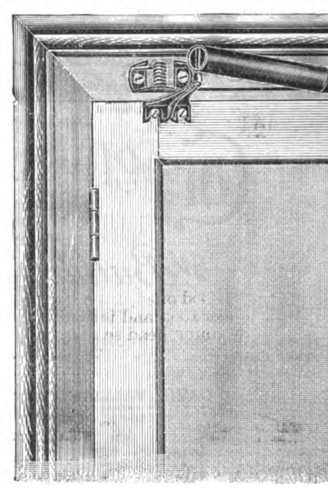


Fig. 4 —The Caldwell Screen Door Check.

6-10 Jones street, Rochester, N. Y., is shown in Fig. 4. The device is referred to as a perfect working low priced pneumatic check for use with the ordinary spring hinge or with any door hinge, and as working nicely on outside house or office doors. The illustration shows the check applied to the outside of the door, but, it is remarked, it is only to be used on the outside of the door when there is not sufficient space between the house and screen doors. The check is finished in japan, is designed to prevent doors slamming, and is, it is stated, easily applied and adjustable to all sized doors.

The Home Steel Tape.

The Keuffel & Esser Company of 127 Fulton street, New York, are introducing the Home steel tape of their manufacture, as shown in Fig. 5 of the engravings. It is intended to supersede woven tapes, metallic or linen, owing to greater accuracy and very low cost. It has a red bent sewed leather case, with brass lined mouthpiece

Novelties.—Fig. 5.—The Home Steel Tape.

and anti-friction roller. The folding brass handle is practically flush. The steel line is $\frac{3}{8}$ inch wide, sharply and plainly graduated to feet, inches and eighths, or to feet and tenths and hundredths of feet. The graduations and figures are bright, the ground surface being nearly black. This tape is offered for use in the building trades, construction and railroad work, &c., for classes of work not absolutely requiring their high grade Excelsior tapes. They are made in 25, 50, 75 and 100 feet lengths, divided in two classes, as described above.

The Phillips Door Holder.

The accompanying cut, Fig. 6, represents a door holder offered by the A. J. Phillips Company, Fenton, Mich. It

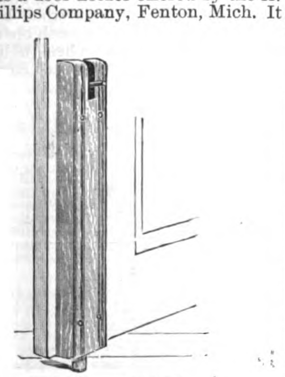


Fig. 6.—The Phillips Door Holder.

is made of hardwood oiled, has a strong spring and rubber foot, and is attached to the door by round head screws furnished by the makers. Turning the wire stem at the top allows the rubber to press on the floor, while raising and turning the stem leaves the door free to be closed. The point is made that by the use of the holder the door may be held partially open to vary the temperature of a room; that it prevents slamming of open doors, and that it obviates the necessity of chairs, bricks or other articles to hold the door open. The holder is designed to retail at 10 cents.

Chain Saw Mortiser.

A machine embodying many novel features in its construction and which represents the result of years of experimentation and study of the needs of wood workers is being manufac-

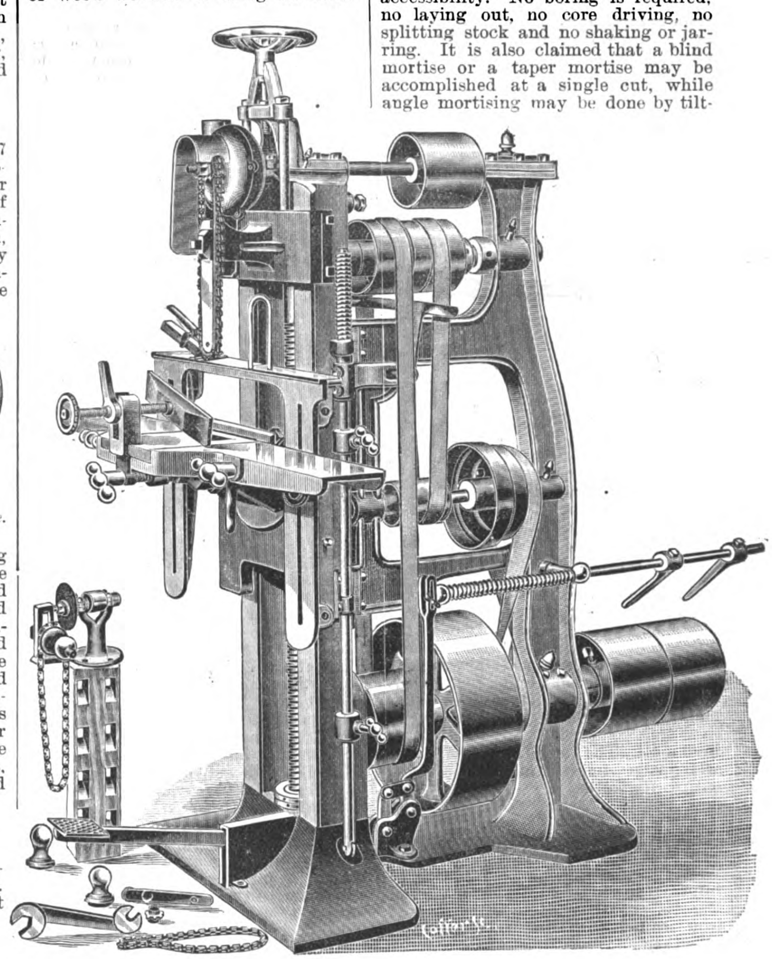


Fig. 7.—Chain Saw Mortiser, Made by the New Britain Machine Company.

tured by the New Britain Machine Company of New Britain, Conn., and for which Sidney B. Whiteside of 139 Liberty street, New York City, is the sole agent. A general view of the machine is shown in Fig. 7 of the illustrations. In this machine the cutting is executed by means of a steel chain, each link of which has a sharpened tooth so formed as to carry away its own chip, and is said to be presented to the work a thousand times a minute. The steel chain, driven by a sprocket, travels over and is guided by a chain bar having an anti-friction bearing at its lower end. The table which holds the work is conveyed automatically upward toward the chain, the mortise being made at a single cut while the table rapidly descends to the starting point ready for another mortise. These operations are so quickly performed that the machine's capacity is only limited by the ability of the operator to supply it with work. The manufacturers state that under ordinary circumstances from 400 to 500 four panel doors should be put through in ten hours, each door having ten accurate clean mortises. The range of the No. 1 Standard mortiser, which is presented herewith, is any mortise from 3 16 to 1 inch in width, $1\frac{1}{2}$ to $3\frac{1}{2}$ inches in length up to $6\frac{1}{2}$ inches deep at a single cut, or up to 13 inches in depth by reversing the stock. The company set forth many claims for this mortiser, among which may be mentioned rapidity, accuracy, adaptability and accessibility. No boring is required, no laying out, no core driving, no splitting stock and no shaking or jarring. It is also claimed that a blind mortise or a taper mortise may be accomplished at a single cut, while angle mortising may be done by tilting the table up to 45 degrees if necessary. The machine is easily set up and the action of the chain cutter is such as to leave the mortise perfect in every respect for gluing. The company make a No. 2 size of machine which is a duplicate of that here illustrated, except that it has in addition a compound table, which is found convenient in making very long mortises without unclamping the stock.

The Johnstone Brad Awl Handle.

A handle intended for holding an ordinary brad awl and possessing features of novelty which are likely to in-

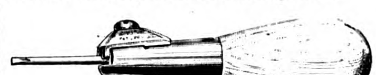
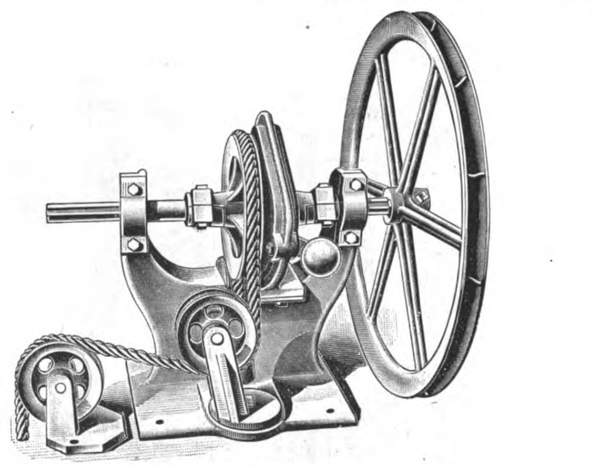


Fig. 8.—The Johnstone Brad Awl Handle.

terest carpenters and builders generally, has lately been placed upon the market by James Johnstone of 78 East 104th street, New York City. The device is composed of a socket and cover made of malleable iron, into which is firmly driven a polished maple handle, securely fastened by a screw.

The socket has a projecting end with a flat inner face, against which one of the square ends of the awl rests, and which when the cover is screwed down prevents the awl from turning. The cover has a grooved claw which hooks over the flange of the awl and prevents it from pulling out of the handle, while at the same time it holds it as in a vise. When it is desired to change the awl in the handle it is only necessary to slacken the screw, turn the cover to one side, place a screw driver in the notch behind the flange of the awl and push it out. It is unnecessary to have the awl tight in the handle, for the reason that the cover holds its firm. The handles are made with two sizes of holes so as to accommodate large and small brad awls. The tool shown in Fig. 8 is well made and is said to have given entire satisfaction in use.



Novelties.—Fig. 9.—Machine of the Columbia Dumb Waiter.

The Columbia Dumb Waiter.

Speidel & Roeper, of Reading Pa , are putting on the market a dumb waiter possessing many features of interest to builders. The machine, Fig. 9, consists of a strong cast iron frame, with an arm extending at either end and forming the journals for the driving shaft. The shaft carries the hoisting sheave in connection with the automatic friction brake and the hand rope wheel. The hoisting rope is brought up from the car through a hole in the base of the machine, over the hoisting sheave down to the swivel guide and then over another idler sheave to the balance weight. An endless hand rope is laid over the wheel in front of the machine, pulling on one side of which will raise the car, while pulling on the other side lowers it. The point is made that no brake rope is required with the machine, as the brake is automatic, powerful and reliable, and that it will hold the car safely at any point of the lift, no matter how heavy the load. The bearings are either anti-friction roller, or self-lubricating graphite bearings ; thus, it is stated, requiring no lubrication. The speed of the car is about 100 feet per minute, depending somewhat upon the size of the hand rope wheels, which vary from 16 to 30 inches, to suit the different widths of cars. It is explained that the machine can be put up by any ordinary house carpenter, since it is self containing, all the sheaves and bearings being part of the main frame, so that no part can be placed in a wrong position or become loose after being in use for some time. The waiters are made in three sizes, of 100, 300 and 500 pounds capacity.

The Prouty Ball Bearing Door Hanger.

A ball bearing door hanger, which is now being offered the trade by the P. C. Prouty Company, Midland, Mich., is shown in Fig. 10 of the cuts. The wheel has a tread made of a turned ring of vulcanized fiber to render the action of the wheel practically noiseless. The tread is mounted on steel sheaves formed from machinery steel under heavy pressure into a cone construction to receive 16 1/4 inch bicycle balls. The balls are divided into two rows, eight on each side of the wheel, which is kept from having a lateral motion by a central enlargement of the shaft, which is turned from special tool steel by automatic machinery and afterward tempered and tested. The base plate is referred to as simple yet effective, and as being applied without cutting or mortising the door. At the front edge is a raised lug to receive and lock the adjustment key, which is pivoted to the adjustment screw and serves not only as a key but also forms a lock to retain the hanger in the base plate and to render it impossible for the adjustment to

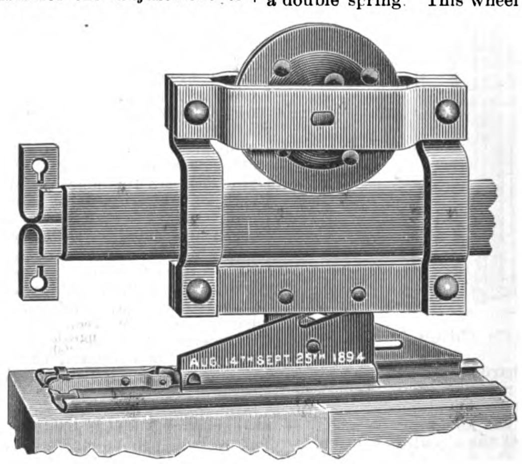


Fig. 10. - The Prouty Ball Bearing Door Hanger

become disarranged. To adjust, the ends of the key are pressed together, which, it is explained, will release them from the lugs on the base plates, when the hanger may be drawn to the front edge of the door to allow the key to hang down at an angle of 20 degrees, so that it may serve as a screw driver acting on the adjustment planes. The hangers and attachments are given a bright finish and covered with a thoroughly rust proof varnish. The point is made that the adjustments are detachable from the top of the door instantly, and can be adjusted and permanently locked without the use of screw driver or wrench. The track is packed complete with screws in 14-foot bundles for full sets and 8-foot bundles for half sets. Each bundle is wrapped in paper ready to hand over the counter. The manufacturers state that one of their wheels, after having made over 1,000,000 revolutions under a steady weight of 200 pounds, was found to be in excellent condition.

The Bigelow Automatic Door Bell.

A sectional illustration is given in Fig. 11 of the Bigelow automatic door bell, which has quite recently been put on the market. The bell is of the type imitating in its push button and its action an electric bell. Its special features are that it requires no winding, rings 50 strokes at each pressure of the button, is exceedingly simple in construction, sells at a very low price and is claimed by the manufacturers to be absolutely reliable. The mechanism is surprisingly free from complicated parts and is easily understood by referring to the cut. The push operates directly on a toothed wheel held by a double spring. This wheel communicates motion to a very small pinion placed on the same shaft with a ratchet wheel. The ratchet wheel works a double pawl, to which the bell hammer is attached Very rapid motion is thus given to the hammer, while the double spring on the main wheel keeps it always in position for positive ac-

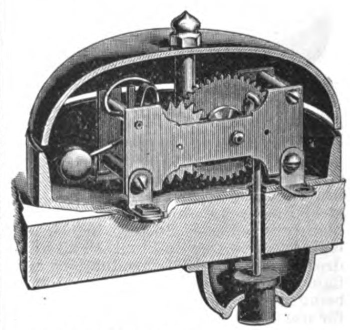
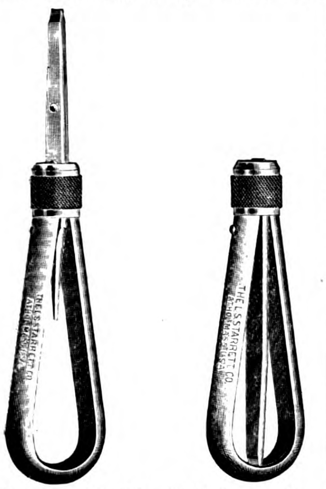


Fig. 11.—The Bigelow Automatic Door Bell.

tion. This bell is put up so that it can be fastened on a door or on the casing at the side of the door. To secure the latter result, with each bell is packed a steel bicycle spoke, long enough to reach through the thickest door casing. If desired, the bell can further be placed a long distance away from the door, making the connection by rods and cranks. The Orr & Lockett Hardware Company, 50 State street, Chicago, Ill., have arranged with the manufacturer to market the entire output of these bells.

Pocket Combination Tool.

The L. S. Starrett Company, Athol, Mass., are offering the pocket combination tool shown open and closed in Fig. 12 of the cuts. The tool consists of a neat, finely finished steel



Novelties.—Fig 12.—Pocket Combination Tool.

handle with a knurled nut which firmly holds a screw driver and brad awl made in one piece, this being telescoped within the handle when not in use. It is explained that the shape of the handle enables it to be used as an emergency wrench. The tool, it is remarked, weighs 2 ounces.

TRADE NOTES.

L. F. PARKS of Cincinnati, Ohio, is distributing among his friends in the trade an illustrated card showing in a condensed form the various machines he manufactures, also the attachments which he is prepared to supply. In connection with the various illustrations is given the name and the price of each machine.

THOSE MEMBERS of the building trade who are desirous of obtaining a new spirit level will be interested in the announcement of the Akron Level Works, Akron, Ohio, presented in another part of this issue. The company make what is known as the Akron level, which is said to be accurate and unbreakable. The makers have issued a catalogue illustrating and describing this level, and they will be glad to send a copy to any one who may apply. They state that if the nearest hardware dealer does not have the level in stock the company will send one on receipt of $2.

THE STEEL BATH MFG. & SUPPLY COMPANY of Detroit, Mich., call attention in their advertisement this month to a line of bathtubs which they are offering the trade. They direct attention to the fact that they are prepared to furnish water closets, wash bowls and bathroom supplies of all kinds at moderate prices for town and country, and also to furnish free of charge to those desiring it advice with regard to fitting up a bathroom, drainage, water supply, &c.

CROSS BROTHERS of Northfield, Vt., call attention in a folder which they have just issued to a paste intended for use in removing stains of all kinds from granite or marble. It is stated that with the exception of oil, it will positively remove the acid stains, dirt stains of any kind, iron stains, or in fact anything that discolors the stone. It is especially valuable for cleaning monuments which have been erected for some time, also for cleaning buildings when they have become old in appearance, and particularly where iron rust has dripped down from around chimneys discoloring large surfaces. The makers state that the paste will not stick to the stone, but will wash off easily after it has dried. Reference is also made to its value for cleaning rock faced work and for other purposes.

JOHN GALT & SONS, with main office at 253 Broadway, New York City, and quarry at Bangor, Pa., have issued from the press an interesting little pamphlet of 16 pages, entitled "Small Talk on Slate for Architects." This little volume has been brought out for the purpose of impressing more deeply upon the minds of all who contemplate building the advantages of slate over other materials for roofing purposes. Numerous varieties of slate are considered from a practical stand point, special reference being made to unfading green and red slate, stamped slate, &c. A price list of slate occupies several pages of the pamphlet, while another is devoted to approximate freight rates, and still another to the certificate of the Bangor Roofing Slate Manufacturers' Association, which is issued with each carload of genuine Bangor slate. An interesting feature of the pamphlet is a table showing the number of slate of each size to make a square and variation in the lap showing the length of slates exposed when laid. This little pamphlet cannot fail to prove interesting and valuable to architects, builders and contractors generally, and Messrs. Galt & Sons, will take pleasure in sending a copy to any one who may apply for it.

THE COBURN TROLLEY TRACK MFG. COMPANY of Holyoke, Mass., issued under date of Feburary 1, an announcement to the trade from which we quote as follows: We hereby notify the trade that we have brought suit against the McCabe Mfg. Company of New York for infringement of the Sumner patent No. 455,695, owned by us, by reason of their manufacturing and selling door hangers infringing upon said patent, and we warn all persons dealing in adjustable door hangers that we are going to enforce our rights under this patent, and that if they do not wish to infringe upon them they should examine carefully into the construction of the goods offered them and compare them with our patent.

THE EGAN COMPANY of Central avenue, John, Front and Greenleaf streets, Cincinnati, Ohio, are favoring the trade with an immense poster intended to be hung up in a prominent place for reference. The poster is illustrated with over 100 engravings of machines turned out by the company, these giving some idea of the varied assortment which the works produce. In fact, the company state that their plant is so extensive and their resources so great that on short notice they can fit out an entire car shop; a navy yard; furniture, chair or piano factory; planing mill; wheel or spoke works; buggy, wagon or carriage shop, as well as special machines for carpenters, barrel factories, &c. They have a special plant for making molding bits and a supply department where they carry a complete line of band saws, circular saws, knives, shafting, pulleys, hangers, coupling, belting, &c. The printing is in two colors and the arrangement of the matter is such as to readily attract attention wherever the poster may be displayed.

ELLIOTT & STUTZMAN of Williamsport, Pa., are meeting with a gratifying demand for their new power feed panel raising machines. In September last they shipped one of them to Morgan & Co., Oshkosh, Wis., and it gave such satisfaction that the manufacturers have since received an order for three more which have recently been shipped. Negotiations are also pending for a fifth machine.

A. DICKEY & CO., 37-41 Bristol street, Boston, Mass., have just issued a very attractive pamphlet relating to some of the special work which they are prepared to execute on short notice. The pages are taken up with designs of grill and fret work adapted to meet various requirements, the designs covering a wide range of style. Special attention is given to Moorish and Egyptian work, as well as to stair building, wood turning, &c. The designs which are presented in the circular are intended simply to give an idea of the class of work which the company manufacture and in this connection they state that they employ skilled designers who can work out any suggestions as to special designs in a most satisfactory manner. They state that they make no charge for special designs when they are returned to them unused. The second page of the pamphlet represents an interior, showing the beautiful effects produced by the judicious employment of grill and fret work in the stair hall of a dwelling.

THE WILLER MFG. COMPANY of Fourth and Cedar streets, Milwaukee, Wis., send us a copy of what is known as Catalogue C, No. 13, relating to Willer's sliding, Venetian and folding blinds, window screens, screen doors, stair work, &c. The volume is a handsome publication of 320 large pages, which has been in preparation for more than a year and is now offered to the trade as the finest work ever brought out in its particular line. The illustrations are particularly well done, the designs are numerous, the letterpress is superb, and in every respect the book is highly creditable to the company. The greater portion is devoted to the presentation of designs of inside blinds, which are a leading specialty of this company. Some 37 pages are assigned to window screens and screen doors. Here are shown spring balanced sliding screens, drop sliding screens, inside folding screens, outside stationary or hanging window screens, combination guards and screens for cellar windows, &c. The frames are made of a great variety of wood, as desired. An interesting feature of the volume and one of no little value to the carpenter and builder, are numerous details to a large scale of window frames arranged for the company's blinds, &c. All screen doors are made to order. They are shown in numerous designs, comprising double and single doors of plain to highly ornate patterns. The catalogue deals very exhaustively with the subject of screen hardware, original as well as stock devices being shown. The volume is intended only for architects and not for free general distribution.

THE HERBRAND COMPANY of Fremont, Ohio, are offering the trade a style of carpenters' snips which are referred to as the handiest device ever included in a carpenter's kit of tools. The snips are made of the best forged steel, perfectly tempered and fully warranted. Prices and a descriptive circular will be mailed to any one who is sufficiently interested to make application to the company.

"WHAT PEOPLE SHOULD KNOW ABOUT FINISHING HARD WOOD FLOORS," is the title of an entertaining pamphlet which reaches us from S. C. Johnson of Racine, Wis. Within its covers reference is made to the kinds of wood best adapted for hard wood floors, how they should be treated after once laid, and how their beauty may be increased by the use of parquetry, borders, &c. A few pages are devoted to the manner of finishing new floors by the use of Johnson's wood filler, after which two coats of Johnson's prepared wax are recommended. The pamphlet tells how to polish floors and emphasizes the warning never to use floor varnish or oil of any kind. The advantages of wax are set forth as well as the merits of Johnson's restorer for keeping a floor always looking bright and clean. A list of prices of Johnson's floor finishes is given, as well as some remarks on refinishing old floors. Another little pamphlet which Mr. Johnson has issued is devoted to testimonial letters from some of those who have used his goods.

THE BANGOR EXCELSIOR SLATE COMPANY, miners and manufacturers of genuine Bangor roofing slate, Easton, Pa., call attention in their advertisement this month to the fact that during 1895 they shipped over 27,000 squares of slate from their quarries located on the famous Old Bangor vein, Bangor, Pa. They have issued a little book on slate roofs which will be mailed free to any one who may apply. It describes in the first place what slate is, refers to its superiority for roofing, tells how roofing slate are made, and show by means of illustrations how slate are put on roofs. The little pamphlet also illustrates the tools used by roofers in putting on slate and in addition there is a great deal of valuable information relative to slate and slate roofing which cannot fail to interest architects and builders generally.

THE ATTENTION OF CARPENTERS is directed to the announcement of the Nicholson File Company of Providence, R. I., which appears in another part of this issue. The company state that during the year 1895 they sold 35 per cent. more files and rasps than in any previous year of their history. This does not include their new acquisition, the Great Western brand.

JAMES LEFFEL & CO. of Springfield, Ohio, state in their advertisement that they make engines and boilers from 3 horse power upward, especially adapted and largely used for power in wood working shops. A copy of a pamphlet which they have issued relating to their goods will be sent to any address on application.

WILLIAM J. BURTON has purchased the interest of John N. Anderson in the firm of W. J. Burton & Co. of Detroit, Mich., manufacturers of Eastlake shingles, &c., Mr. Anderson having formerly held a quarter interest. The business will be continued by Mr. Burton under the same firm name.

THE IRWIN AUGER BIT COMPANY, Wilmington, Ohio, issue a calendar for 1896 calling attention to the Irwin solid center stem augers and bits.

THE GOETZ BOX ANCHOR COMPANY of 71 State street, New Albany, Ind., show in their advertising space this month the application of the Goetz box anchor and wall plate, joist hanger and post cap. The Goetz joist hanger is made in 14 sizes and is carried in stock ready for prompt shipment. The box anchors and post caps are supplied through licensed foundries who pay royalty while the joist hanger can be had through the hardware trade.

— "I understand that the railroad companies are making great preparations for carrying bicycles next summer." "Yes, wheelmen are beginning to get their rights. Why, I know of one road this year that actually refused to allow more than two trunks to be put on top of one wheel."—*Brooklyn Life.*

— THE PLOT.—The Author: "I think I have a good idea for a detective story."
His Wife: "What is the idea?"
The Author: "I will have the detective trace an umbrella to its original owner."—*Harlem Life.*

— THE LAST STRAW.—Susan (reading): "And now came the hour of supreme peril, when every man took his life in his hand."
Her Mother: "No wonder the poor soldiers became exhausted. These men must already have had all they could carry. I think it is said that they were in heavy marching order."—*Boston Transcript.*

CARPENTRY AND BUILDING

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
96-102 READE STREET, NEW YORK.
APRIL, 1896.

Legislation Inimical to Trade Schools.

Much dissatisfaction is felt by the friends of trade schools with the bill relating to building masons and bricklayers now before the New York State Legislature. If the bill passes and becomes a law in its present form it will, it is claimed, effectually destroy the bricklaying class which has been so successful a feature of the New York Trades School for several years past. The bill in question, which applies to New York City alone, provides that no person shall practice as a mason builder or bricklayer in the city unless he is duly registered in the office of the clerk of the county. To be entitled to such registration he must present a certificate of satisfactory examination before a board consisting of two architects, one mason builder and two practical bricklayers, appointed by the Mayor. The necessary qualifications for such examination as laid down in the bill are that the candidate shall be a citizen and that he shall have served an apprenticeship at bricklaying for at least four years. It is this last feature to which strong objection is made by the trades school supporters, and which, if enacted, must result in the discontinuance of one of the most important and useful classes in the New York Trades School. For it would no longer be worth a young man's while to give his time and money for special instruction, as is now the case, if he is to be obliged, after all, to drudge through four long years of servile work before he can take his place as a practical craftsman in his trade. The whole idea, too, is an unwarranted reversion to worn out methods which no longer suit modern trade conditions. Strenuous efforts, we understand, are being made to have Assemblyman Leonard's bill annulled so as to modify the apprenticeship provision in the case of trades school graduates. It is to be hoped that they will meet with success. Anything that strikes a blow at trade schools injures one of the most useful and beneficent institutions of our modern social system.

Movable Foundations for Buildings.

The attention of the building public has at different times been called to various forms of foundations employed in connection with dwellings, office buildings, &c., but unquestionably the most novel plan yet brought to notice is one involving the use of huge ball bearings upon which to rest the foundation walls. This plan is more especially intended for use in countries subject to earthquake shocks, and is the result of experiments by Prof. John Milne of the Imperial College of Engineering at Tokio. This gentleman has made the subject of earthquakes a life long study and has invented machines to show just how the earth moves at such times and its effects on all sorts of structures. It appears that something like half a century ago a famous Japanese builder became convinced that the secret of protection did not rest in the construction of the buildings themselves, but rather in their foundations, and upon this theory he erected an immense bamboo structure with its foundation of wooden beams resting upon long iron rollers. Upon the occasion of the first earthquake the structure rose and fell with the undulations of the earth, but it was only for a short time and while the vibrations continued in one direction. As soon as the trembling changed its direction the building collapsed, for the reason that the rollers could move only in one way. The experiment was useful, however, in showing that the builder was on the right track and he next equipped a structure with two sets of rollers, one above and at right angles to the other. This was more successful, as it sustained the building for a longer period, but did not accomplish all that was desired. The experiments were then discontinued, but after the elapse of many years and a great deal of investigation, Professor Milne, in taking apart a bicycle, noticed the ball bearings at the axles, and the idea at once suggested itself of employing this principle in the foundations of buildings. He at once proceeded to construct a founation upon this theory, and making the walls with a groove at the base and resting them on rows of iron shot or balls. These in turn rested in grooves running in all directions, so that the house could move to and fro in conformity with the earth's movements. The experiment is said to have been entirely successful, and that while the building swayed in a startling manner it did not collapse.

An Earthquake-Proof Structure.

Professor Milne has now devised a new style of building and foundation which rest on iron balls, but instead of being constructed of bamboo, it is made of wood and iron, lightly but strongly riveted together, so as to make the whole thing rigid. The foundations are four iron posts, one under each corner of the building, these being supported and connected together by light iron arches running from one to the other. Upon these the building rests, while the open space between them serves as a cellar. The base of each of the pillars or posts is grooved and rests on an immense steel ball, between which and the base of the post is a number of small shot which serve as ball bearings. In the case of vibration of the earth the smaller balls, being sensitive to shock, move readily before the larger balls get into motion. The four large balls rest upon a perfectly smooth surface of cement and can roll in any direction without interruption. About 8 feet from either side of the pillars are stone walls which confine the rolling of the building within a given space. This permits of ample play to the swaying in any direction without allowing the structure to incline to such an angle as to topple over. It is stated that the only possibility by which the structure could collapse during an earthquake would be the opening up of a great seam in the earth directly beneath the pillars, so as to tear the building from its foundations.

The Hampton Institute.

Twenty-eight years ago, Gen. Samuel Chapman Armstrong, the revered founder of the Hampton Normal and Agricultural Institute, almost single handed and in face of determined opposition from both the white and the colored people of the South, introduced industrial education in the institution under his charge. Persevering in his idea, he lived to see it heartily indorsed by its former opponents, and generally adopted in every similar establishment in the South. The Hampton Institute has grown to the highest degree of importance, with a plant valued at $600,000, an endowment fund of $400,000 and an industrial department turning out thousands of dollars' worth of finished products every year. About 120,000 negro and Indian pupils have, at Hampton and its offshoots, been given not only a common school education but also a thorough manual training, thus furnishing them with a means of livelihood. Many trades are now taught at the institute in addition to agriculture. These include wood working, from log sawing to finest cabinet work, and carpentry in all its branches, machine work, blacksmithing, molding, painting, carriage and harness making, printing and mechanical drawing. A class in plumbing has also been recently added. The magnitude of the work now being carried on in this establishment will be appreciated when it is understood that the schools carried on there require a clear annual income of $125,000 over and above the profits received from the sale of the handiwork of the students. At present the institute has over 500 negro boarding pupils, 140 Indians and 300 day scholars in its various departments, which are all carried on under the general supervision of the present principal, the Rev. H. B. Frissell, D.D., assisted by both white and colored teachers.

The Preparation of Mortar.

Some very interesting suggestions relative to the proper method of slacking lime, preserving it in good condition thereafter and preparing from it strong adhesive mortar, are contained in a letter from Edward Wolff, recently contributed to one of our contemporaries. Among other things he says:

"The slacking operation should be done in a water tight box made of boards, and so much water should be mixed in that the contents will never get dry, and a sheet of water will remain on top to prevent access of air. If the box will not hold the entire quantity of lime required, the contents may be emptied into a cavity made in the ground close to the pan, and this process may be repeated. This should be done at least two weeks before sand is added, or before the mortar is prepared for use. Slacked lime prepared and kept as stated has been found free of carbonic acid after many years, air and gas having not been able to find access. Instead of following the procedure in slacking lime recommended above, we see in this country, or at least in the neighborhood of New York, a faulty process adopted, which consists in loosely mixing the sand with the slacking lime immediately after water has been added, and forming a dry heap on the surface of the ground, which is left lying there several weeks to give time for complete slacking before the sand is worked in evenly and the mortar considered ready for use. This heap arrangement is perfectly adapted to circulating air through a material which should be guarded against contact with air. The sun heats the surface of it, makes the air escape after it has given up its share of carbonic acid gas, while at the base of the heap and at the shady side a fresh supply enters to fill up the vacuum after it has circulated through the heap and has been robbed of its share of carbonic acid gas. That this procedure really happens in such a heap we can easily see when we place a lump of freshly slacked lime in a wine glass and in another glass place a small quantity of material taken from a heap such as described, and which has been prepared a few days before; fill both glasses nearly up with water, and add a few drops of muriatic or sulphuric acid to each. In the first glass nothing can be observed, while in the second glass we will see in the shape of small bubbles the carbonic acid escape, which has been absorbed by the lime from the atmospheric air circulating in the heap." It is reasoned that as the hardening of mortar after mason work results from slow absorption of carbonic acid from the air, if this be allowed to take place to any considerable extent before the mortar is used a granular and non-adhesive condition of the mortar results, and a strong wall cannot be made with it.

The St. Paul Building, which will tower 26 stories above the sidewalk at the corner of Broadway and Ann street, New York City, has a novel provision for overcoming uneven settling of the foundations. This is accomplished by supporting the main columns on what may be termed a double or split shoe, having its two parts exactly alike. This shoe rests on rails bedded in concrete, each layer being at right angles to the one immediately below. The space between the two parts of the shoe is intended to be occupied by a hydraulic jack, so that in case any part of the wall settles during the progress of erection or after the building is completed it can easily be readjusted by means of the hydraulic lift. The same plan was adopted in connection with the foundations of the Marquette Building, completed last year in Chicago.

Discoloration of Brick Buildings.

Brick buildings in almost all cities are from time to time disfigured by streaks and patches of white. The evil is most noticeable in dry weather on parts of walls subjected to dampness, and on entire walls after rainstorms have soaked them. The white coating is derived primarily from both the bricks and the mortar. In some instances, says a writer in the *Brickbuilder*, it undoubtedly comes from the bricks; here the white substance is dissolved by moisture from the bricks even before they are built into the walls; in fact, it can sometimes be seen on bricks fresh from the kilns. It has a peculiar taste, that of sulphate of magnesia, but besides this salt the bricks also contain sulphate of lime.

The theory is that the silicates of magnesia and lime in bricks are converted into sulphates by the sulphuric acid evolved from the sulphite of iron and iron pyrites contained in the coal employed in the kilns.

Now sulphate of magnesia effloresces in dry air, and sulphate of lime is dissolved by moisture and appears on the surface of the bricks. Hence, plainly, one mode of preventing the incrustation is the employment of only wood, or of coke free from sulphur, in the kilns; at least this might be done in the manufacture of pressed brick for house fronts.

As for the incrustations having their origin in the mortar comes from the fact that sulphate of magnesia is largely produced by the decomposition of mortar. The observations on this head have special applications to vicinities where most of the lime used in buildings is from magnesia limestone.

The resulting mixture of limestone and magnesia when slaked and made into mortar is very susceptible to the influence of sulphurous fumes in the atmosphere, which produce in the mortar sulphates of lime and magnesia.

The great solubility of magnesia facilitates its diffusion; sulphate of lime is comparatively insoluble, and does not cause so much disfigurement. Of course, mortar made from magnesia limestone quickly decomposes and the brick it was intended to cement becomes loose. The remedy for this is the employment of lime from non-magnesia limestone. The remedy also offered for this evil is the addition of a small quantity of baryta to the water used for tempering the brick clay. The baryta having a strong affinity for the free acid would seize upon it and with it form insoluble sulphate of baryta. A like addition of baryta to mortar after it is prepared for use may reasonably be expected to check the tendency to efflorescence, except, of course, when the mortar, as in chimneys, is continuously exposed to sulphurous vapors. The white patches may be washed off with simple water, then use linseed oil as a coating, which is an excellent treatment. The best success has been attained when diluted muriatic acid has cleansed the pores in the bricks and thus permitted the oil to penetrate further into the bricks and keep the wall dry.

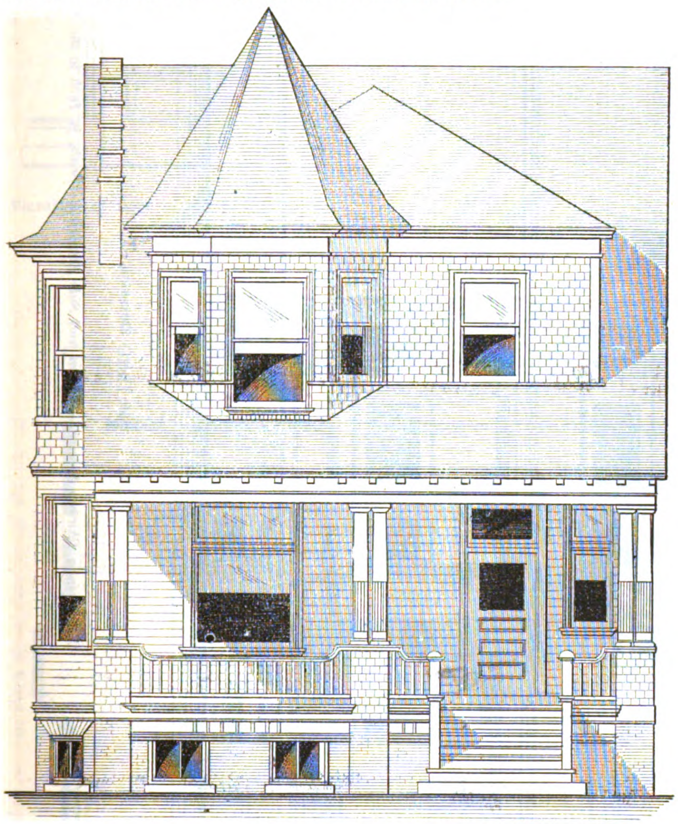
A rather novel transaction in the building line is said to be pending in the West, and if carried to a successful issue a lot of 50 dwelling houses now located at Harvey, Ill., will be loaded on flat cars and carried 8 miles to Chicago Heights. The houses as they stand in Harvey have been unoccupied for some months, while the demand for houses at Chicago Heights has been such as to force the land association which is backing the town enterprise to devise plans whereby the supply may be immediately increased.

COTTAGE OF MR. THOMAS CUMMINGS, BERTEAU AVENUE, RAVENSWOOD, CHICAGO, ILL.

W. L. KLEWER, ARCHITECT.

COTTAGE IN A CHICAGO SUBURB.

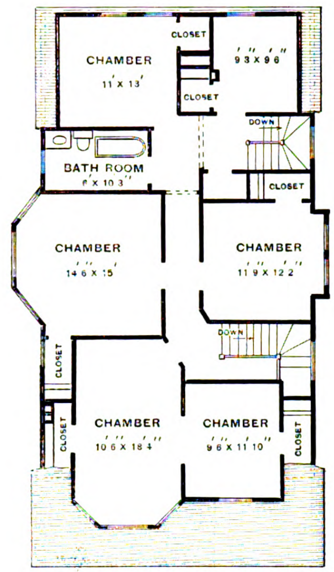
AMONG the various features of the paper this month which will doubtless prove interesting to a large number of our readers is the half tone supplemental plate showing two views of an attractive cottage, nestling among the trees in one of the many pleasant suburbs of the city of Chicago, both pictures being direct reproductions from photographs taken last summer especially for the purpose. An idea of the interior arrangement of the house may be gathered from an inspection of the floor plans presented herewith, while the accompanying details indicate the construction employed. The cottage is located on Berteau avenue, near Clark street, in Ravenswood, and was erected for Thomas Cummings from plans prepared by W. L. Klewer, Architect, Room 1506, Schiller Building, Chicago, Ill. From the architect's specifications we learn that the footings and walls for a distance five inches above ground are of rubble stone laid



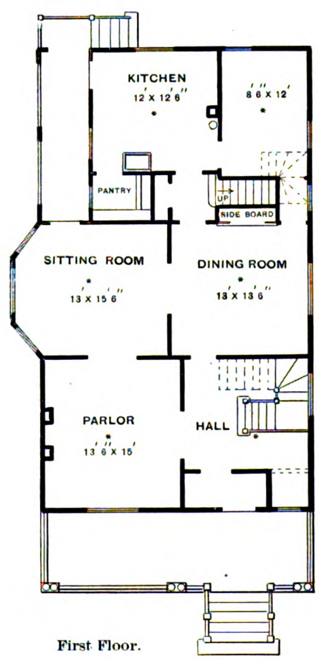
Front Elevation.—Scale, 1/8 Inch to the Foot.

Cottage in a Chicago Suburb.—W. L. Klewer, Architect, Chicago, Ill.

in Utica cement, while the underpinning is of brick laid in lime mortar with tight joints. The girders, sills and posts are 8 x 10 inches, the girders in the cellar being supported by 8 inch square posts, resting on rubble stone footings. The joist in the first story are 2 x 12 inches, and those in the second story 2 x 10 inches, all placed 16 inches on centers. The attic joist are 2 x 8 inches and the rafters 2 x 6 inches, also placed 16 inches on centers. All joist having from 9 to 12 bearings have one row of 2 x 4 cross bridging well fitted at the angles. The headers and trimmers are double, thoroughly framed and spiked together, and in no case do the timbers come within 2 inches of the brick of any smoke flue. The door and window studs are of pine set double, and trussed over all openings. The studding is 2 x 4 inches, placed 16 inches on centers. The sliding door partitions are 2 x 4 placed flat, and all bearing partitions have two bearing plates top and bottom. The frame of the house is covered with siding except certain portions which are shingled, as indicated in the elevations. The exterior wood and metal work is painted with three coats of pure white lead and linseed oil paint of desired tints, while the roof has two coats of paint. The porch has 8-inch turned posts with molded cap and base, while



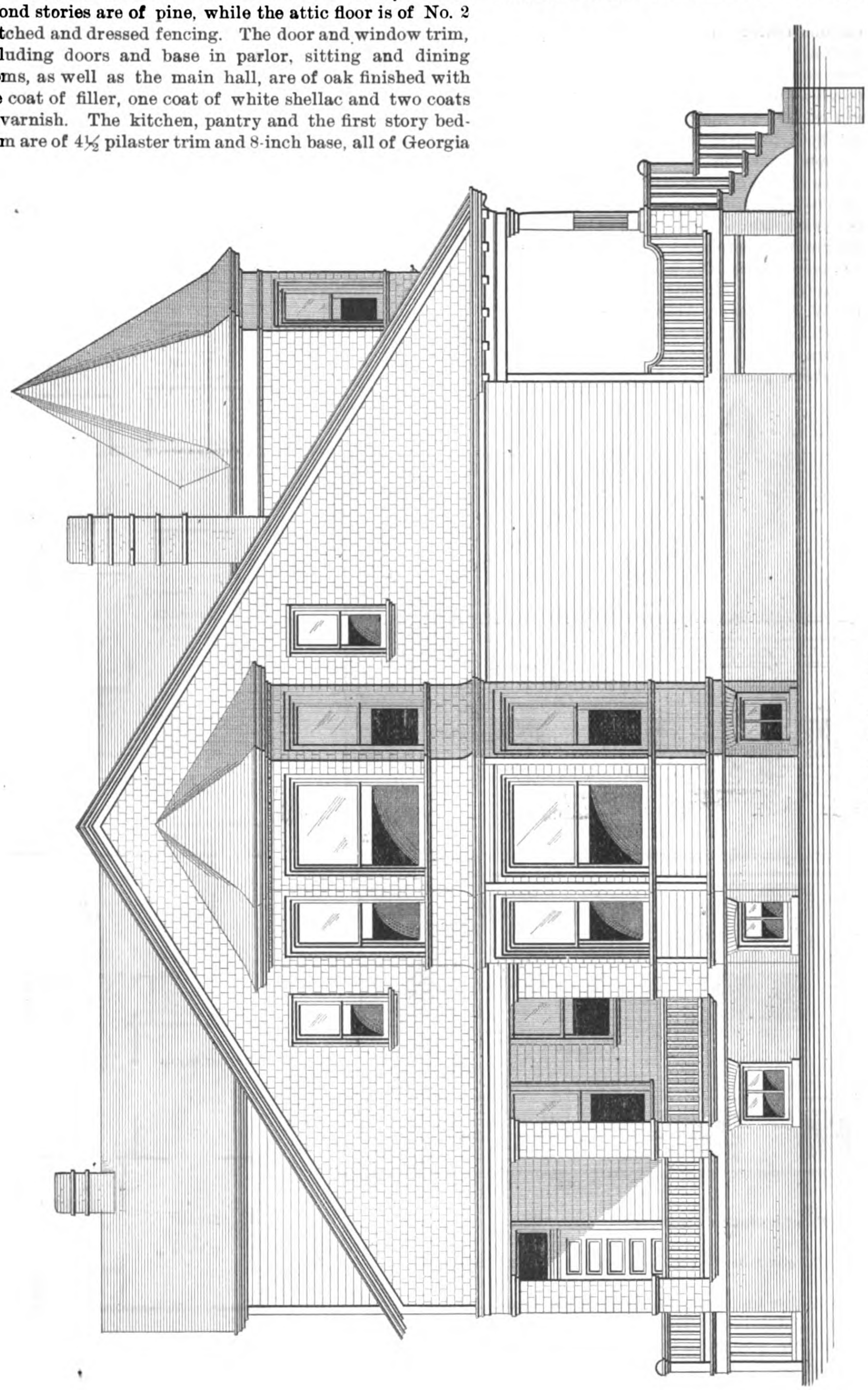
Second Floor.



First Floor.

Scale, 1-16 Inch to the Foot.

the roof is sheeted with matched and dressed fencing and covered with stained shingles. The balusters are 1¾-inch, turned, of special design, and the floor is 1⅛-inch thick. The under floor in each story is of matched and dressed fencing, well nailed to the joist. The floors of the dining room, kitchen, halls of the first and second stories and bathroom are of 2¼-inch maple, laid close together and thoroughly blind nailed. All other floors in the first and second stories are of pine, while the attic floor is of No. 2 matched and dressed fencing. The door and window trim, including doors and base in parlor, sitting and dining rooms, as well as the main hall, are of oak finished with one coat of filler, one coat of white shellac and two coats of varnish. The kitchen, pantry and the first story bedroom are of 4½ pilaster trim and 8-inch base, all of Georgia pine, finished with three coats of hard oil. The front stairs are of hard wood, finished with two coats of hard



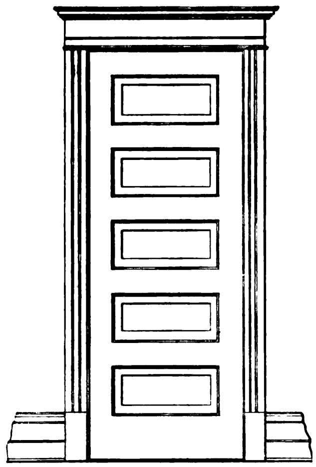
Side (Left) Elevation.

Section.

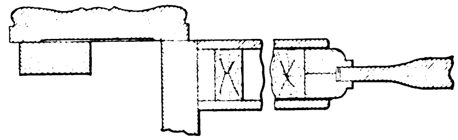
Cottage in a Chicago Suburb.—Section and Side Elevation.—Scale, ⅛ Inch to the Foot.

pine, with doors having Georgia pine panels and pine stiles and rails. The oak trim is 4½ inches wide with neat architrave head. The second story trim is of Georgia oil. The kitchen is wainscoted 3 feet high, and bathroom 5 feet high, with acme cement, painted two coats.

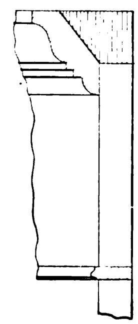
An inspection of the floor plans shows that in the main story are four large rooms, while on the second story are six rooms and bath. The latter is fitted with gray enameled iron tub, oval marbleized wash bowl and porcelain wash out closet with large copper lined siphon tank. The bathtub is provided with Fuller's nickel plated combination bath cocks, with nickel plated chain and sprinkler and rubber plug and hose.



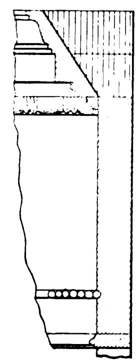
Elevation of Door.—Scale, ⅜ Inch to the Foot.



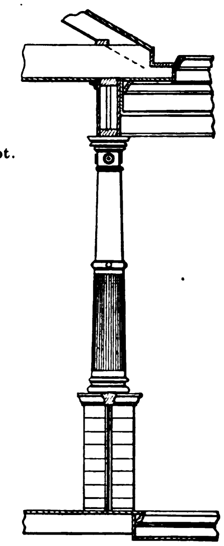
Section Through Door and Detail of Trim.—Scale, 3 Inches to Foot.



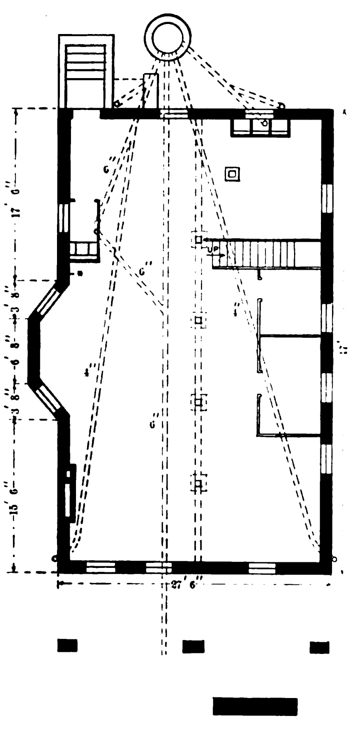
Detail of Trim, Showing Georgia Pine Architrave.—Scale, 3 Inches to the Foot.



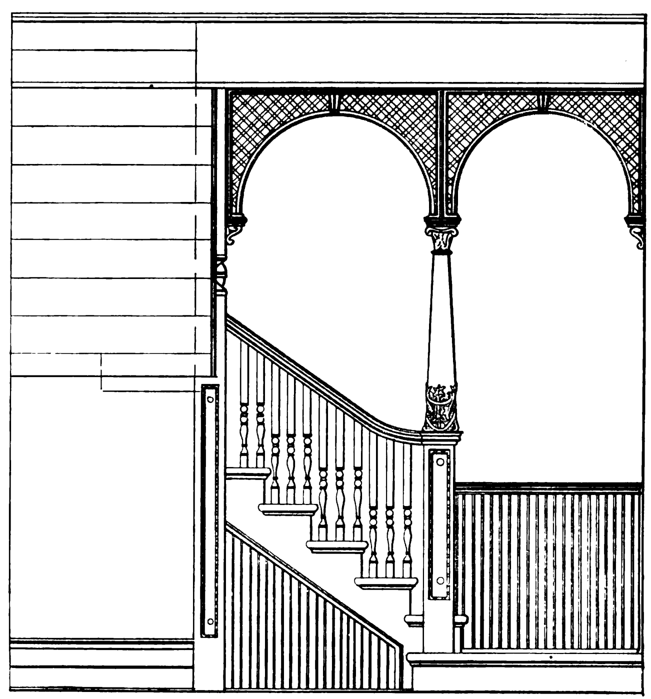
Detail of Hard Wood Architrave.—Scale, 3 Inches to Foot.



Detail of Cornice and Porch Column.—Scale, ¼ Inch to the Foot.



Foundation.—Scale, 1-16 Inch to the Foot.



Detail of Main Staircase.—Scale, ⅜ Inch to the Foot.

Miscellaneous Details and Foundation Plan of Cottage in a Chicago Suburb.

A number of experiments were recently made to ascertain the length of time that brick and sandstone are rendered water proof or protected by oil. The three oils used, says a Boston paper, were linseed oil, boiled linseed and crude mineral oil. The amount of oil and water taken up by the sandstone was very much less than that absorbed by the brick, although the area of the sandstone cube was much greater. Equal amounts of the raw and boiled oil were absorbed. The mineral oil, however, was taken up in much greater quantities by both brick and sandstone. By the end of 12 months the mineral oil evaporated from the bricks, but such was not the case when the other oils were used. After an exposure of four years, the bricks practically retained all their oil.

METHODS OF CONSTRUCTING FLAGSTAFFS.

THERE are times when the building mechanic is called upon to do work which might properly be considered as just outside his legitimate line of business, and yet it is so closely allied to it that he is desirous of being fully informed concerning all its details, to the end that he may be in a position to accept at any time contracts which may be offering. The construction of flagstaffs might be cited as a good example of this, and there are doubtless many readers deeply interested in the subject who would find helpful a description of the methods employed in erecting a number of poles of different styles and sizes. A valued correspondent signing himself "M. D. S." of Pittsburgh, Pa., contributes some very interesting descriptive particulars, accompanied by sketches from which the engravings presented herewith have been made. He writes as follows:

In Fig. 1 is illustrated the design of a flagstaff which was erected on an eight-story office building, while Fig. 2 shows some of the details of bracing, &c. In these views A is a white oak stanchion, 7 x 7 inches, and extending 7 feet above the roof. The part *b*, under the roof, extends to the ceiling below, and is securely braced. The top of this stanchion at B is dressed with a bevel, or hipped to turn water. The mast was made of white pine timber, and in the rough was 7 x 7 inches by 40 feet long. It was dressed as shown, which, I think, is a very pleasing proportion. The first 7 feet 3 inches are square; the next 4 feet are octagon; then 9 feet 6 inches are round, full size; the remaining 19 feet taper from 7 inches diameter to 2½ inches diameter at the top. The point in the mast where the taper begins is not prominent, but is worked with a graceful swell or easement. The same rule was observed in dressing the round part of the masts in the figures which follow, to wit: Round full size for one-third, and tapering for the remaining two-thirds of the hight. This is the Grecian rule for dressing the shaft of a column.

At C of Fig. 1 is inserted a 3-inch sheave for the halyards. The ball D is copper, and 8 inches in diameter. The mast is held in place by the hinge E at the bottom, and by the clamp F at the top of stanchion. The hinge is made from ½ x 7 inch iron bar. The clamp at both E and F is made from ½ x 2 inch iron, and all secured in place by ½ x 8 inch bolts as shown in the detail, Fig. 2. The clamp F is bolted permanently to the stanchion with the open end to receive the mast when raised, and the bolt in the end fits snug against it, thus insuring against shaking or clattering in the wind. This arrangement at E and F allows the mast to be lowered for painting or for

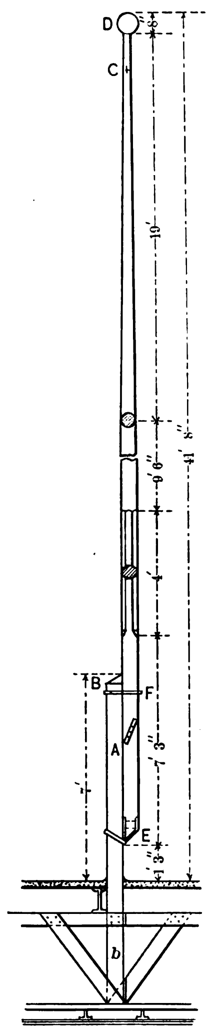


Fig. 1.—Flagstaff for an Eight-Story Office Building.—Scale, 3-16 Inch to the Foot.

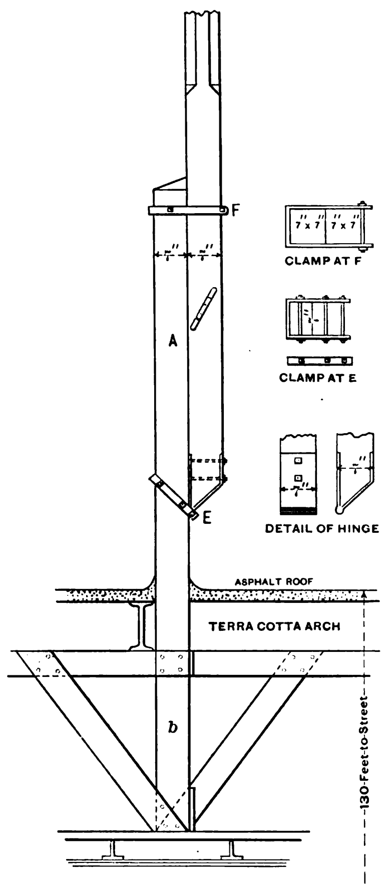


Fig. 2.—Detail, Showing Manner of Bracing Stanchions Under the Roof Beams.—Scale, ⅜ Inch to the Foot.

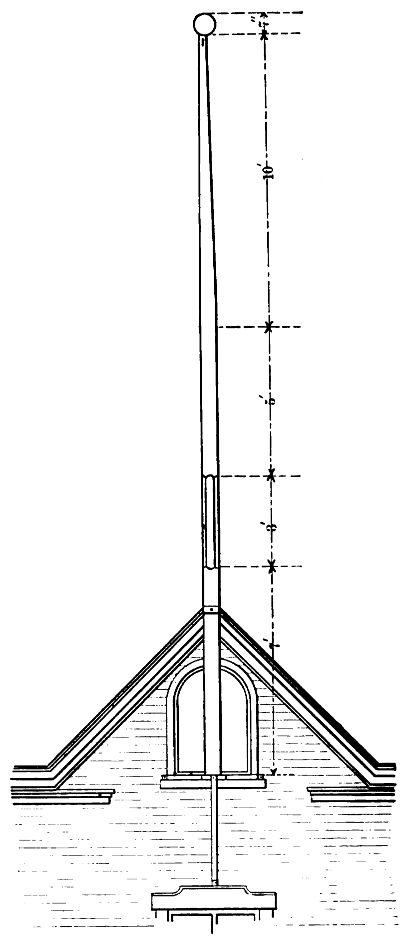
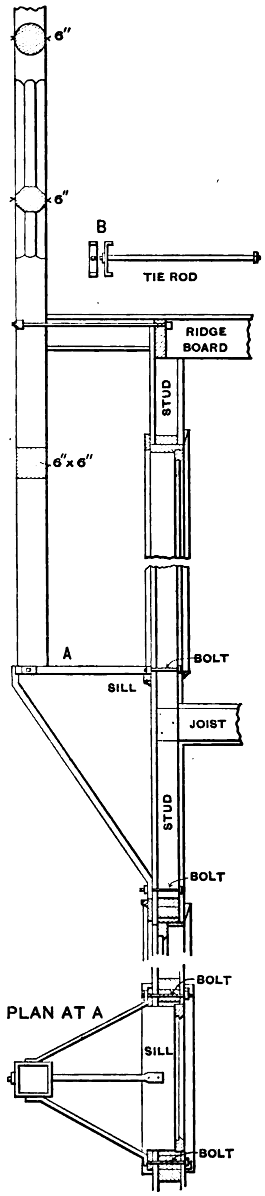


Fig. 3.—Flagstaff for the Gable of a Building.—Scale, 3-16 Inch to the Foot.

Methods of Constructing Flagstaffs.

inserting the halyards. Fig. 1 shows the pole completed and set up.

In Fig. 3 is represented a flagstaff as put on a gable of the main building of a charitable institution. It is made from white pine timber, 6 x 6 inches at the lower end and 25 feet long, and was dressed as shown. The ball on this pole is about 60 feet above the ground, and is 7 inches in diameter. The cornice on the main building



Methods of Constructing Flagstaffs.—Fig. 4—Detail, Showing Iron Bracket and Method of Fastening to the Building.—Scale, ⅜ Inch to the Foot.

projected 21 inches from the siding to the fascia. The contrivance for securing the pole in place is clearly indicated in Fig. 4 of the engravings. The bracket A and the stays are made of ⅝ x 1⅝-inch iron bar, and are fastened to the building with ½-inch bolts of proper length. The clamp B is of ⅜ x 1⅝-inch iron, and a ½ x 30 inch bolt, which in this case was required to reach behind the rafter, and was fastened permanently with the nut on the outside, so that the pole may be taken down if necessary.

(*To be continued.*)

The Domestic Chimney.

The strongholds which were erected about the period of the Conquest consisted of several stories, and their roofs were used as a terrace for defense, thereby rendering the central hearth and opening impracticable; but as it was necessary to provide some exit for the smoke, the fire place was made in the wall and terminated in a loophole on the outside. This, says the London *Architect*, was an important step toward the construction of the chimney. Conisbrough and Rochester Castles furnish examples of this contrivance, which prevailed, without much variation, from the twelfth to the fifteenth century. Until the latter period the chimney, properly so called, appears to have been little known in England, or indeed in many other parts of Europe. The ancient Romans seem not to have been acquainted with it; and there is no trace of it in Italian houses up to the fourteenth century, by the middle of which it had become common at Venice, for an inscription over the gate of the school of Santa Maria della Carita states that in the year 1347 a number of chimneys were thrown down by an earthquake. We learn also from Muraton that in 1368 a prince of Padua, on making a journey to Rome, took with him masons to make a chimney at the inn at which he put up, "because in the city of Rome they did not then use chimneys, and all lighted the fire in the middle of the house on the floor." But, as Mr. Turner remarks, in seeking to ascertain the antiquity which should be assigned to chimneys, facts are often at variance with the statements of respectable writers. Existing remains prove that perpendicular flues were constructed in England in the twelfth century. We can only suppose that the principle of the modern chimney was understood long before the construction itself became general. The cost of remodeling the house would in very many cases prevent the improvement. In drawings of the time of Henry III, chimneys of a cylindrical form are represented rising considerably higher than the roof, and orders to raise the chimneys of the king's houses are frequent in this reign. Nevertheless, it was still the general custom, even in the fourteenth century, to retain the hearth in the middle of the room. When the wood was fairly ignited the smoke would not be great, and the central position of the fire was favorable to the radiation of heat. This method of warming the hall was continued long after fire places with chimneys had been erected in the smaller apartments. By the reign of Elizabeth the advantages of the new system were so well appreciated that ladies in their visits to their friends, if they could not be accommodated with rooms with chimneys, were frequently sent out to other houses, where they could enjoy the luxury.

The well-known slate firm of Auld & Conger of Cleveland, Ohio, are putting up a handsome building, to be known as the Bangor, which has a frontage of 80 feet on Prospect street and an average depth of 110 feet. They have named their building after the Bangor slate district, where they have extensive quarries. The front of the building is of New Jersey Pompeiian brick and terra cotta, the main structural work being of cast iron and steel. The floors will be of hard wood, laid on asbestos lining. Sheet metal lathing will be used and the halls will be lined with marble wainscoting, the floor of the main entrance hall being mosaic. The store front of the first story and the large window sashes in the second story will be of bronze. Throughout the interior the finish and doors will be of hard wood, but marble and cement work will be used wherever possible to make the building fire proof. The roof will be covered with thick slate tiling imbedded in asphaltum. Auld & Conger will occupy one of the stores on the first floor and also the entire second story, the third and fourth stories being arranged for offices, while above will be the College of Dental Surgery. In addition to the fire proof stairways there will be an electric passenger elevator and an electric freight elevator. The building will be heated by steam and lighted by electricity.

LAW IN THE BUILDING TRADES.

ACTION FOR BALANCE ON CONTRACT FOR WORK AND LABOR.

Where no time is fixed for the completion of work under a contract in an action thereon for a balance due, the party for whom the work is being done is not entitled to credit for wages voluntarily paid, in the absence of the contractor, to another, to do part of the work he had contracted to do.—Wagner *vs.* Jennings, Court of Civil Appeals of Texas, 27 S. W. Rep., 888.

FAILURE TO REGISTER BUILDING CONTRACT.

A contractor is not excused for failure to register his written contract when the statute requires registration in order to fix a mechanic's lien, by the fact that the contract, consisting of his written proposal and telegrams in response thereto, were in the possession of the owner of the building, as a substantial compliance with the requirements of such statute is necessary to fix the lien.—Warner Elevator Mfg. Company *vs.* Houston, Civ. Ct. App. Texas, F. 28 S. W. Reporter, 405.

RIGHTS OF SUB-CONTRACTORS TO MECHANICS' LIENS.

The right of lien to sub-contractors and material men is, by operation of law, incorporated into and made a part of the owner's contract, as much as if expressly included and written therein. He contracts about a subject in which the law declares certain advantages to all persons concerned, whether by direct contract with him or by the employment of his contractor. The law declares that a lien shall exist in favor of the sub-contractor and material man in certain contingencies; hence the owner who makes the contemplated contract cannot justly complain of the legal result, especially when he receives the benefit of the labor and material of those for whom the lien is provided, and who often have no other means of compensation. The enforcement of this law does not necessarily result in loss to the owner, nor take from him something for nothing. That the owner may be compelled to pay the sub-contractor and material man after he has already paid the original contractor, is literally true, but it is not true in the sense that it ascribes to the statute a purpose of enforcing double payment. In other words, it is a fact that an owner who pays the original contractor within 30 days after the completion of the work, building or machinery may, upon notice given within that period, be forced to pay the sub-contractor and material man when the original contractor unjustly fails to pay; but double payment does not follow as a necessary legal consequence in any case. In every instance the owner may fully protect himself by withholding the whole or a sufficiency of the price agreed upon from the original contractor until after the expiration of the 30 days, or he may see to it that the sub-contractor and material man are paid as the work progresses, or he may indemnify himself by bond, as prescribed in the statutes. It may be truthfully said that it will be inconvenient for the owner to adopt any one of these expedients; yet inconvenience of parties affected is never allowed to defeat a statute. Much more inconvenience is involved for the sub-contractor and material man. Without the protection of such a law they would be constantly exposed to the danger of an entire loss of labor and material. Hence, as a matter of pure wisdom and justice, there could be but little difficulty in choosing between the situation with such a law and that which would exist without it. A policy that would involve one class of citizens in mere inconvenience for the pecuniary safety of another class is far more wise and just than that which would suffer loss to the latter class rather than entail inconvenience on the former.—Duignan *vs.* Montana Club (Supreme Court of Montana), 40 Pac. Rep., 294.

INDEPENDENT CONTRACTORS.

Contractors who have agreed to erect a building according to fixed plans, of certain materials, and who are empowered to perform the work thereunder in their own manner and with their own machinery, subject only to inspection of the architect, are independent contractors, and the owner cannot be held liable for injury resulting from their negligence.—Smith *vs.* Builders and Traders' Ex. (Supreme Court, Wis.), 64 N. W. Rep., 1041.

INJURY TO EMPLOYEE DURING BUILDING CONSTRUCTION.

A party was engaged in taking bricks and mortar, by an elevator, up into a building being erected by a contractor, he being in the employ of such contractor, and after the elevator had been unloaded by means of a wheelbarrow operated by this employee, on and along a narrow plank leading from the elevator to the scaffolding, where other workmen were engaged, he walked hurriedly backward along the plank, without looking to see whether the elevator had descended or not, and fell into and down the elevator shaft, and was injured. The court held that this conduct was such that he was chargeable with contributory negligence, and debarred him from recovery, whatever negligence may have existed by reason of the sending down of the elevator by others.—Smith *vs.* Van Sciver (Court Errors, N. J.), 33 Atlantic Rep., 390.

LIABILITY OF BOTH OWNER AND CONTRACTORS FOR INJURIES.

The Supreme Court of Wisconsin holds that where one who is exercising ordinary care is injured by the failure of the owner and two independent contractors, one of whom is constructing the masonry and the other setting the iron work in the building, to comply with the terms of an ordinance which requires "any owner or contractor who shall build or cause to be built" any building abutting on the public sidewalk, after the completion of the first story to cause a roofed passageway to be built in front of the building, on the sidewalk, he may base a claim of negligence on account of such failure against all three.—Smith *vs.* Milwaukee Builders & Traders' Ex., 64 N. W. Rep., 1041.

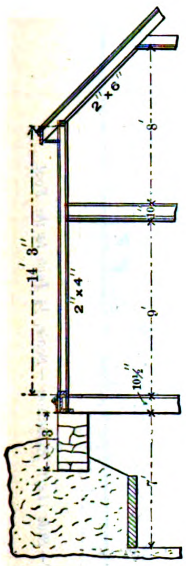
RIGHTS OF SUB-CONTRACTOR AGAINST OWNER.

The indorsement by the owner of property of notes of a building contractor, it not being shown that they were given in discharge of claims for liens on the property, does not authorize the owner to claim the amount of the notes as payment on the contract, as against liens of sub-contractors thereafter duly established. Where the owner of a building knows, or has opportunity to know, that there are sub-contractors, he cannot, as against liens they may afterward establish, legally make final payment to the contractor, until the expiration of the time allowed them by statute in which to file and serve notice of their claims.—Merritt *vs.* Hopkins (Supreme Court, Iowa), 65 N. W. Reporter, 1015.

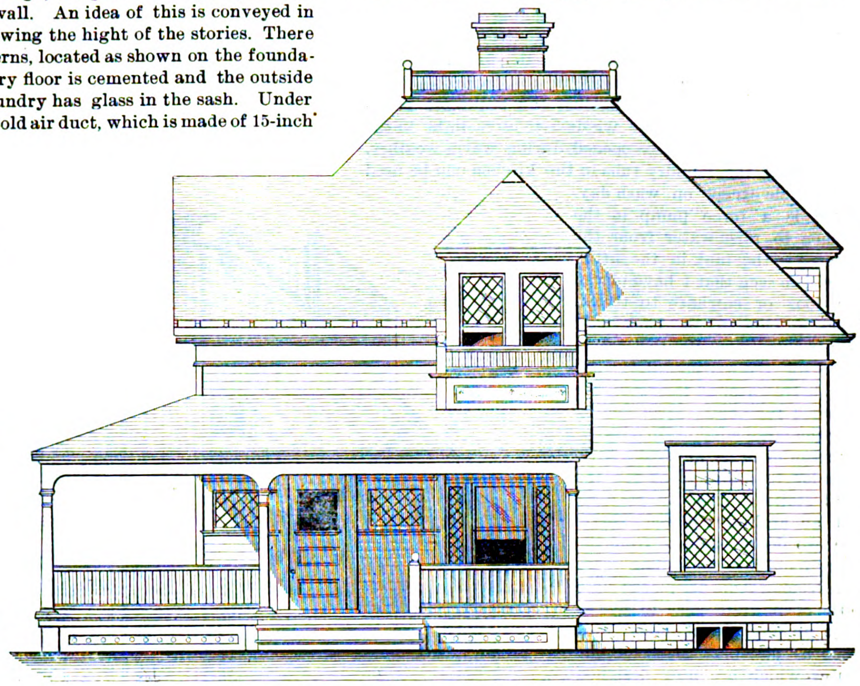
HEATING THE HOUSE OF "DIAMOND ROOM."

A SHORT time ago we presented in these columns a floor plan of rather novel construction contributed by a correspondent signing himself "Diamond Room," who requested some of the readers to furnish elevations to it, stating that after such had been done he would describe his method of heating and ventilating the house. The engravings which are presented herewith are made from drawings furnished by the author, A. R. Brink, Red Wing, Minn. In referring to the matter he says: "I notice in the February issue that my request for elevations has been answered by Mr. Crabtree, who contributes two elevations and a second story plan, with some changes suggested for the first story of the house, the plan of which I forwarded for publication a few months ago. I promised at that time that I would give my idea of heating and ventilating the house, and to this end I forward drawings showing front and east side elevation, plans of basement, first and second story, together with intimations of my idea of properly heating and ventilating the building. My idea is to make the house comfortable and home like with as little expense as possible, and combine with this a convenient arrangement of rooms. The house is designed for a family of three and a hired girl. The expense has not been put into ornamental work, but into conveniences within the house. I notice that Mr. Crabtree has enlarged the dining room, which I do not consider necessary for so small a family as would occupy a house of this size. I also notice he has changed the library and moved the large living room further to the west, which he says he does to bring the large front window in the center of the building. With the elevation which I send it does not make any particular difference, as the front porch extends beyond the window. The window in the second story or attic can be placed in the center, and will not be noticeable on account of the porch making a break at that point. I think Mr. Crabtree has carried out my idea in the elevations, and I like his suggestions very well with the exception of the changes he makes in the dining room and library.

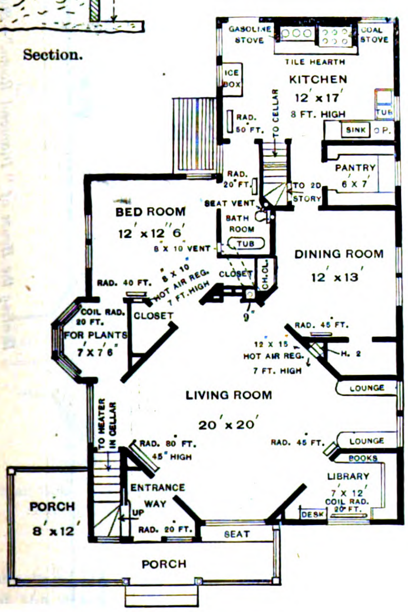
The outside cellar walls of the building, except where the laundry is located, are 3 feet high, and the cellar is excavated so as to be 7 feet deep 30 inches clear of the walls. The portion under the kitchen is not intended to be excavated. The inside cellar walls are of brick, 4 inches thick and about 4 feet high, the ground being sloped back on top to the stone wall. An idea of this is conveyed in the sectional view showing the hight of the stories. There are two 60-barrel cisterns, located as shown on the foundation plan. The laundry floor is cemented and the outside door leading to the laundry has glass in the sash. Under the cellar floor is the cold air duct, which is made of 15-inch common matched fencing, the space between being filled with dry sawdust or mineral wool. The outside walls are covered with narrow ogee thin siding, while the roof is covered with boards, tar paper and quarter sawed white



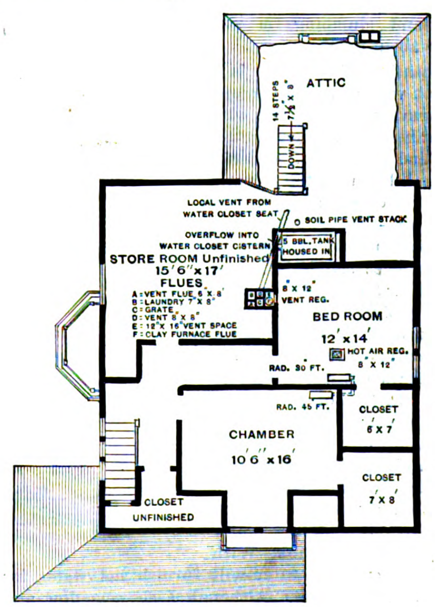
Section.



Front Elevation and Section.—Scale, ⅛ Inch to the Foot.



First Floor.



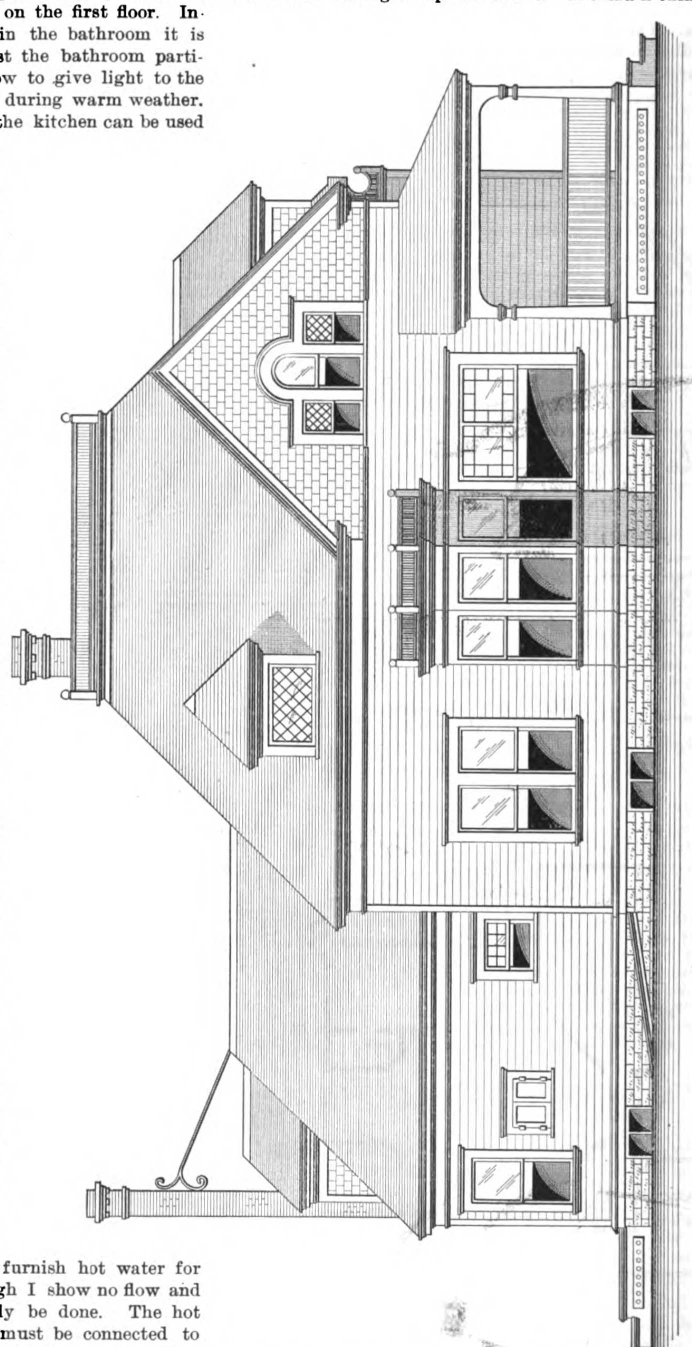
Second Floor or Attic.

Scale, 1-16 Inch to the Foot.

Heating the House of "Diamond Room."—Method Suggested by A. R. Brink, Red Wing, Minn.

sewer pipe, and which extends to 3 feet above the top of the ground outside the building. The top of this pipe is covered with a wire netting and a roof. In the cellar is also a vegetable room, coal bins, &c. The sewer pipes for closets, bath and other fixtures are extra heavy 4-inch pipe and run under the cellar floor. The house is constructed of 2 x 4 studding and sheeted on two sides with pine shingles. All the floors of the house are of single thickness, and as they are all to be covered with paper and carpet, first quality fencing flooring answers the purpose. The kitchen, pantry and bathroom, however, have a flooring of quarter sawed Georgia pine, and are wainscoted with narrow, bastard sawed, beaded ceiling, also of Georgia pine. The main living room and the front hall are finished in oak, while all other rooms on the first floor are finished in Georgia pine. The stiles of the doors are of white pine and the panels Georgia pine. The stair door in the front hall is made to slide and rests on the first tread of the stairs. The second story finish is white pine, painted. In arranging the bathroom in the manner indicated, it occupies little space and is convenient to the sleeping room on the first floor. Instead of having the washbowl in the bathroom it is placed in the sleeping room against the bathroom partition. There is an outside window to give light to the bathroom, and this can be opened during warm weather. The tops of the laundry tubs in the kitchen can be used for a table except on wash day. There is a force pump in the kitchen to raise water from the cisterns to the tank in the attic. It will be seen that I have placed the door or entrance to the library as close to the back wall as possible, so as to give ample space for the writing desk. All the shelves around the room are intended for books. The ceiling over the large window in the living room must be lowered a little in order to allow space for the front stairs. This can be done and an archway placed there. The two doors opening from the living room into the dining room and sleeping room are placed close to the open grate so as to give as large an amount of clear wall space as possible. Many of the houses which are now designed are all doors and have no great amount of available wall space. The cost of this house, including heating and plumbing, is estimated at about $3300.

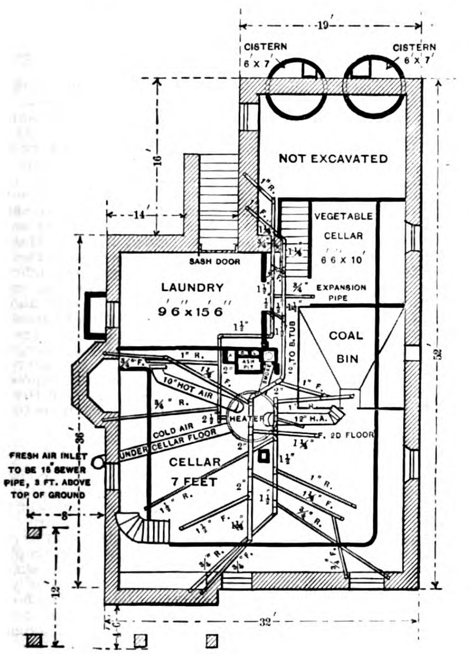
The heating of the house is to be by hot water circulation and some warm air in connection with the water heater. I believe in this system, and the more I see of it the more I learn that it is not a good thing to depend altogether on the hot air—that is, all rooms should have hot water radiators and dependence should be placed on the hot air for ventilation only, with plenty of it, in the living and sleeping rooms. The sizes of the water radiators are marked on the plans; also the hot water and vent registers. Instead of using a separate expansion tank for the heater it is my idea to connect the expansion pipe of the heater with the main house supply tank, which is located on the second floor, 18 inches above the highest water radiator, to bottom of tank. With this arrangement the heater will furnish hot water for both tub and kitchen use. Although I show no flow and return pipes for this it can readily be done. The hot water flow pipe to the bathtub must be connected to the top of the flow main with a swing check in the return pipe, so that when drawing a large amount of hot water the check will prevent it from coming down from the tank. The check should be placed on the horizontal part of the return pipe. The overflow from the tank empties into the water closet tank on the first floor, or it can be connected with the soil pipe vent close to the tank, but if this is done there must be a trap between the two. The heater is located in the cellar, as indicated on the foundation plan. All hot air registers are to be set 7 feet above the floor and vent registers at the base. It is designed to warm the house at 70 degrees when it is 40 degrees below outside. For the main vent flue the space in flue E around the outside of the heater flue is to be used, this space always being warm and having an up draft in it. The main chimney is divided into six flues—namely, D, which is used for the local vent from water closet seat; flue A, for local vent from bathroom; flue E, for the two bedrooms; while flue F is a 9-inch clay pipe starting in the cellar and running up 2 inches above the top of the chimney. This flue is intended for the heater. The ventilation for the main living room is at the fire place, set in the chimney where shown on the plans.



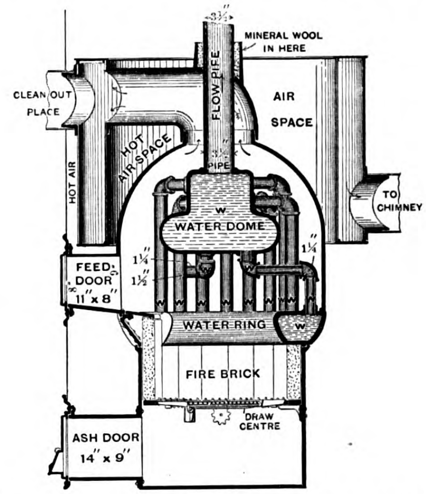
Heating the House of "Diamond Room."—Side (Left) Elevation.—Scale, 1/8 Inch to the Foot.

I send a sectional view of the water heater designed for use in this house. The grate is intended to be 20 inches in diameter, the fire place is lined with fire brick and the water ring is cut out over the feed door to allow for removing the lining when it is burned out. The fire brick extends up to the bottom of the feed door, which is covered by a reversible plate. The water dome over the fire box is connected with the water ring by 1¼-inch pipe. On the top of the heater, connecting with the smoke pipe, is a large circular radiator, which is one of the principal functions in the hot air part of the heater. There is also supply from between the casing and the heater, as is usually done with hot air furnaces.

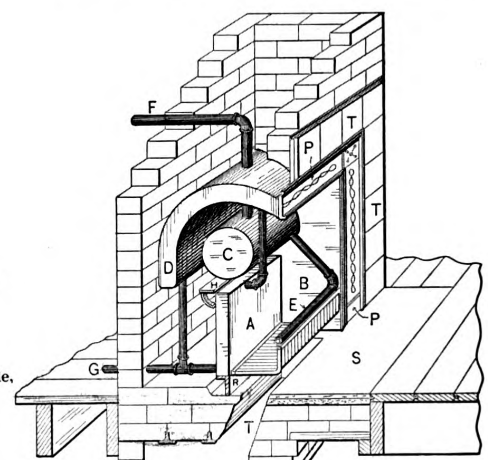
I also send a drawing of a combination hot water heater and fire place, intended to be used in case it is desired to employ a hot air furnace placed in the cellar for heating the house. With the exception of the large living room, conservatory and bathroom all the apartments will be warmed by hot air, and the remainder of the house by hot water from the fire place heater, which would require about 160 feet of radiation. With this arrangement a small sized hot air furnace could be used, and a fire kept

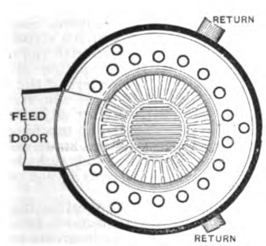


Foundation.—Scale, 1-16 Inch to the Foot.

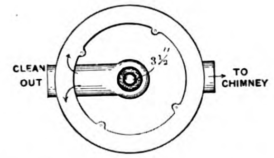


Vertical Section of Water Heater.—Scale, ½ Inch to the Foot.





Plan Below Top of Water Ring.—
Scale, ½ Inch to the Foot.



Top View of Hot Air Radiator.—Scale, ¼ Inch to the Foot.

Combination Fire Place Heater.

Heating the House of "Diamond Room."

shown a plan of the heater on top of the water ring, and of the grate below. Another view represents the top of the hot air radiator and the top of the cast iron elbow connected with the radiator ; also the flow pipe hole. With this arrangement of the water sections in the fire I think the results will be as satisfactory as in the case of the large cast iron water heaters, which have a great amount of water surface away from the fire. I think the correct principle of heating water is to have the water parts exposed to the direct action of the fire and have them so arranged that the hottest water will pass direct to the flow outlet instead of through water which is cooler than that close to the fire. This heater can be cased in sheet iron, or it can be bricked in to form the hot air space. It is the intention to obtain the fresh warm air continually in the grate would make the main living room cheerful, as well as afford good ventilation. The cost to operate would not be more than the first system mentioned. Referring to the illustration showing the combination fire place heater, A B C D are cast water sections, E is a 1-inch pipe, S is the hearth, T the tile facing, P a cast iron frame, H the direct draft damper, R a casting to support the water back section, T the ash dump and G the return water pipe. There is a cover made of sheet iron for the front grate opening, and is to be used when a view of the fire is not desired, or at night to check the draft. This cover has a sliding draft at the bottom, and there is one over the fire to serve as a check. The water sections are all hollow and are placed as indicated in the engraving.

WHAT BUILDERS ARE DOING.

INDICATIONS seem to point to a fairly active opening of the building season throughout the East, with certain of the larger cities giving promise of plenty to do. It is, however, still too early to secure sufficient data to warrant any forecast of what the season may be. Many building projects in the hands of architects are dependent upon general business conditions for being carried out, and cannot be safely accepted as sure indications of work to be begun when the season opens. The prospect, with a few exceptions, seems to be less favorable in the middle and extreme West. Most of the cities west of the Mississippi River are still awaiting a more substantial revival of general business prosperity before any appreciable increase in building will be undertaken.

Local conditions seem to govern the action of the labor unions, and no general movement of a specific nature is under way that seems likely to retard or obstruct work.

Baltimore, Md.

The Baltimore Builders' Exchange is taking active steps to provide for more thorough inspection of buildings in that city by urging upon the Mayor and City Council the need of additional inspectors. It has been shown by the members of the exchange that the building inspector's force is inadequate to the needs of the city, and that more assistance is required to insure proper observance of the building laws. The exchange has also been moving in the matter of certain amendments to the lien law of Maryland, providing that where a building is erected by a lessee of a lot of ground the lessor of the ground shall be liable to lien. A large delegation from the exchange visited the State Capital by special train and appeared before the Judiciary Committee of the Legislature in support of the change. The exchange is reported as being in excellent condition and steadily gaining ground among the substantial business organizations of the city.

The outlook for building during the coming year is favorable, and relations between employers and workmen have been undisturbed since last fall.

Boston, Mass.

Contractors and others connected with the building business in Boston are greatly interested in a bill now before the State Legislature relating to the reorganization and administration of the building department of the city. The bill was prepared by a joint committee on building law composed of five members of the Master Builders' Association, the Boston Associated Board of Trade, the Real Estate Exchange and the Boston Society of Architects, which committee was established in April, 1895, at the suggestion of the Associated Board of Trade.

This bill aims to secure a more effective administration of all laws or ordinances relating to construction of buildings, a more complete inspection and control of buildings after they are constructed, and in addition to the duties now imposed by statutes and ordinances, provides for special supervision of sanitary, heating and ventilating appliances, and an oversight and control of such matters in public and quasi-public buildings not previously adequately provided for by law. It aims to secure this result by uniting under one general department such departments of the city of Boston as now have relation to construction and superintendence of buildings, private or public, and by comprehending in this general department certain important duties, functions and powers not previously provided for by law.

The bill contemplates that this general department is to have three subdivisions—one for the inspection of all building construction, one for the inspection of condition and use of buildings after construction, and to have charge, under direction of the commissioner, of repairs upon buildings owned and used by the city, and control of employees in such buildings when not otherwise provided for by law or ordinance, and one for the inspection of all matters pertaining to sanitation, ventilation, heating and elevators, and so provides that each of these subdivisions shall be under an efficient head, subject to the chief of the department.

One of the most important features of the bill, and upon which the committee largely relies to lift this department out of political influence, is the creation of a Board of Examiners, and the provision that all inspectors, including the three chief inspectors at the head of the divisions of the department as indicated above, must pass an examination satisfactory to this board before they can be appointed or continued as inspectors in the department.

The Building Commissioner alone is exempt from examination by this board. He is to be appointed by the Mayor, but must be either an architect, civil engineer or builder.

This Board of Examiners is to be composed of three persons, one appointed by the Society of Architects, one by the Master Builders' Association, and one by the Society of Civil Engineers. All to be approved by the Mayor. This insures a non-partisan and an expert board.

Arguments for and against the bill are now being made before the Committee on Metropolitan Affairs, to which it was referred.

The outlook for building during the coming season continues very favorable, and it is evident that a large amount of work will be undertaken as soon as the weater permits. Most of the work in sight is in the business portion of the city, a number of large operations being planned. There is no present prospect of any unfavorable change from the present relations between employers and workmen.

Bloomington, Ill.

The Builders and Traders' Exchange of Bloomington, Ill. held its first annual banquet on March 12 in celebration of the successful ending of the first year of its existence. C. L. Hutchinson, the president of the exchange, presided at the banquet, and Hon. E. M. Heafer acted as toastmaster. After a number of interesting and amusing speeches had been added to the enjoyment of the excellent *menu* the majority of the members and their ladies adjourned to Washington Hall and the remainder of the evening was spent in dancing. The whole affair was most delightful.

The Builders and Traders' Exchange was organized one year ago and has a membership of 80 contractors of various kinds. Matters concerning the various buildings and improvements of the city are discussed and contracts are figured in the club rooms. They have done much to help along the improvements of the city and are much encouraged at the outlook. The officers of the association are: President, C. L. Hutchinson; first vice-president, J. H. Jeffries; second vice-president, J. A. Rankin; treasurer, J. B. Holmes; secretary, J. A. Shrock.

Buffalo, N. Y.

The members of the Builders' Association Exchange of Buffalo entertained the National Association of Painters and Decorators during its annual convention in February. The association held its sessions in the rooms of the exchange, and elected Thos. A. Brown of Washington, president, and Francis F. Black, secretary, for the ensuing year.

The strike on the Ellicott Square, which was declared off just as the March *Carpentry and Building* went to press, was resumed a few days later owing to a disagreement or misunderstanding between the unions and the superintendent of the work. The men claimed that the helpers on the iron work were using tools and that they should receive a mechanic's pay of 25 cents an hour instead of a laborer's pay of 15 cents an hour. They met Mr. Halback, the representative of the contractors, who promised that the helpers should not use tools any longer, but that they should do only a laborer's work. This was several weeks before the strike. The men claimed that Mr. Halback had not lived up to his agreement and that was one grievance that caused a strike. The difference has not yet been officially settled. The Builders' Association Exchange is moving in the matter of improvement in the building laws of the city, and has appointed the following members as a committee to assist the inspector and City Council in preparing desirable changes: H. C. Harrower, J. H. Tilden, John Feist, Alfred Lyth, George W. Maltby, James S. Stygall, Jr., J. W. Danforth, John Lawrence, Jr., and F. P. Jones. Each member of the committee represents a different branch of building. W. S. Wickes, U. G. Orr and William Lansing have been appointed by the architects to represent the architects' side.

Chicago, Ill.

The annual arbitration agreement between the Chicago Bricklayers' Union and the Masons and Builders' Association has been completed and signed by the arbitration committees of both organizations. Judge Elbridge Hanecy acted as umpire. The rate of wages in the new agreement remains as before at 50 cents an hour. Eight hours constitute a day's work, except on Saturday, when seven hours' labor and a full day's pay shall be the rule. An apprentice will be required to serve four years and his employer is required to see to it that he attends school at least three months of each year. Apprentices will not be allowed to work at the trade during the months of January, February and March.

The agreement between the arbitration committees of the Carpenters and Builders' Association and the Carpenters' Executive Council, reported in March, has been ratified by both the Executive Council, and the District Council of the Brotherhood. It will go into effect March 30. It is probable that after that date union carpenters will refuse to work for contractors who do not agree to employ none but union men and pay the union rate of wages.

Ninety-two men of the Stonecutters' Union have cut loose from that organization and formed the Chicago Stonecutters' Society, and will resume work in the yards against which a strike has been in progress several months. Dissatisfaction with the management of the strike—particularly with the action of the Arbitration Committee—led to the split. The leaders of the new organization, which includes about a third of those who struck, had a conference with the bosses, and a satisfactory adjustment of the difficulties arising from the introduction of machines in the yards was arranged. It was agreed that ten hours should constitute the work day of machine operators and eight hours for hand workers. A scale of 50 cents an hour was agreed upon for the latter.

The Builders and Traders' Exchange, after investigating the merits of several localities, has determined to remove from its present quarters at the corner of Lake and Clark streets to the Chamber of Commerce Building, where four large rooms have been secured. The removal will occur about May 1. A lease of the new quarters has been taken for a term of five years.

The Building Trades Club expects to have its new home ready for a house warming by April 15. Plans are being made for a most enjoyable time on that occasion and invitations have been extended to builders in other cities; particularly to the members of the Building Trades Club of New York City and to the officers of the National Association of Builders.

Cincinnati, Ohio.

The Cincinnati bricklayers' strike has not changed materially during the past month. Out of 60 contractors in Cincinnati 46 are members of the Builders' Exchange. Of those who are not, seven have signed the bricklayers' scale of 56¼ cents per hour provided the bricklayers work for them during the strike. This proviso was accepted by the union bricklayers and about 100 of them are now working for the seven contractors who have signed it. The members of the exchange still refuse to sign the scale and have organized an independent association of non-union bricklayers, who are admitted without the payment of initiation fee or dues. They have also given bond not to pay the union scale and to protect the men who are working for them; and have expressed a willingness to compromise, but the union bricklayers have given out 56¼ cents as their ultimatum. The number of men now on strike is placed at 425.

At the first regular meeting of the Builders' Exchange since the election of officers President Holtzinger announced the following standing committees :

Committee on Legislation—S. D. Tippett, George B. McMiller and Lawrence Grace

Committee on Admissions—L. B. Hancock, Robert Blair and Frank S. Rohan.

The prospect for building during 1896 is considered as being fair.

Dallas, Tex.

The Dallas *News* of recent date says : At the rate building permits are being issued from the office of the city engineer the indications are that the building done this year will be three or four times as great as what was done during the year 1895. For the first 11 days of January there were issued permits to the amount of about $58,000, while for the entire month of January last year the permits issued only amounted to $24,800. Several warehouses and business blocks are going up and several large residences are now anticipated by the architects of the city. Among the business blocks now in course of construction is the two-story brick at the corner of Commerce and Field streets, which is to be one of the finest blocks in the city and is to be constructed of Pecos stone and Texas brick and is to have a marble entrance from Field street.

The total amount of work done in 1895 exceeded the amount done in 1894, and there is good reason to expect that the present year will be a much better one for builders than 1895. It is predicted that there will be more work done in the coming season than in the two preceding years.

Lowell, Mass.

The outlook for building in Lowell during the coming year is considered very favorable, some of the contractors going so far as to predict the best season in the history of the city. The Master Builders' Exchange on March 10 changed its name by omitting the word "Master," leaving the title The Builders' Exchange.

Relations between employers and workmen have been undisturbed for some time and there is little likelihood of unfavorable change.

Minneapolis, Minn.

Unless some compromise can be reached it is probable that there will be trouble between the boss plasterers and their men in Minneapolis. The men demand $3.50 per day, a raise of $1. This the bosses consider exorbitant, and unless some plan can be agreed on whereby they will not have to pay this there is a chance that no work will be done in the city for some time. It is said that there is not much work on at the present time, and that that which is on hand can easily be held over until the warm weather, two facts which will not go to aid the men in their cause. Although a strike was threatened if the increase was not granted by the employers, none has yet occurred, in spite of the fact that the majority of the contractors have refused to concede the demand.

From present indications the present year, in the building business, will be but little better than 1895.

New York City.

Building operatons are rather quiet at this season, although the plans filed from week to week with the Bureau of Buildings would indicate a fair degree of activity as soon as the weather becomes settled. A marked feature of the situation is the number of office buildings and business structures likely to be erected in the near future. Several of these are of a lofty character, one running as high as 25 stories, while others range from 12 to 16 stories.

For a number of years the workingmen of this city have been agitating for a law which will give them greater protection to life and limb while at work on the big buildings which have been and are being erected in New York City. As a result of the agitation of the question there has been introduced into the Legislature a bill known as number 724-1,181, and is entitled "An act to afford protection against injury or death to persons employed on buildings in course of construction in cities of the State of New York." It is as follows :

SECTION 1. It shall be the duty of all contractors and owners when constructing buildings in any of the cities of the State of New York, where the plans and specifications require the floors to be arched, between the beams thereof, or where the said floors or filling in between floors shall be of fire proof material or brick work, to complete the said flooring or filling in as the building progresses to not less than within three tiers of beams below that on which the iron work is being erected.

SEC. 2. It shall be the duty of all contractors for carpenter work of buildings in the course of construction in any of the cities of the State of New York, where the plans and specifications do not require the filling in between the beams of floor to be of brick or fire proof work, to lay the under flooring thereof as the building progresses on each story to not less than within two stories below the one to which the said building has been erected. Where double floors are not used the contractors shall be required to keep planked over the floor two stories below that on which the work is being carried on.

SEC. 3. It shall be the duty of all contractors for iron or steel work of buildings in the course of construction or the owners thereof, in cases where the floor beams are not of iron or of steel, to thoroughly plank over the entire tier of iron or steel beams on which the structural iron or steel work is being erected, except such spaces as may be reasonably required for proper construction of said iron or steel work, and for the raising or lowering of materials used or to be used in the construction of the said building or such spaces as may be designated by the plans and specifications for stairways and elevator shafts.

SEC. 4. It shall not be lawful for any builder to employ or permit to be employed above the first floor on the structural iron work in any building any incompetent workman or mechanic.

SEC. 5. The chief officer in any city, charged with the enforcement of the building laws of such city, is hereby charged with enforcing the provisions of this act.

SEC. 6. Any violation of the provisions of this act shall be a misdemeanor, and on conviction shall be punishable by a fine, for each violation thereof, of not less than $25 nor more than $200.

SEC. 7. This act shall take effect immediately.

The difference between the Progressive Varnishers' Union and the New York Painters' Union is becoming threatening. A number of strikes have already resulted from the difference and more are in prospect. The painters claim that varnishing is as much a part of their trade as gilding, and they fought the Gilders' Union last year until the members of the latter were forced to leave all building work.

Stephen M. Wright, the secretary of the Building Trades Club, and director for New York City of the National Association of Builders, has been recently elected secretary of the Empire State Society, Sons of the American Revolution.

New Haven, Conn.

At the last regular meeting of the New Haven Builders' Exchange the following new officers were elected : President, James E. Todd ; vice-president, S. E. Dibble ; treasurer, J. Gibb Smith ; secretary, F. S. Miner ; trustees, Robert Morgan, James A. Church, F. R. Thompson, S. A. Mansfield, E. H. Sperry and F. L. Still. The old organization voted to disband. The officers, with the board of trustees, become the directors. The latter body was authorized to call in the stock subscriptions, which amount to $5,000, from time to time as they saw fit. The new body will undoubtedly soon take some action regarding the issuing of $100,000 worth of bonds for a building on Crown street, which right the law of incorporation gives it.

Nashville, Tenn.

Workmen in the building trades have had a busy season owing to the unusual amount of work resulting from the erection of the exposition buildings. A recent visit to the grounds shows everything to be progressing favorably and rapidly. The landscape gardening and road making is being pushed as fast as possible, the latter being nearly ready for the asphalt The buildings, without exception, are going on nicely. The contractors on the Parthenon are nearly done with the brick work and have put up about thirty of the frames on which the 54 great columns are to be built. The trusses for supporting the roof of the auditorium are being put up and the outside is nearly lathed, ready for the reception of the plaster. The inner walls of Machinery Hall have been ceiled almost throughout, and much of the exterior has been lathed. On both the Commerce and Transportation buildings the trusses for the roof are being put in place, and the great structures now look like the buildings they are designed to be. Nearly the entire interior of the Woman's Building has been plastered and the outside is lathed ready for the staff. The staff ornaments for the exterior are being made in one of the rooms by an experienced workman and little outside work remains to be done except the putting on of the staff and making the roof.

Philadelphia, Pa.

The annual dinner of the Master Builders' Exchange was given at the Hotel Lorraine February 27, and was one of the most successful ever given in Philadelphia.

Ex-City Treasurer William B. Irvine, president of the exchange, presided, and W. S. P. Shields acted as toastmaster.

After the excellent *menu* had been fully discussed and the cloth removed ex-City Treasurer Irvine, president of the exchange, called the assemblage to order and made the opening address, in which he touched upon the principal events in the history of the organization since its formation nine years ago. In part he said : " We adopted what has since been called the 'uniform contract,' which is in general use to-day, not only in this city, but throughout the country. We then, together with the Building Inspectors, turned our attention to the passage of a new building law, which was very much needed on the part of the public, as well as on the part of the builder.

" We then turned our attention to adopting a system of arbitration, which has been quite beneficial to those who have tried its use. This fact alone would warrant our existence.

" We then established a trade school, that the young men might be enabled to obtain a mechanical trade, to go forth into the world side by side with the imported labor which is constantly arriving in our midst."

Among the other speakers were James V. Watson, president of the Clearing House Association; James M. Beck, architect; John H. Fow and George Watson. A number of informal speeches were made after the regular toasts had been responded to. The attendance was large, and the whole affair was most thoroughly enjoyable and successful.

Pittsburgh, Pa.

The Building Inspector's annual report shows that the 50 acres composing the Third Ward of Pittsburgh furnished one-eighth of the entire building operations of Pittsburgh. More than half a million of money was spent by architects in this ward alone. The new buildings in the Twentieth Ward numbered 185 ; the number of new dwellings erected last year is 956. Business demanded 17 new office buildings, 20 warehouses and 23 stores. The total estimated value of the buildings erected last year is $4,467,000. During the year 90 condemnations were heard, and all but one of the owners complied with the requirements.

About a month ago the painters struck for an increase in wages and the situation has been growing steadily worse until present indications point to a general disturbance of all the building trades of the city. The most favorable sign is the fact that several conferences have been held between the unions and the employers, although without accomplishing anything up to the present time

Portland, Oregon.

The bricklayers of Portland have demanded a higher rate of wages. For the past two months negotiations have been pending between the master and union journeymen bricklayers looking to an adjustment of the differences which have existed for over two years. Since the first of the year many attempts have been made to patch matters up. The substance of the last offer of agreement by the union was that the wages should be $5 per day of eight hours, with pay and one-half for overtime, and that the union shall be governed by the same rules adopted by the bricklayers' union of New York, which, among other things, stipulate what the mechanic's work is and what the hodcarrier's work shall be. The most objectionable part of this offer to the master builders was that the union bricklayers should be at liberty to work for any one who would pay them union wages, and allow them to live up to their constitution.

The master bricklayers met in the Builders' Exchange some days after the foregoing offer had been received by Secretary Sutherland of the exchange and decided that they would meet the journeymen half way in the matter of wages, and offer them $4.50 per day of eight hours, but refused to concede them the right of working for any other master than a member of the Builders' Exchange. To offset this stipulation, the masters undertook to employ none but union men.

There has been comparatively little work going on during the past few months and the bricklayers chose the dull season in which to make their request, hoping that the matter would be adjusted by the time the coming season opened.

Providence, R. I.

A most hopeful feeling regarding the amount of building to be done in Providence during the coming year prevails among builders, architects and real estate men.

Everything seems at present to point to a continuation of the prosperity of 1895, and those best informed look for a repetition of the favorable conditions of the past year.

Architects report that business is rushing in their line and that the plans which they are preparing this spring exceed in number those of any season for several years past, from cottage houses for summer use to grand substantial business blocks.

The Builders and Traders' Exchange is in its usual excellent condition and its members are looking forward to an increase in standing and numbers during 1896. Affairs between employers and workmen are in a tranquil condition with no prospect of disturbance.

San Francisco, Cal.

The San Francisco Builders' Exchange had nominated for election at the annual meeting, which was held too late in March for report here, the following candidates for the new Board of Directors:

P. L. Bassett, James A. Wilson, Oscar Lewis, S. H. Kent, M. McGowan, Thomas Elam, Thomas McLaughlin, H. Wagner, Robert Smiley, J. J. Morehouse, C. P. Moore, James Britt, D. F. Mullville, John Trotter, W. B. Anderson, Gus B. Daniels, A. Kendall and Thomas Butcher.

The difference between the mason and carpenter contractors over the right to take entire contracts has not yet been officially settled, though there is much less friction than formerly.

The Berkeley branch of the Carpenters and Joiners' Union has advanced the scale of wages from $2.50 per day to $3. The new rate will begin with May 1. It is understood that there is a general feeling among the contractors that this is only fair pay, and no objection will be raised to the increase in wages.

The outlook for 1896 is not very promising in spite of the fact that a hopeful view of the amount of work to be done seems to prevail. While there is a considerable amount of work in sight the total now in prospect is much less than it was at this time during the more prosperous years of the past.

Springfield, Ill.

The new Builders and Traders' Exchange of Springfield has elected the following officers: William Mayhew, a contractor, president; S. J. Hanes and D. A. DeVares, contractors, vice-presidents, and Willaim M. Payne, of the hardware dealers, treasurer. The Board of Directors consists of the following: J. L. Powell of the planing mill; J. L. Fortado of the stone contractors; R. N. Baker of the lumber dealers; Thomas Armstrong of the painters; W. J. D. Downs of the plasterers; N. S. Ohlson of the contractors; Frank Lindsay of the bricklayers; Lewis Miller of the hardware dealers; E. J. Utt of the brick makers; L. A. Constant of the tinners.

The contracting brick masons have formed an organization and have decided not to sub-contract any work from the carpenters, but to take orders direct from the owners.

The officers elected are as follows: Albert Wise, president; L. L. Irwin, secretary, and Frank Lindsay, delegate to the Builders' Exchange. Of the 16 firms in the city, 12 firms are represented in the new organization.

St. Louis, Mo.

The new builders' organization of St. Louis formed under the name of the Master Builders' Association has been incorporated, with a capital of $10,000, in 100 shares, and has elected the following officers: Daniel Evans, president; F. J. Rummers, vice-president; Adam Baeur, treasurer; Samuel Hoffman, J. D. Fitzgibbon, Richard P. McClure, C. Chaplaine and A. E. Cook, directors.

The new body will not interfere in any manner with the present Builders' Exchange, as, unlike that body, sub-contractors and material men will not be admitted to active membership. It is the intention of the members to fit up elegant quarters for the holding of daily meetings.

The purpose of the association is to foster closer relations between builders, with the view of securing much needed legislation, and the concentration of interests in securing contracts, some of which have recently been permitted to slip away to other cities.

May 1 next threatens to prove an unusually eventful day in St. Louis. Several labor organizations—including the Stonemasons' Protective Labor Union No. 1—have asked for an increase of wages to go into effect on that day. It is said that strikes will follow a refusal to meet the demand, and the troubles of five years ago—when more than a dozen organizations were "out" at one time in St. Louis—may be repeated.

In the building line, the Stonemasons' Protective Labor Union has taken the initiative step in asking for an increase of wages, and it is supposed that the unions of carpenters, plasterers, lathers, hodcarriers and similar organizations will follow suit.

The stonemasons ask for an increase from 30 to 32½ cents per hour.

Secretary Richard Walsh of the Builders' Exchange writes that that organization is in excellent condition, and is steadily increasing its membership. Builders generally in St. Louis are looking forward to a busy season, and from the amount of work in sight, they are evidently warranted in so doing.

Toledo, Ohio.

On March 2 the Builders' Exchange of Toledo held its annual meeting and election of officers. There was a large attendance and the meeting was one of the best in the history of the organization. Much enthusiasm was manifested in the election and the new officers promise to boom the exchange. Albert Neukom was elected president by a unanimous vote, as was John Cavanaugh, first vice-president. A. R. Kuhlman is second vice-president, and the new Board of Directors, including the six holdover members, is made up as follows: John C. Romeis, M. Donovan, J. W. Lee, Jos. Pheils, Ed. J. Weis, R. G. Bacon, Frank Gorman, John Stollberg, Fred. Schulty, W. W. Oburdier, P. F. Whalen and John McCaffery.

The new quarters in the Masonic Temple Building have been elegantly fitted up and nicely arranged for the comfort of the members.

Washington, D. C.

At the annual meeting of the Washington Builders' Exchange, held recently at the hall on Thirteenth street, reports of the year's work were received, and officers for the ensuing year elected. The report of the Finance Committee showed a cash balance of $10,009.32 and no indebtedness. The election of officers and directors resulted as follows: President, A. L. Phillips,; vice-presidents, J. W. Thomas, Thomas B. Walker; treasurer, William C. Morrison; secretary, William C. Lewis. Directors: John R. Galloway, D. J. Macarty, Robert A. Clarkson, John T. Lynch, Fred. W. Pilling, Jacob Viehmeyer, Thomas Norwood, C. A. Langley, Thomas P. Stephenson, T. V. Noonan and R. W. Darby.

Wheeling, W. Va.

The Builders' Exchange is a far more important business organization in Wheeling than is supposed by the general public, says the Wheeling *Register*. Its large membership includes all of the contractors, builders and material men in the city and vicinity. It is an incorporated association and regulates all matters of contracting and building in the city, establishes uniform prices of labor and for material, settles disputes between its members and has power by law to enforce its findings and assess and collect, if necessary, fines from its members who disobey its rules and laws. It also gives the public and its members the latest building information throughout the country, and is an important factor in the matter of public improvements of any kind in the city. It has accomplished not only great good for the city and vicinity, but has built up the credit of its members with Eastern dealers in all kinds of constructive material and has also improved greatly the relationship existing between the mechanic and employer. It is a very prosperous organization and its members meet frequently, and the secretary is always in charge of its place of business on Market street.

Winona, Minn.

The builders of Winona organized a builders' exchange recently, and elected the following officers: President, John Knopp; secretary, W. F. Meier; treasurer, E. A. Bradley.

At a later meeting a constitution was presented and adopted, but the consideration of by-laws was postponed. The constitution fixes the name of the association as the Builders' Exchange, and fixes the officers as president, vice-president, secretary, assistant secretary and treasurer. These, with five others, are to constitute the Board of Directors. The directors, vice-president and assistant secretary are yet to be elected. The other officers were chosen at the first meeting.

A resolution was passed at the meeting declaring the exchange in favor of strict impartiality on the part of architects and opposed to their acting as agents for building articles or having any business connections outside of their profession.

The special committee to interview manufacturers reported progress and was granted further time.

Notes.

Vice-President S. E. Dibble of the Builders' Exchange, New Haven, Conn., has recently devised a new seal for the exchange. It embraces a combination of the various tools of the trade, surrounded by the words: "The Builders' Exchange of New Haven."

A certificate of incorporation of the New Jersey Society of Architects was recently filed in the Hudson County Clerk's office, in Jersey City. Louis H. Broome is president and secretary, and George W. Von Arx, treasurer. The other charter members are Robert C. Dixon, Lewis Meystre, Howard W. Louche, Charles Cachan, George B. McIntyre and George Beetz.

It is reported that the outlook for buildng in Minneapolis during the coming year indicates that the season will be much more active than the one just past. There is an unusual demand for residence property for building purposes and a number of office buildings, manufactories and warehouses are to be erected during 1896 if present indications are correct.

An effort is being made in Jersey City, N. J., to compel applicants for building permits to file plans of the proposed building with the Building Inspector. It has been customary only to show the plans. Consequently the only record in the possession of the inspector was the size of the building, the number of stories in hight and whether brick, stone or frame. Recently the Fire Commissioners found, it is said, that certain builders departed from the plans under which permits were procured, and in some instances added a story. In brick buildings this did not matter much, but in the case of frame houses, particularly where they are within the fire limits, it is a clear violation of the building law. The Fire Commissioners tried to stop one or two builders but were unable to do so, as the necessary permit from the Building Inspector was produced. Violations have become so frequent of late that the Fire Commissioners have arranged with the Aldermen to secure the passage of the ordinance necessitating the filing of plans. In future, departure from original plans will be permitted only with the approval of the Building Inspector.

HINTS ON WOOD CARVING.*

BY CHAS. J. WOODSEND.

THE operation of finding all the hights and spaces has no doubt seemed a long and tedious one, but in reality it is comparatively short. The methods used are simple, and are applicable to all sizes of capitals of this order. It is necessary to proceed in this or a similar manner in order to arrive at correct results. We will now prepare the block for cutting. For large capitals, it may be stated, that it is preferable to glue them up in staves, leaving the center hollow and make the joints radiate from the center. In this way there is less difficulty in cutting, while the appearance is considerably improved. After the joints are thoroughly dry place the block in a lathe which can easily be done by screwing pieces on the ends to receive the centers. The general contour of the capital is round to a little distance above the overhang of the long leaves, consequently it may be turned off up to that point. Turn it down as close as possible, or so as to just touch the highest member in each part, thus reducing the labor of cutting considerably. When the turning is completed trim off all the surplus material above the turned parts, and rough it out until it has the general outline. After this has been done work the volutes and helices. If they were drawn upon stiff paper they can be cut out and used as a mold. Under the abacus there is a division of three minutes, as may be seen from an inspection of Fig. 87 presented in the issue of *Carpentry and Building* for November. This member is an ovolo, and is circular in plan. It is shown in the latter half of Fig. 88. From the outer edge of this the body of the capital is formed into a cavetto, the outer curves of the volutes and helices giving the shapes, the plan remaining circular. After the upper part is worked, space off the leaves according to the distances and shapes as found in Figs. 85 and 86, with the addition of the band of olive leaves running up the center. If the interested student of carving gives proper attention to the different figures and sections presented he should find little difficulty in executing the work. One thing it is desirable to bear in mind, and that is, capitals usually are so placed as to be at a considerable distance from the eye of the observer; consequently the work upon them should be bold and the cuttings sharp and distinct, with not too much attention to minute details.

Attention will next be given to crockets, which, in their usual form, are bands of leaves covering the angle of the member to which they are applied and swelling out at regular intervals into bunches of foliage, sometimes having a considerable projection, as is shown by the illustrations of the western spire of the Cologne Cathedral published in *Carpentry and Building* some time ago. Frequently the volute is of a very simple nature, and at other times it is complicated. Not infrequently instead of the swelled parts being bunches of foliage they take the form of animals. The design given in Fig. 93 is one of the simplest, being easy of execution, and when finished is attractive in appearance. In executing this design it is usual to cut the swelled portion from one piece, and the leaves between the swelled parts out of another piece, thus saving both in labor and materials. The joints are to be made in a narrow part and may simply butt together. The leaf M is intended to be repeated until it meets the swelled part below. The blocks require to be fitted together, and to the angle to which they are to be applied, before any cutting is done. After this has been done mark out the design. The outline may be sawn out when the cutting is very easy, consisting mainly of some bold curves, and in connection with the sections given in Fig. 94 very little difficulty should be experienced. The sections as given are for one-half only. Any apparent differences of measurements between the design and the sections may be accounted for by the direction from which the figure is viewed.

(*To be continued.*)

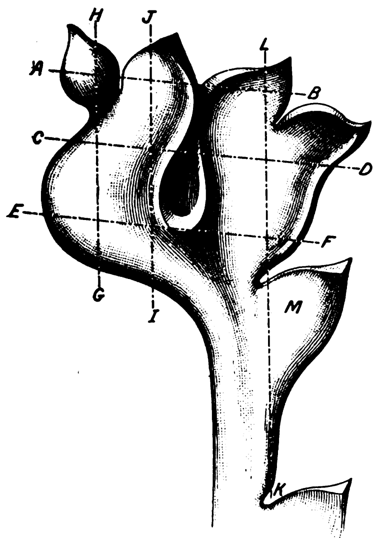


Fig. 93.—Design of a Crocket.

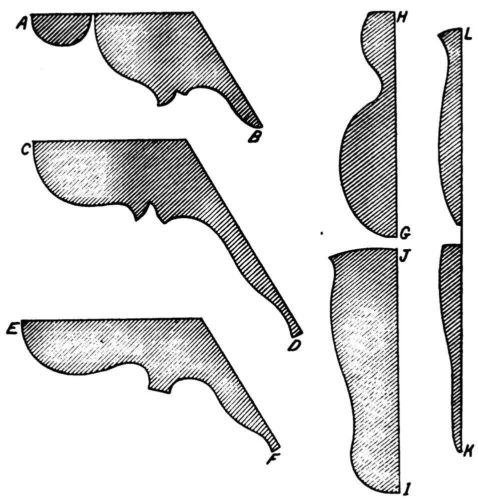


Fig. 94.—Sections Taken on the Various Lines Indicated.

Hints on Wood Carving.—Crocket with Details.

* Copyrighted 1894, by David Williams.

ONE of the most interesting pieces of work in connection with building operations which has recently been called to the attention of the public is that of the rebuilding of the defective walls of a large structure in the city of Chicago, Ill. The building was finished last October at a cost of about $100,000, and several of the floors were occupied, when one of the tenants reported to the Building Department that the walls were out of plumb. An investigation showed that he was correct in his assumption, the west wall being found to be 14½ inches out of plumb. The result was that the building was condemned as unsafe, ordered vacated and to be torn down. Instead of demolishing the entire building, the floors and roof were supported on cobb piles and timbers in such a way as to remove all weight from the exterior walls. The latter were then taken down and rebuilt from the foundations. It is said that the cost of rebuilding the structure was in the neighborhood of $30,000, and the work was done under the supervision of Architect C. H. McAfee.

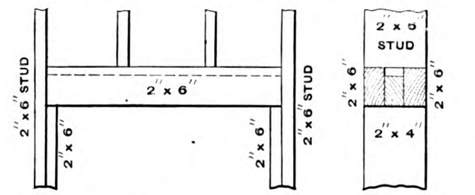
CORRESPONDENCE.

A Spirit Plumb Rule.

From M. L., *Warren, Ohio.*—The illustration of the spirit plumb rule in the March issue of *Carpentry and Building* is excellent, but I find one part of the description that I did not make perfectly clear. Instead of there being three $\frac{1}{8}$-inch pieces nailed on one edge near the ends to be used when raising, the description should have read "two pieces $\frac{1}{4}$ inch thick by 1 inch."

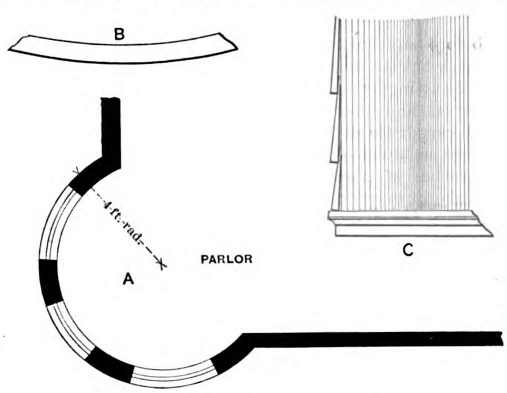
Trussing Door and Window Openings.

From E. W. H., *Santa Barbara, Cal.*—The plans for a large frame residence which I have in hand show outer



Trussing Door and Window Openings.—Elevation and Section Submitted by "E. W H."

walls with 2 x 6 inch studs boxed with 1 x 8 boards. The inner walls have 2 x 4 studs, all set 16 inches on centers. The building is to be lathed with metal lath. The sash for glass are 3 feet wide, and the ordinary doors are 3 feet wide, so that the studded openings in both cases are a little over 3 feet in width. The sliding door partitions have 2 x 3 inch studs, and the pockets are lined with flooring. The openings are 6 feet wide in the clear, the specifications calling for "all studs to be doubled at door and window openings and all openings over 3 feet wide to be trussed over in the most substantial manner known to the trade." Will some of the readers kindly illustrate their methods of trussing over door and window openings for such widths as those given above, and also suggest the best manner of trussing over the sliding door openings with their double lines of 2 x 3 studs? The object is to do the work in the most substantial manner possible. The sliding doors are $1\frac{3}{4}$ inches thick. The ordinary door and window openings being but a few inches greater than the prescribed 3 feet, the writer has figured to put in deep headers as shown in the accompanying sketch instead of trusses. Will not this be amply sufficient for solidity? I would also be glad if some one who has had experience



Weather Boarding a Circular Bay Window.

will give me the benefit of it in the manner of applying metal lath. Should it be bent into and around all corners or simply butted edge to edge?

Weather Boarding a Circular Bay Window.

From READER, *Illinois.*—In the erection of a frame dwelling with a circular bay, covered with 3-inch siding laid $2\frac{1}{2}$ inches to the weather, it becomes necessary to cut the siding from 6-inch stuff similar in shape to that shown at B of the sketch which I inclose. The lap indicated at C throws the lower edge from the sheeting and requires to be cut to a certain curve. I would like to have some of the readers take this matter in hand and furnish me with a rule, if there is one, for describing the arc at B.

Convenient Tools for the Carpenter.

From J. J. D., *Cornwall, Cal.*—I send herewith sketches of a few tools which I have found useful for a variety of purposes. Fig. 1 is a clearing chisel used for taking down old buildings, and is made of $\frac{5}{8}$-inch octagon tool steel. I make the handle A A 13 inches long and the cutting blade B $6\frac{1}{4}$ inches long. The cutting edge O is $1\frac{1}{2}$ inches wide and tempered to a deep pigeon blue. Fig. 2 represents an offset clearing chisel used by me for the same purpose as that above described. It is of $\frac{5}{8}$-inch octagon tool steel, the handle C being 7 inches long, and is offset at D *d* enough to allow the back of the hand to clear the boards when used for parting boards or cutting nails. The portion E is made 9 inches, and the cutting edge $1\frac{1}{4}$ inches wide, tempered to a deep pigeon blue. The heads K K are tempered soft enough so as not to break the head of the hand hammer. The third tool is a nail set, of which the main portion I is $5\frac{1}{4}$ inches long, J is $\frac{3}{8}$ x $\frac{5}{16}$ inch, G $\frac{1}{4}$ x $\frac{3}{16}$, H 1 inch long and intended to set a three-penny finishing nail. The part marked F is 1 inch long, and is

Fig 1.—A Clearing Chisel.

Fig. 2.—An Offset Clearing Chisel.

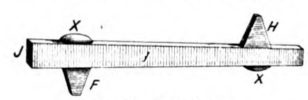


Fig. 3.—A Nail Set.

Convenient Tools for the Carpenter.

made to set eight-penny cut casing nails. All are hard tempered. The portions X X are the places to strike with the hammer when using the small sets. I also use old saw files to make scratch awls, heating them in a forge, and from long, flat files I make draw knives, gouge chisels, &c. This is the kind of work with which I busy myself during the winter days.

Suggestions for Pattern Makers.

From A. W. W., *Copper Cliff, Ontario.*—I have in my possession 11 bound volumes of *Carpentry and Building*, and although these touch on almost every subject in connection with carpentry work in its different branches, I find in the Correspondence department nothing relating to pattern making, with the exception of one or two inquiries which still await answers. As this is a subject which it seems to me would interest a good many readers, including myself, I would like to see it taken up either in the Correspondence department or as a serial from month to month similar to "Hints on Wood Carving," or "Architectural Drawing for Mechanics." I will commence setting the ball rolling myself by asking what kind of wax is used for filling nail holes in finished patterns; also what is used for staining patterns black so they will dry hard and smooth with a good shine?

Answer.—Some pattern makers use common beeswax, employing rosin to harden it or a little lard to soften it, as circumstances may require. It is commonly used hard with one-third rosin to two-thirds wax melted together. With regard to staining patterns black it is customary to use the best shellac varnish, coloring it with lamp black. The latter is mixed in the varnish, making it as black as possible. The patterns are given the first coat with this, while the next coat is very much lighter and the third coat has only enough lamp black in it to slightly color it. Some pattern makers do not use black patterns, but employ those which have been treated with light or orange shellac.

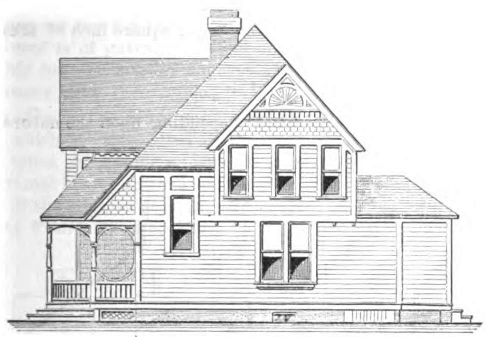
The suggestion of "A. W. W.," with regard to a discussion of the subject of pattern making is one which we trust our practical readers will consider as applying to themselves, and send for publication letters treating of the topic in its various phases.

Raising the Roof of a One-Story Cottage.

From N.T. M., *Creston, Iowa.*—I wish to raise the roof of a one-story cottage 5 or 6 feet, and should be glad to have some of the readers who have had experience in that line tell me their method of raising and securing the roof while splicing the studding.

Six-Room Cottage.

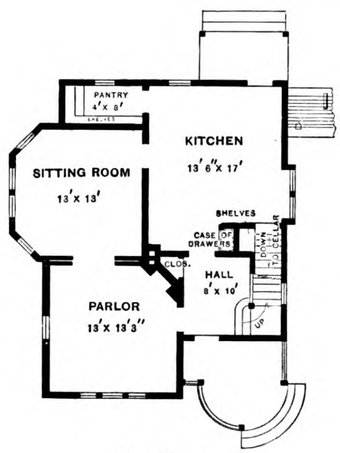
From GEORGE W. PAYNE & SON, *Carthage, Ill.*—The correspondent who recently asked for a design of a six room cottage, as well as many other readers of the paper, may find some points of interest in the drawings here presented. The amount of room provided is somewhat unusual for a house of its character and cost. It is easy enough to build a house that is cheap, yet it is quite another matter to construct one possessing this feature and a fair share of the comforts and conveniences desired. Of course everything must be done on a more or less reduced scale. The rooms cannot be so large, for the amount of ground covered must be reduced to the smallest possible space, as it is the entire area of ground covered which must be taken into the estimate of cost. Another point to be considered is the hight of stories. Very large rooms require proportionately higher ceilings, but moderately low ceilings are preferable, as the rooms are more easily heated. The plan here shown has six good sized rooms in addition to the usual accessories. The feature of a front hall and staircase as commodious as shown is of such a nature that the value of it will be daily appreciated by the occupants of the house. The foundation is of stone laid in lime mortar. The first story of the house is 9 feet in the clear and the second story 8 feet. The frame is of pine, the studding joists and rafters are placed 16 inches from centers and the joist well bridged. The outside of the frame is sheathed, papered and covered with ½-inch siding. The wood finish of the interior is of selected cypress in the natural color for the first story and white pine in the second story. The kitchen is of good dimensions, as it is also intended for use as a dining room. The cellar, which extends under the entire house, is reached from the kitchen by stairs leading down under the main flight. The plaster is of three-coat work and finished in white. The house has been built in this locality, in a first-class manner, after the plans here shown, for $1300. In some localities it would cost more, while in others it could be erected for less.



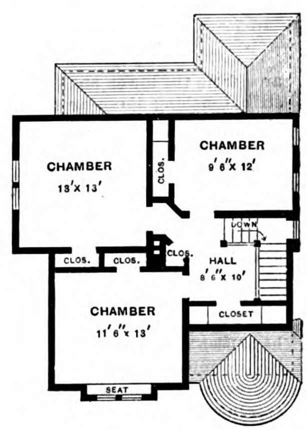
Side (Right) Elevation.

Side (Left) Elevation.

Front Elevation.



First Floor.



Second Floor.

A Six-Room Cottage.—George W. Payne & Son, Architects, Carthage, Ill.—Scale, 1-16 *Inch to the Foot.*

Surveying Lumber.

From F. S. W., *Seal Harbor, Maine.*—Can any of the readers tell me through the columns of the paper how to survey lumber ½, ¾, 1⅛, 1¼ and 1½ inches thick? How is it surveyed by dealers?

Lessons in Furniture Perspective.

From YOUNG CHIP, *Montreal Canada.*—I am much interested in the lessons in perspective drawing which are at present appearing in the various issues of the paper. I hope the author, Mr. Hicks, will give us some lessons in furniture perspective before he finishes. I would like to ask him if the lines in the lessons are put on the drawings and rubbed out afterward, or are they purely imaginary?

Carriages for a Quarter Winding Stairway.

From R. B., *Columbus, Ohio.*—In compliance with the request of "S. P. G.," San Antonio, Texas, in the November issue of *Carpentry and Building*, I submit sketches showing the best method of constructing carriages for a quarter space winding stairway. According to my idea, the safest way is to make a full size drawing of the circular parts, then lay a flat straight edged slat of pine of sufficient length over the carriage A, Fig. 1, and mark the lines on the slat. Joint the bottom edge of the plank to be used, which should be 2 inches thick and dressed out of wind on the face side. After this has been done, lay out the risers and all other plumb lines to correspond with the lines on the slat, then lay out the steps accurately to correspond with the hight of the risers. Continue this operation until all are laid out. The bevels for the plumb cuts can be obtained from the lines on the slat. To shape the lower edge of carriages for lath and plaster, cut, with the aid of a pair of dividers,

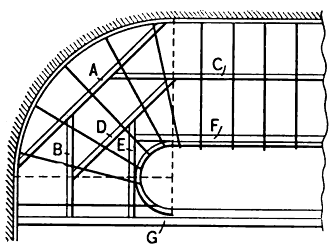


Fig. 1.—Plan of Stairs.

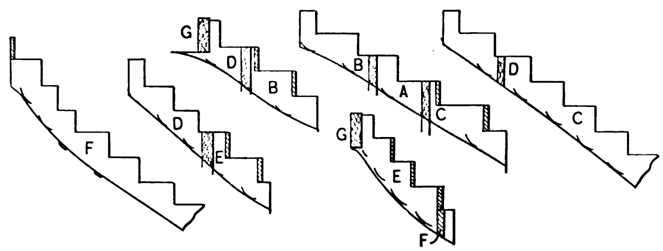


Fig. 2.—The Various Carriages for the Stairway.

arcs from the lower angle of the tread and bend a thin strip touching these arcs to mark the curve. This is clearly shown in Fig. 2 of the sketches. The points in the curves at the beveled ends can be found by measuring the plumb line at the connecting point on the piece to which it connects. This is no experiment, as I have successfully practiced it for 20 years. It may be said that continued rail stairs, when properly built, are much more graceful and convenient than those having angle newels, as they are constructed with two risers centering into one post on a quarter platform, or with the land and start risers on a half platform centering into the post. There have been so many of this kind built in the last few years by incompetent bunglers that it almost gives one the horrors to look at the stairways in buildings of beautiful exterior design. Stair building, to secure the best results, is an art that requires good judgment in laying out, but the angle post variety has so degenerated that almost any "saw and hatchet" carpenter can build them somehow. This state of things is of no benefit to the mechanic and much less so to the owner.

Strength of Columns and Girders.

From E. E. C., *Whitesboro, N. Y.*—I have more favors I would like to ask through the columns of the paper, the first being with regard to iron columns. I would like to know what weight 4-inch wrought iron pipe columns 6 feet long and 5-16 inch thick, with a plate of iron at top and bottom, will sustain; also what weight a 8 inch pipe of the same kind will sustain? These two columns are to be used in a cellar under a cross girder carrying the floor joist and partitions of the house. I would like to know how much weight there is on an 8 x 8 inch cross sill 28 feet long, taking into consideration, of course, the plaster and furring that will be sustained by it in a house of ordinary construction? What I want to get at is the weight per running foot on the cross sill, so that I can use it as the basis of figuring in future cases.

Answer.—Iron columns of the character and size first indicated by our correspondent will safely support a quiescent load of 12 gross tons, while columns 8 inches in diameter and 5-16 inch thick will safely support a load of 8½ gross tons. We assume that the columns are placed equidistant from the walls of the cellar so as to support the cross girder at two intermediate points, thus dividing the span into three equal parts. This being the case the girder will safely carry a uniformly distributed load of 1000 pounds per running foot. There are quite a number of rules for determining the strength of columns, but they are rendered only approximate by the unavoidable and unsuspected defects in the texture of the material employed. For this reason, if for no other, notwithstanding the theoretical correctness of the formula, it is always advisable to allow liberal margin on the side of safety. A formula for the strength of columns very generally employed at the present day is that known as "Gordon's Formula," prepared by Prof. Lewis Gordon of Glasgow, and is as follows:

Breaking weight in pounds per square inch of area of cross section =

$$\frac{f}{1 + \frac{l^2}{r^2 a}}$$

in which f is a coefficient depending upon the nature of the material, as follows:

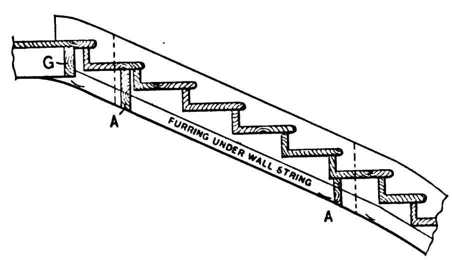


Fig. 3.—Section through the Stairs.

Carriages for a Quarter Winding Stairway.

For good wrought iron it is taken at 40,000 pounds; cast iron, 80,000 pounds; mild steel, 50,000; hard steel, 80,000; white pine, 5000 pounds.

l is the length of columns; r is the least radii of gyration, and depends for its value on the shape of the cross section of the column, and must be used in the same unit as l, either in feet or inches; a is another factor depending for its value on the manner in which the column is held in place. In this case the column has flat ends and is fixed securely in position. Its value under these conditions would be taken for wrought iron as from 36,000 to 40,000. To obtain the least radii of gyration, r, we have the following formula:

$$r^2 = \frac{D^2 + d^2}{16}$$

in which D equals the outer diameter and d the inner diameter. For finding the value of r we substitute its value, together with all the other factors in the original formula

$$\frac{f}{1 + \frac{l^2}{r^2 a}}$$

and solve the fraction. Multiply the result of the cross section of the column, which gives its breaking weight.

The formula for timber girders, white pine or spruce, and probably the one easiest to remember, is as follows:

Total center breaking load $= \frac{b\,d^2}{l} = 450.$

b = breadth of beam in inches.
d = depth of beam in inches.
l = length of beam in feet.

It is only necessary, in order to find the breaking load equally distributed, to multiply the center breaking load by 2.

Sizes of Material in Truss for Bank Barn.

From B. H., *Bentleysville, Pa.*—I inclose herewith sketch showing the middle bent of a small bank barn, 28 feet wide. There will be two bents like this, constructed of white oak and placed 14 feet apart. I would like to know if the timber and rods used in the truss are of sufficient size for the purpose or whether they are too large; also, is it properly constructed and what load will it support? There will be joist resting on the truss chords with flooring on top for the purpose of storing hay and grain. The roof is of galvanized steel. I would like an answer to this inquiry similar to that given on page 39 of the February issue.

Answer.—The truss submitted by our correspondent, and which is represented in Fig. 1, is known as a queen post truss, but having queen rods instead of posts. Two additional braces and one rod have been added to the members of the truss so as to take up the half load between the points F and H. According to the conditions of loading

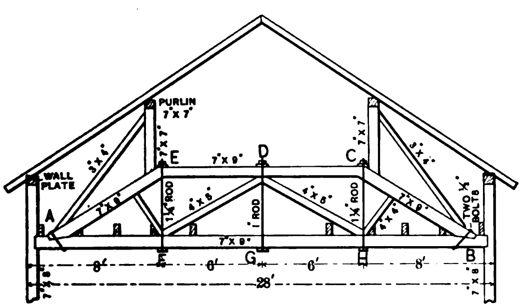


Fig. 1.—View of Truss Submitted by "B. H."

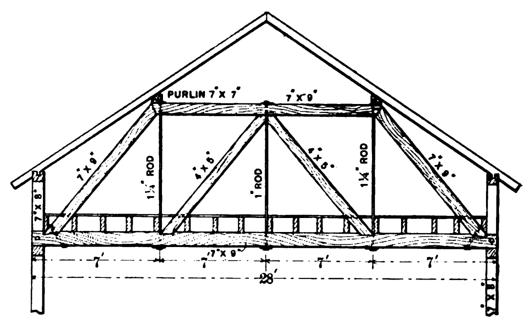


Fig. 2.—Form of Truss Recommended as a Substitute for that Shown in Previous Figure.

Sizes of Material in Truss for Bank Barn.

it has been found advisable to calculate the strains separately for each load; first those caused by the roof load, and then those due to the floor load. Both may be considered as quiescent loads, and when the strains have been found in each, their sum will give the total. Taking the roof load first and assuming 40 pounds per square foot, including wind, snow and weight of roof itself, it is found that a load of about 7280 pounds will be concentrated at or near the points E and C. This load will cause a stress of about 18,500 pounds compression in each of the rafters A E and C B; also a compressive strain of 11,300 pounds in the straining beam E C, as well as a tensile strain of about 11,300 pounds in the tie beam A B. In computing the strains due to the floor load, 200 pounds per square foot of floor area have been taken, including the weight of the flooring and the weight of the truss itself. The following table gives the strains on all the members of the truss due to both loads:

	Pounds.
Main rafters A E and C B	65,450
Straining beam E C	41,800
Tie beam A B	55,050
Suspension rod D G	16,8 0
Braces D F or D H	15,700
Rods E F or C H	28,000

These figures are, of course, only approximate, owing to the assumptions which have been made and the smallness of the diagram submitted, but they are of sufficient accuracy to draw the following conclusions: First, that the truss as shown in Fig. 1 is sufficiently strong to carry with entire safety the assumed loads here quoted, provided, however, the points of supports at A and B are sufficiently strong. From the diagram it appear as if the tie beam was tenoned into an upright post at each end and the parts pinned together. Considering the heavy load liable to be placed on the truss it would seem doubtful whether this point is strong enough. In Fig. 2 we present a view of a truss in which an attempt has been made to improve on the form employed by our correspondent, using the same amount of material. It will be seen that the depth has been increased somewhat, which insures greater rigidity, and also gives the rafters less inclination to the horizontal, thus causing the strains to become less under the same load. It also affords better facilities for passing through the space between the members from one portion of the floor to the other. Again, the purlins rest directly on the trusses, thus doing away with the long 4 x 5 inch braces and also the short 7 x 7 inch posts. The small 4 x 4 inch braces shown in Fig. 1 can be dispensed with, as they receive no strains whatever.

Making a Box Sill.

From C. C. J., *New Bedford, Ill.*—I would like to ask the readers of the paper what they consider the best way of making a box sill for a house or any other building.

Cement Wash for Stone Work.

From F. A. F., *Helena, Mont.*—Please give me information how to mix cement wash for stone (rubble) foundations. What I want is a wash that will spread as evenly as, and leave a body like, lime wash on brick work. In trying a mixture of cement and water I find it will not spread evenly, neither will it set quick enough, but it forms into drops and runs down the surface. If any reader of the paper can help me in this matter it will be regarded as a favor.

Reversible Rafter Templet.

From G. T. E., *Chicago, Ill.*—The reversible rafter templet shown in the issue of *Carpentry and Building* for November last is not new, the writer having used that method of laying off the various cuts of rafters more than 21 years ago and probably got the idea from some other carpenter. Of course any carpenter is capable of making use of patterns or templets of his own design without knowing of their previous use.

Strength of Beams.

From W. F. N., *Corsicana, Texas.*—In answer to the questions propounded by "C. B." of Norfolk, Va., I wish to say that a square beam set at an angle is weaker than one placed flat on the side, for the reason that it has a tendency to split the notched end of the upright as hinted by the correspondent. As to the second question, I desire to say that two plates at X X are preferable to one at P. Two plates reduce the strain on the pieces used to reinforce the plate and also cut the span of the main plate from post to post into three smaller spans instead of two, thus virtually strengthening the main plate.

Note.—It is generally conceded that when a beam which is square in cross section is supported on its edge—that is, has its diagonal vertical—it will bear about seven-tenths as great a breaking load as when placed the other way.

Weather Boarding a Round Tower.

From A. E. G., *Cleveland, Minn.*—The sketches which I send are in reply to the inquiry of "G. G. R.," New Philadelphia, Ohio, who asked in the November issue of the paper about lapping siding on a round tower. My way for doing the work is to first find the circumference of the tower. We will take one, for example, that is 30 feet around it. If common 6-inch siding is employed, it must be cut in short lengths of, say, 6 feet each, in which case it will require five pieces to reach around the tower. As the siding is lapped and the bottom edge is the thickest, it gives the lower edge a full ½ inch larger radius than the upper edge, so that the distance around the lower edge of the siding is 3 inches greater than around the upper edge. Divide this 3 inches by the number of pieces required to go around the tower, in this case five, and the result is the extra length to be added to the bottom edge of each 6-foot piece of siding. In order to do this, I cut off the lower edge at each end, as shown in Fig. 1, and after having the pattern correctly made I cut all the pieces like it and gauge them where I want the lap to come. It should not be laid over 4 inches to the weather, as the ends are narrow. If in following this plan the ends cut too narrow to cover well the pieces should be made shorter. On small towers the siding will lay better if it is curved on the back side. In nailing on the siding, one end should be held up above the line, as indicated in Fig. 2 of the sketches, so that it will follow the line in bending. I have covered a number of towers in this way with entire satisfaction.

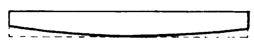


Fig. 1.—Method of Cutting the Siding Adopted by "A. E. G."

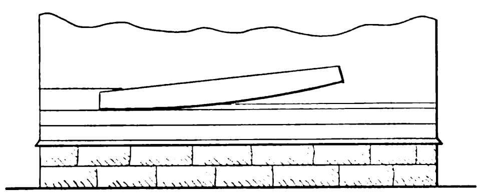


Fig. 2.—Manner of Holding the Siding when Nailing.

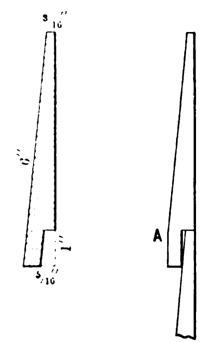


Fig. 3.—Sketches Submitted by "C. A. B."

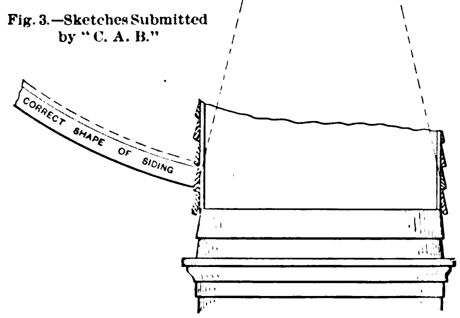


Fig. 4.—Method of Siding Suggested by "J. D."

Weather Boarding a Round Tower.—Sketches Submitted by Various Correspondents.

From J. D., *Chester, Conn.*—In reply to the request of "G. G. R.," which appeared in a recent issue, I submit the following as the proper method of siding a round tower: The strips of siding overlapping each other causes them to assume the shape of a cone—that is, if the lines of the underside of the siding are extended until they meet they will form the elevation of a cone, as may be seenby the dotted lines in the sketch, Fig. 4, which I send. Extending the lines to back of the siding until they intersect. will give the radius for obtaining the correct shape to which to cut the siding.

Note.—We also have a similar answer from "A. E. P.," Chicago, Ill.

From C. A. B., *Oakfield, Wis.*—In the November issue of *Carpentry and Bu lding*, on page 284, "G. G. R." of New Philadelphia, Ohio, asks how to weatherboard a round tower with lap siding so as not to throw the ends down lower than the center nor have the side stand away from the top edge. I would say rabbet out the entire inside edge a little more in depth than the thickness of the top edge and the width of lap. The result will be as indicated in the first sketch of Fig. 3, which I send. We build round silos that way here and the method is used altogether in siding them. We use 6-inch basswood siding, rabbeted as shown. I have run siding for six jobs recently and it has worked all right. I would say, however, that the rabbet must be deeper than the siding is thick at the top edge, as in bending the outer lower corner draws in, forming a slight bend, as indicated at A in the second sketch of Fig. 3, which also shows how nicely the siding fits one course over another.

Heating a Workingman's Cottage.

From J. P. S., *Hazleton, Pa.*—I am glad that my letter on the subject of heating a workingman's cottage meets with the approval of "N. H. D.," for I shall endeavor to answer his questions in detail and more fully than was suggested in my original communication. In the building where I adopted this system of heating I placed the tin pipe in a corner similar to that made by the partitions between the hall and the dining room and parlor. As the girder supporting the two partitions prevented the 10-inch flue from extending into the space within the partition, the pipe occupied a little space in the room. From many years' experience with heating, I had very little fear that fire would ever result from the hot air pipe made of tin, and so I made no preparation for protection beyond fastening the pipe with wire, so that it could not come in contact with any wood work. In this case a hole 11 inches in diameter was sawed in the floor, over which was fastened a piece of sheet iron, Fig. 1, leaving an opening 10 inches in diameter for the pipe to pass through, and fastened so that the pipe would be held centrally in the 11-inch hole in the floor. This left a margin of ½ inch all around the hot air pipe, and in this margin in the sheet iron a series of holes were punched ¼ inch in diameter and about 1 inch apart, as shown. Instead of making a square extension in the corner, wire lathing was nailed across, cutting off a triangular space, as indicated in Fig. 2, in which the hot air flue was run up, and the connections for the registers, instead of being directly opposite each other, were placed somewhat at an angle, with the tin partition between them, as shown. The hot air pipe was reduced to 8 inches in diameter above the top of the registers on the first floor, and continued above the floor at the second story high enough to allow of connection with an 8 x 10 register set above the washboard. After the partition was placed in the flue the latter was stopped short by a cap on the top. This room was also finished by a triangular corner space, that part above the flue being used for a closet. Considerable space in the room would have been taken up had the hot air flue through the dining room been incased in a square extension in the center. As some heat is retained in the hot air flue, protection is afforded to the wood work by wrapping the tin flue with asbestos paper. This enables the air to be delivered to the registers at a higher temperature than it would if the pipe was not wrapped. I have known a tin flue to be run up through the room without any other protection or ornamentation to it than a coat of enamel, as mentioned in my previous letter. The assumption that the flue requires less space than the chimney is because a chimney, as a rule, is located midway between the two ends of a room, while this flue is in a corner, and corner space is seldom as valuable as

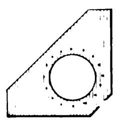


Fig. 1.—Sheet of Iron Serving as a Collar to the Hot Air Pipe at the Floor.

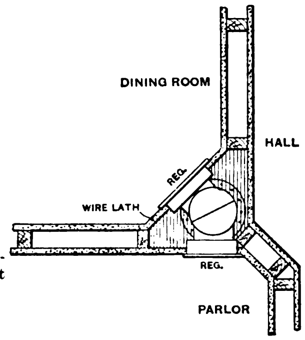


Fig. 2.—Manner of Arranging the Corner of the Room to Accommodate the Hot Air Flue.

Heating a Workingman's Cottage.—Method Recommended by "J. P. S."

that toward the middle of the side walls. Then, again, it is not uncommon to build a breast for a mantel wherever there is a chimney; and while the chimney is not to blame for this, it is nevertheless the excuse for occupying space. If the flue is run in the corner, it is quite possible to cut away the girder so as to let it back; and where the builder has this object in view it is possible he may devise means of economizing some little space. If the flue is run up midway of the partition between the two ends it would be hardly possible to cut away the cellar girder without unduly weakening it; but as a rule the joists rest on the girder and leave a space between the top of the girder and the floor proper, by which means, with slight slant to the pipe from the furnace to the flue, no greater extension into the room will be made than is suggested by "N. H. D." From experience in using Baltimore heaters and the system which I have suggested, I have no hesitation in saying that the Baltimore heater by no means approaches in satisfactory heating the results obtained by the small hot air furnace. The Baltimore heater generally takes its air supply from the floor of the room in which it sets. Consequently, that room is frequently cold, as large quantities of cold air have to come into it to supply the heater. This complaint is generally recognized by all who have made a business of making and selling Baltimore heaters. Sometimes they are supplied with air from out of doors, which relieves the trouble to some extent, but there is always a strong possibility of air in the room in which it sets entering the registers and passing up the flue to the other room, necessitating the entrance of air through cracks around the windows and doors to make up the deficiency, and at the same time not only interferes with the heating but very materially cools the room. As an efficient heater and for economy, the little furnace in the cellar is far superior to the Baltimore heater. It is possible to use floor registers at the second story and not use any of the space in the upper rooms, by building register boxes which will pass under the floor to the room furthest from the flue, and by placing a partition in the flue each room will get its full supply of air. Regarding the kind of furnace to be used, I would say that one having a galvanized casing 24 inches in diameter and with a fire pot 12 inches in diameter is sufficiently large for the work, provided the rooms are not larger than those in the plan submitted; but as there are furnaces and furnaces, a construction should be selected which utilizes some of the heat from the gases before they pass to the chimney. A furnace which has an open way from the top of the fire to the smoke outlet, and which is direct in its draft, will need more frequent attention, consume more coal, and less of the heat generated by the coal will be utilized for heating than if a furnace is selected of the indirect draft character, with the upper parts so arranged that the smoke must make some in and out and up and down passages and travel considerable distance before it reaches the smoke outlet. The efficiency of any hot air furnace will be increased if an inner casing of black iron is suspended or supported between the heating surface and the casing, leaving a space of 1 inch or more on each side for the air to travel up to the hot air outlet. I hope that the request of "N. H. D." for elevations for the floor plans which he has submitted will be furnished by some of the readers; and if there are any other questions which arise in the minds of those who are interested in this subject I shall be glad to answer, as far as I can, those which are brought to my notice.

Barn Framing One Hundred Years Ago.

From TRAMP, *Denver, Col.*—A number of years ago I found myself in one of the Eastern provinces of the Dominion of Canada, and while there I saw a barn which was said to be about 100 years old. I took particular notice of the manner in which it was framed, as it seemed to possess features of more than ordinary interest. The timbers were all hewn and were very heavy. The framing of the bents was similar to the barn framing done to-day, with the exception that the plate, tie beam and post of a bent were framed together. The tops of the posts for the bents were framed as indicated in Fig. 1 of the sketches which I send, this showing two tenons, A being for the plate and B for the tie beam. In Fig. 2 is represented the post, plate and tie beam put together, the braces between them not being shown. The seat of the hip rafter is at R. Posts framed as indicated in Fig. 1 were known in that part of the country as cock tenon posts. I notice that in nearly all the barns built in recent

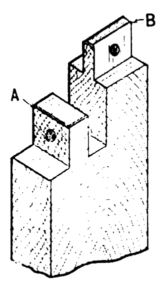


Fig. 1.—Method of Framing Top of Post.

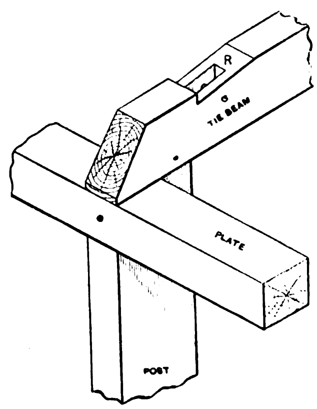


Fig. 2.—Appearance of the Post, Plate and Tie Beam in Position.

Barn Framing One Hundred Years Ago.

years the cock tenon framing has been abandoned, the tie beam being framed into the post below the plate. Now, will some of the readers of *Carpentry and Building* who are posted on framing give their views as to the advantages or disadvantages of cock tenon framing, if that is the proper name for it?

Trouble with Oak Casings.

From J. E. H., *Sidney, N. Y.*—I would like to ask the numerous readers of the paper to advise me in regard to the following difficulty: When I built my house I put on a few pieces of oak casings which had a little sap wood on the back side. I have since found that they contained small white borers, which are continuing to powder the wood to such an extent that I do not know what the end will be. Can any reader of the paper tell me how to get rid of them?

ARCHITECTURAL DRAWING FOR MECHANICS.*

By I. P. HICKS.

WE will now take up a figure which shows the changes occurring when an object is placed at some angle other than 45 degrees with the station point, and follow it up in a way to involve more of the principles and points which necessarily have to be considered in architectural perspective. The previous diagrams of perspective have been made to illustrate very plain objects in order that the learner might the more readily become familiar with the points and principles involved. The next step is showing in a practical manner a method of drawing the perspective outlines of a plain building. This structure is not a figure with a square base, like the previous one, but is longer than it is wide, and being placed with the end at an angle of 60 degrees with the station point, there is more involved than in any of the previous perspective figures. Referring to Fig. 55, draw the H L and the P L V, and fix the station point. C V is the center of vision in the horizontal line. With S P as a center draw the semicircle and set off a point which will represent the degree of the angle at which it is desired the end shall retreat. In this case it is made 60 degrees; therefore a line drawn from S P at an angle of 60 degrees will at the intersection of the horizontal line find a vanishing point for all lines running in that direction. A line drawn at right angles to the one of 60 degrees will at the intersection of the horizontal line find a vanishing point for all lines running in that direction. As V P 1 and V P 2 must each have a measuring point, the next thing in order is to locate them. This may be done by taking V P 1 for a center with S P as a radius and striking the arc shown by dotted line cutting the H L and establishing M P 2, as shown. Take V P 2 for a center with S P as a radius and strike the arc, cutting the H L, locating M P 1, as shown. Next draw the ground line and then the nearest upright corner which remains unchanged by perspective. In this case the corner is made in the P L V, so all that is necessary is to set off the hight on this line, as shown at A. Now draw the retreating lines to the vanishing points, V P 1 and V P 2.

Next comes the foreshortening of the sides. The plan shows the geometrical size of the ground plan and the angle at which it is turned from the ground line Take the actual scale measurements from the plan and set them off on the ground line, the width to the right of the P L V and the length to the left. These are the geometric scales, and are represented in the diagram by G S and G' S'. From the end of these scales draw lines to the measuring points, M P 1 and M P 2, as shown. The points of crossing the retreating ground lines will be the points from which to draw the two remaining upright corners of the figure. In developing the roof lines first set off the hight of roof, which in this case is assumed to be as represented by A B. The hights should be set off according to the scale of the geometrical elevations, and which will be explained more fully in another diagram by means of a hight line. The roof being on an inclination causes a portion of the roof lines to retreat upward at an inclination, consequently we must find a vanishing point for them. As we have assumed the hight of roof to be A B, draw a line from B to V P 2. Find the center of the gable, which may be done by drawing a line from the center of the end geometrical scale to M P 1 and raising the vertical dotted line from the crossing of the retreating end ground line. The intersection of the vertical dotted line at C on the line B V P 2 will be the point through which to draw a line from A, which will at its junction with a perpendicular line raised from V P 2 find a vanishing point for the upwardly inclined lines of the roof. This point is V P 3. We now draw the further inclined retreating roof line to V P 3, and then the horizontal retreating line from C to V P 1, which represents the ridge line.

We now have one more point to consider—the inclination of the roof line on the further side of the gable, which is downward, hence we must look downward for a vanishing point for all lines running in that drection. To determine this point measure down from V P 2 the distance V P 2 is from V P 3, establishing V P 4. A line drawn from C to V P 4 will cut the top of the post

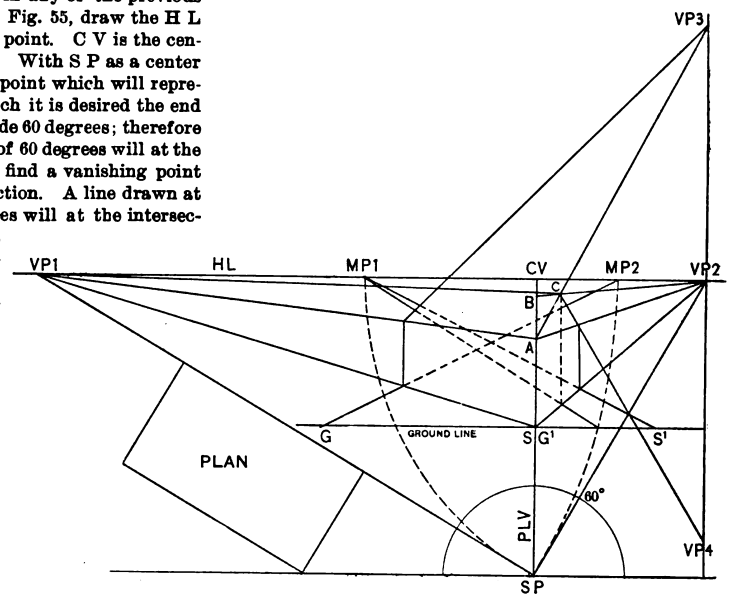


Fig. 55.—Diagram Showing Change of Vanishing and Measuring Points when the Object is not at an Angle of 45° with the Station Point; also Method of Obtaining the Vanishing Points for Roof Lines.—Scale, 3-16 Inch to the Foot.

Architectural Drawing for Mechanics.

on the further corner of the gable and thus complete the figure.

(*To be continued.*)

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Strength of Floors.

Some very strong floors are among the many interesting features of the Boys' High School building in Philadelphia, Pa. The first floor is constructed of 6-inch steel I-beams, 13 pounds per foot, the spans being 18 feet long and the beams set 2 feet on centers. The terra cotta lintels were set in place, and concreted over top of the same, up to the level of the top of the beams. After this part of the work had been done for over two months a boom of one of the derricks became loose during a heavy gale and, swinging around, knocked down a line of columns and girders in the course of erection on the fourth floor. One of the cast iron columns struck a girder and broke in two. A portion of this column, weighing 432 pounds, fell to the first floor, a distance of 32 feet, striking the Fawcett floor endways, directly between the floor beams and nearly in the center of the span, breaking a hole in the floor less than 3 inches in diameter. It is estimated that the column struck the floor a blow of 13,888 feet pounds, without further damage to the floor than the 3-inch hole referred to.

The Builders' Exchange

Directory and Official Announcements of the National Association of Builders.

Officers for 1896.

President,
Charles A Rupp of Buffalo.
First Vice-President,
H. J. Sullivan of Milwaukee.
Secretary,
William H. Sayward of Boston.
Treasurer,
George Tapper of Chicago.

Directors.

Noble H. Creager	Baltimore.
E. Noyes Whitcomb	Boston.
John Feist	Buffalo.
William Grace	Chicago.
Frank L. Weaver	Lowell.
Louis A. Clas	Milwaukee.
Stephen M. Wright	New York.
Stacy Reeves	Philadelphia.
Thomas B. Ross	Providence.
Justus Herbert Grant	Rochester.
Thomas J. Ward	St. Louis.
George J. Grant	St. Paul.
A. S. Reed	Wilmington.
George H. Cutting	Worcester.

To Unaffiliated Exchanges.

The secretaries or other officers of unaffiliated exchanges are urged to correspond with the secretary of the National Association of Builders in reference to the State associations of builders provided for at the last convention of the national body. Full information in reference to the purpose, functions and relationship to the National Association will be gladly supplied; and such assistance as may be possible from the secretary's office will be cheerfully given to exchanges seeking to establish a State association.

Constitutions for local and State associations, together with explanatory matter, are in print, and will be forwarded to any organization desiring them.

All associations of builders are urged to investigate the matter of more complete and uniform organization, to the end that general conditions prevailing in the building business may be improved and builders better protected against the many evils that now exist.

A Point of View.

An interesting example of the different ways in which various bodies of men look at the question of the expense necessary to the maintenance of organization occurred recently in one of the principal cities of the Middle West. The example consisted of the publication in a daily newspaper of two news items, one following the other, in relation to action upon the subject of annual dues by an organization of employers and an organization of workmen. The first item stated that at a regular meeting of a certain workmen's union, the annual dues had been increased, by a unanimous vote, from $5 to $25; the second stated that the Builders' Exchange of the same city had voted to reduce its annual dues from $25 to $20.

The comparative success of two such organizations as these is an easy thing to forecast. If the same spirit of personal interest in the welfare of the whole, shown by the union, actuated the members of the exchange, there is no doubt that it would be in a condition much nearer successful than it is at present. The continued operation, in conducting an exchange of the principle which cheapens the organization and all its work cannot result other than disastrously in the end. The argument that a reduction of dues will increase the membership is fallacious, and is especially dangerous to the welfare of the organization when the dues are low in the beginning. If a builders' exchange is not worth $25 per year to its members, it certainly is not worth $20; and such members as would join because of the membership being reduced $5 are a damage rather than a benefit to the organization. If a builder's conviction as to his duty to help his fellows establish and maintain honorable business practices, and to equip and support in a proper manner an organization to this end, is measured by the difference between $25 and $20 per year, he is indeed of little value to his brother builders in the effort for improvement.

If a builder measures the benefits to accrue from an exchange to the building fraternity of his city, and therefore to him also, by the same standard, refusing to join at $25, but becoming a member for $20, he is a detriment to the exchange and a hindrance to its progress.

If a builder estimates the usefulness of an exchange as an aid to the transaction of his business, as a means of devising better methods of conducting his business, as a safeguard against the evils which reduce the profits in his business—if he estimates these and other benefits at so narrow a margin in his favor, he shows that he fails to comprehend its nature and his duty to it and to his fellow builders. Such a member as this is of no benefit to an exchange, for the total of his appreciation of the value of an exchange, the obligation of every member to do his share, the business policy of honorable methods, the profit resulting from uniform practice and the numberless other matters within the province of an exchange, may be summed up as representing the difference between $25 and $20 per year.

Unless an exchange is conducted properly, with dignity and ability, it will have little or no standing in the community, and will therefore be a thing little desired by the men for whom it exists. If the dues are fixed upon a basis of what it is thought outside builders will pay to become members, and then the exchange compelled to live within the sum thus provided, the result is very plain. In such a case the members are conscious of restrictions and limitations in many directions; the whole atmosphere of the organization is petty and penurious; it is not a place of which the members can be proud, and in the end it dwindles into either a useless makeshift or its grave.

Annual Dues.

Annual dues have a purpose distinct from the mere provision for the actual needs of an exchange; they are significant in themselves of the caliber of the organization, and of the estimation in which it is held by both members and the public. Financial standing lends dignity to any institution, and no exchange can hold a dignified and influential position in the community without it. So long as the dues are considered as being simply the means of re-imbursing the treasury for the expense of maintenance, the question of cost will always be so prominently in the foreground as to obscure the true aspect in which dues should be viewed. Then, too, when dues are considered solely from this standpoint, there will always be continual dissension over the cost of maintenance, for there will always be found some to cry "Extravagance!" and to advocate a reduction of expenses.

The annual dues of a builders' exchange should be fixed at a liberal and dignified amount, and should be considered as much a part of the policy of the organization as anything else. They should, in a measure, represent the estimation in which membership is held, and it is needless to state that if the membership is cheaply held, the exchange will be held in the same light both by members and the public at large.

The amount, therefore, which the maintenance of an exchange costs is not the real question. The real question is whether or not an exchange is necessary and beneficial, and whether or not it would be worthy of support if that support involved no cost whatever. If an exchange is worthy of support the question of its maintenance becomes simply, How much, and not how little?

'Change Hour.

A large majority of the builders throughout the country fail to realize the practical value of an exchange as an aid to the transaction of business. The idea of organization seems to be limited; and the usefulness of an exchange is virtually unknown except as a piece of machinery for bringing a certain set of men together quarterly or even, perhaps, monthly An exchange, in a large number of cases, is looked upon by its members as an organization whose function is to enable them to present a united front to such menacing conditions as may from time to time arise. When emergency requires the members meet and consider what action shall be taken, and through the agency of the exchange a majority opinion can be obtained and unity of action made possible. As soon as an agreement is reached the practical usefulness of the exchange is forgotten until another emergency arises requiring united action In many instances the ordinary meetings of an exchange are poorly attended and are, as often as not adjourned for lack of a quorum. These conditions in an exchange appear to limit its usefulness, and a wider field, extending its operation into different channels, is looked upon as being visionary and impractical.

Builders nearly everywhere think that conditions in their city are worse or different from those in any other city, and are inclined to think that results which have been obtained elsewhere are impossible with them. Experience which proves beyond question the practical, day to day value of an exchange as a help to the transaction of business, seems to be of little value as an example of the inherent possibilities for benefits in such an organization. It is too often the fact that attempts to make an exchange useful every day fail, because the majority of the members make the attempt through persuasion rather than through conviction. A member who follows a certain course of action in an exchange because he has been persuaded is likely to be of small value in securing the desired end; for his action, not proceeding from conviction that the good of the whole, and therefore the good to himself, is likely to be half hearted and perfunctory.

Prompt Attendance.

It has been the experience of many exchanges that have tried to establish the custom among their members of transacting all the business of the day, at some fixed hour, in the exchange rooms, that few have appeared at the appointed hour with any regularity, and the majority have stayed away until they found out how the other members were attending. The few who remain faithful in their attempt to facilitate their own and the business affairs of their fellow members by appearing regularly at the exchange soon find themselves too small in number to secure efficiency, and are forced to go on in the old way again for lack of support. After such an experience as this the majority, who lent no aid whatever to the attempt, declare the plan to be utterly impractical and cite the failure in support of their statement.

Time for Business.

The custom of transacting all the business that builders have with each other, with dealers in building material, with architects and owners, in the rooms of an exchange between certain hours in the day is as beneficial as the same custom is to the stock broker, or perhaps more so. By establishing such a custom builders can transact in one hour all the business they may have with those with whom they have dealings and be entirely free to give their undivided personal attention to their various jobs. The convenience to dealers of building material of finding all the reputable contractors, in person or by representative in a certain place at a certain time every day is invaluable. Such a custom as this can only be established by a sufficient effort of a sufficient number and by persistence in visiting the exchange at the appointed hour, until it becomes generally recognized that the only place where a builder can with certainty be found is at the exchange during 'change hour. Exchange members should begin by regular attendance, and by making it known to those with whom they deal that business will be transacted at the exchange only. If, for example, a contractor would decline to give his order for materials except at the exchange, with due allowance for emergencies; and if he would award his sub-contracts at the exchange only; if he gave the exchange as his business address, results would very soon begin to appear, and all those with whom he dealt would be equally benefited with himself. The desirability of such a custom is self evident, and experience has proven its practicability.

The sentimental side of the custom also is very much undervalued, for the constant daily contact of builders and those with whom they have business dealings inevitably brings about a greater feeling of fraternity, and a quicker recognition of the value of working in harmony rather than antagonism.

In seeking to establish the custom of using an exchange as a piece of business machinery the fact must not be overlooked that time, and plenty of it, will be required; and that a half hearted effort that is made and abandoned in three or six months is worse than none at all, as it will be labor wasted. The custom is capable of being established in any city in the country, and once established will never be abandoned.

New Publications.

THE STEAM FITTERS' COMPUTATION AND PRICE BOOK. By M. E. Dean. Size, 5 x 8 inches, 244 pages. Published by M. E. Dean. Price, $2.50.

This book is bound in leather, and contains data for steam fitters arranged in tabular form. The first portion of the book is devoted to a series of tables giving the cubic contents of different sized rooms with different hights of ceiling. This is followed by a series of tables showing the radiation necessary at various rates per square foot of glass surface, wall surface or cubic feet. These tables occupy the first 70 pages of the book, after which tables are given showing the cost or selling price of radiators per square foot at prices ranging from 17 to 26 cents in various quantities. Another table carries the price from 27 to 50 cents per square foot. These are followed by the list price of pipe, fittings, brass work, gauges, traps and the various devices that are needed in a steam heating plant. These are arranged in alphabetical order, regardless of the quality, the book having been compiled, it is claimed, to making everything subservient to the convenience of the contractor. Blank spaces are left for marking in the discount or those list prices which are subject to frequent change. The suggestion is made that they should be written in with a hard lead pencil in preference to ink. After dealing with standard fittings and appliances in a comprehensive manner, list prices and cuts of radiators are shown in all of the various forms in general use, and several pages are left blank so that the prices may be written in of such goods as are not listed or are handled by the owner of the book. The last 50 pages are devoted to list prices and cuts of various steam and hot water boilers made by different manufacturers, both of the horizontal tubular character as well as of the upright and cast iron sectional boilers. A few pages are given up to some of the standard tables used by the heating contractor in laying out plants. The book possesses many qualifications for being a very valuable hand book for the heating contractor. It is accompanied by a circular bearing testimonials from several large manufacturers and heating contractors who have found the book to be of special service in their practice.

CONTENTS.

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NOVELTIES.

The Forest City Screw Driver and Drill Combination.

The accompanying cuts relate to a screw driver and drill combination, offered by the Forest City Screw Driver & Drill Company, 468-470 Fore street, Portland, Maine, for whom John H. Graham & Co., 113 Chambers street, New York, are agents. The tool, as shown in Fig. 1, has a double spiral thread cut on the spindle and is provided with a loose sleeve between the lower end of the spindle and the screw driver bit. It also has two shippers in the cylinder immediately above the spindle, the other one being directly opposite the one shown in the cut. The shippers work in connection with the spirals in such a manner as to permit of the following results being obtained at will, by pushing the shippers backward or forward: A driver to push a screw in; a driver to push a screw out; a driver which will make an automatic drill; a driver that will make a continuous drill; a driver that will ratchet a screw in and out; a driver that is a ratchet wherever the operator may catch the spindle, and a driver that is stationary at long and short range. In operation the loose sleeve is held between the thumb and fingers of the left hand, while the handle is grasped in the right hand. In Fig. 2 the form of the shank of the bits used with the combination tool is shown. A spring catch holds the bit in place, to remove which the thumb is slipped easily down over the spring, pulling on the bit at the same time, thus disengaging it from the tool.

Novelties.—The Forest City Screw Driver and Drill Combination.—Fig. 1.—General View of the Tool.

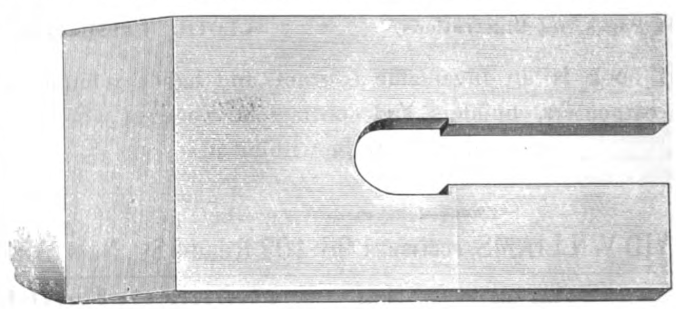
Fig. 2.—The Form of Shank Used with Combination Tool.

Architectural Sheet Metal Work.

The standard of elegance in trade literature appears ever to advance, the latest expression in this line of literature that has come to hand being a most sumptuous and artistic production which cannot fail to be appreciated by the trade. It is a flexible bound catalogue, 15 x 10 inches, containing 171 pages and devoted to art architectural metal work and issued in the interest of the well-known firm in this line, W. H. Mullins, Salem, Ohio. The extending trade of Mr. Mullins has been characterized by two distinct advances. In one way it has extended geographically, and the record of this catalogue shows art work distributed in nearby and far distant parts of the continent. The more notable advance, however, has been in the artistic quality of the work, until the latest productions deserve the highest praise. It is difficult to review any publication of this sort, for the ground it covers is so extensive, and it would seem invidious to select one part of the work for special distinction when all are worthy of notice. Speaking generally of the contents of the book, an excellent plan followed has been the interspersing of general views of the work erected on buildings, in public squares, &c., together with interior views of Mr. Mullins' shop, showing the work in process of execution, with the standard engravings of particular articles. The catalogue opens with a picture of the 52 pieces of statuary made for the Cotton States & International Exposition Company of Atlanta, Ga. Then comes the interior of the shop, after which is the far famed statue of Hermann, standing 32 feet in hight and made for a monument at New Ulm, Minn. Other monuments are the statue of Dr. Chenier, erected at Montreal; the soldiers', at Warrensburg, Mo.; likewise the one on Guilford battle ground, Greensboro, N. C. Next is the engraving of the tower of Madison Square Garden in New York City, surmounted by the wonderfully graceful statue of Diana modeled by Mr. St. Gaudens. The engravings that follow represent ecclesiastical and allegorical figures, the Muses, military and industrial types, &c. There are also shown brackets and modillions, weather vanes, crestings and finials, stamped zinc rock faced siding and quoins, ceiling center pieces, garlands, festoons and ridgings, scrolls, heads and faces, friezes, enrichments, panels, metallic tile roofing, various styles of tympanum panels, capitals and corbels, rosettes and cheap styles of enrichments. A table of contents and a general index with telegraphic cipher follow. The engravings, it is hardly necessary to specify, are fine examples of half-tone work, and the printing on heavy coated paper is excellently done. Mr. Mullins states that since the 1891 catalogue was issued he has more than doubled the capacity of the works, and incidentally refers to drops sufficiently large to stamp metal 72 inches in width.

The Mathias Patent Safety Bit and Bolt.

John Mathias of 2123 West Third street, Dayton, Ohio, is offering the trade a patent safety bit and bolt, as shown in the accompanying illustrations. In Fig. 3 is represented the bit, and in Fig. 4 the bolt. The device is of simple construction, the arrangement being such that if the nut is worn and should slip over the bolt, or if the nut should break, the bit cannot fly off. Some of the reasons advanced why the safety bit and bolt should be used are that it results in a large saving of expense; the mandrel-shaft is not sprung every time a bit becomes loose; the work is not delayed as is usually the case when one bit is broken and a new pair must be made; the bed of the wood worker or the hand facer is not damaged by bits flying off and breaking pieces out of it, and the bolt can be used with any ordinary slotted bit without the least trouble. The manufacturer states that these bits and bolts cost no more than ordinary ones, and that many dollars per year are saved on breakage for each molding machine used in the factory. The device is in use in many wood working establishments through the West, and is giving gratifying results.



Mathias Patent Safety Bit and Bolt.—Fig. 3.—General View of the Bit.

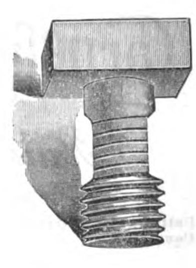
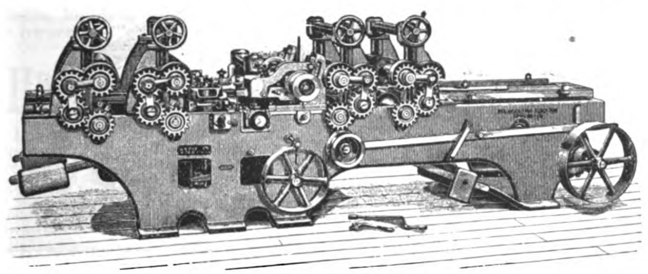


Fig. 4.—View of the Bolt.

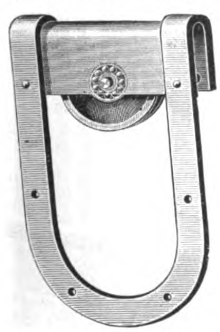
Eight-Roll Double Cylinder Lightning Flooring Machine.

The new lightning flooring machine which has just been added to their already wide and varied assortment of wood working machinery by J. A. Fay & Co. of 513-533 West Front street, Cincinnati, Ohio, is shown in Fig. 5 of the engravings. One of the important features of the machine is its massive proportions, distributed even to the smallest working parts and giving to them "a capacity for crowding the work hitherto unprovided for in a flooring machine." The frames have accurate, planed surfaces, securely jointed and bolted. All journals, shafts, gears, screws and bolts are made to standard sizes. The cylinders are constructed from solid steel forgings, and have six sides for carrying 2, 4, or 6 knives, as may be required. Each side has a chip breaking lip for working cross grained lumber. Both cylinders are driven with two belts, each pulley having a taper bearing and secured by a wrought nut. The lower cylinder is placed immediately beyond the upper one, thus bringing the material to an exact size before it is tongued and grooved and bringing both top and bottom cuts as close together as possible when using bits on the cylinders for making two pieces of flooring from one board. Another feature of the machine is a self acting pressure bar located before the cut of the upper cylinder on the feed-in side, which is attached to arms that swing eccentric to the periphery of the cylinder. The



Novelties.—Fig. 5.—Eight-Roll Double Cylinder Lightning Flooring Machine.

bar after the cut of the upper cylinder adjusts itself vertically and is self acting in its operation. Both bars are adjustable to and from the cylinder to give room for different lengths of cutters required in making moldings, drop sidings, &c. The matching works are of a substantial character, the cutter spindles being $1\frac{3}{4}$ inches in diameter where the cutting heads are applied. The construction is such that the wear of the cutters can be equalized, and there is a vertical adjustment in the lower bearing to take up any wear in the spindles, a lock attachment being provided for holding them in position when once set. The company's improved automatic weighted chip breaker is applied to the machine, being hinged to the matcher hanger, and as the pressure is reduced by a weight, it is uniform at all times whether the cut is heavy or light. The feed works consist of eight rolls 8 inches in diameter, two pairs before the cut of the upper cylinder and two pairs after the



F g. 6.—Lane's Special Steel Door Hanger No. 50.

cut of the lower cylinder. The feed is controlled by a binder operated on the feeding end of the machine. The latter is made to work either 8 inches, 14 inches, or 18 inches in width up to 16 inches thick. The tight and loose pulleys are 12 x 8 inches and should make 900 revolutions per minute.

GEORGE F. GLASKIN & Co., Atlanta, Ga., have secured the contract for the heating apparatus to be put in the Court House at Columbus, Ga.

Lane's Special Steel Door Hanger No. 50.

Lane Brothers of Poughkeepsie, N. Y., are introducing the steel door hanger shown in Fig. 6 of the accompanying cuts. The frame is of steel, quite similar, it is remarked, to the original Lane steel hanger. It has a complete cover, the two sides of which are bolted together with a sleeve between to strengthen this part of the hanger. Inside the wheel and around the sleeve are steel rollers as shown in the cut It is explained that with this construction there is rolling friction only and that it is anti-friction any distance.

Eureka Screw Driver No. 4.

The Eureka screw driver No. 4, which is being offered by the Decatur Coffin Company, Decatur, Ill., is shown in Fig. 7 of the cuts. The No. 4 becomes locked when closed, as do the other Eureka screw drivers made by the company, and may be used as an ordinary screw driver in driving or drawing a screw. It has two different sized bits with each driver, and has an adjustable screw chuck, so that drill bits may be used, which, it is

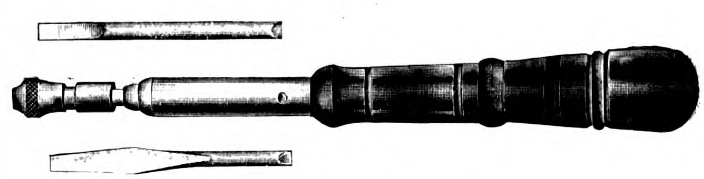


Fig. 7.—The Eureka Screw Driver No. 4.

remarked, is often necessary when working in hard wood.

New Expansion Bolts.

The Steward & Romaine Mfg. Company, 123 North Sixth street, Philadelphia, Pa., are introducing the new styles of expansion bolts shown in the accompanying illustrations. Figs. 8 and 9 represent bolts especially adapted to the requirements of plumbers in lavatory work, such as closet, basin, marble or slate work fastenings, and of builders in hinge fastenings, artistic brass work and marble fastenings where the ordinary slotted head bolt is deemed out of place. Figs. 10 and 11 show bolts for use in a variety of fastenings, such as plumbers' work, fastening soap racks and toilet paper receptacles to marble or tile wainscotings, masons' and builders' work, sign and notice board fastenings, and for many purposes in connection with the fitting up of hotels and public and private buildings and residences where a superior finish is required. The bolts are of brass, plain or nickel plated heads, and are made in sizes from No 9 to $\frac{5}{8}$ inch diameter.

The American Trackless Sliding Door Hanger.

The Van Wagoner & Williams Hardware Company of Cleveland, Ohio, and 14 Warren street, New York, have made some improvements in their

Fig. 8.—Expansion Bolt, Movable Head, Single Case.

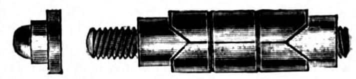


Fig. 9.—Expansion Bolt, Movable Head, Double Case.

Fig. 10.—Round Head Expansion Bolt, Double Case.

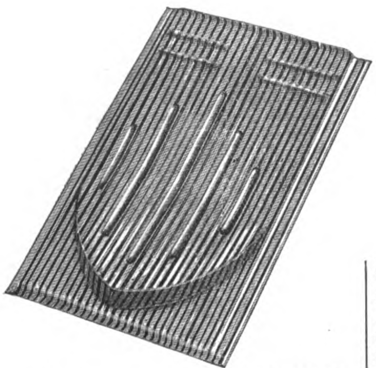
Fig. 11.—Countersunk Head Expansion Bolt, Single Case.

Some New Expansion Bolts.

American trackless door hanger, which was illustrated in the issue for December, 1894. As improved, the hanger is secured in a frame which is attached to the studding. The frame is held secure by bolts passing through the top and bottom of the frame, as well as through the studding, in addition to the screws in the corners. The hanger is held in place by two set screws, which pass through the studding next to the door, and also serve to plumb the door. By detaching the ends of the hanger from the door and pushing up the gravity stop in the head jamb the door may be taken out. The set screws in the frame are then unscrewed, which allows the hanger to be taken out of the frame in the pocket or be put in with great ease without interfering with the plastering It can also be adjusted by the set screws from the inside of the pocket to overcome the sagging of extra heavy doors, the warping of the studding which holds the hanger, or irregularities from the settling of the door, all without detaching the hanger from the door. The door can be raised by means of a set screw located in the hanger where it attaches near the top of the door. These new features are intended to overcome difficulties which might arise after the hanger is placed in the pocket, and which might otherwise require the removal of the plastering ; and to allow, in case of breakage, of new parts being easily substituted. Among the points of excellence claimed for the hanger are the following: That it is trackless, noiseless and wheelless; that it leaves no openings overhead; that it is quickly put up; that it moves with a touch, and that it never gets out of order.

Merchant's Gothic Shingle.

A new shingle which Merchant & Co., Incorporated, of Philadelphia, Pa., are putting on the market is shown in Fig. 12. This shingle, called the Gothic, is designed expressly to meet the demand for an ornamental shingle for use in places where an ordinary plain flat shingle presents a monotonous appearance. The crimping of the shingle not only imparts an ornamentation of a pleasing character, but also adds to its strength and



Novelt'es—Fig 12.—Merchant's Gothic Shingle.

rigidity. The shingle has the storm proof lock common to other shingles manufactured by the concern, and is made of copper and tin, in the various grades of roofing plates, and also of galvanized steel, in two sizes, 10 x 14 inches and 14 x 20 inches.

Safety Rafter Support.

The accompanying cut shows a new rafter support which the Safety Rafter Company, P. O. Box 294, Lancaster, Pa., are putting on the market. The device will no doubt be appreciated by builders for securing rafters of piazzas, verandas, balconies, porches, or other structures required to be built against a brick, stone, or frame building, inasmuch as its use precludes the possibility of a roof separating from the wall of the main structure. Fig. 13 shows the device to consist of a wall anchor, with a bearing butting against the face, on which is formed a bracket, with a trunnion projecting on either side of the rafter. A slot is cut in the rafter to fit the bracket of the anchor, and a trunnion plate with socket to receive the trunnion is screwed on each side of the rafter, thus forming a solid and permanent support. The engraving represents a rafter in position against a brick wall, with the iron bracket and its projecting trunnions in place, ready to be bound into the wall. One of the trunnion plates is seen ready to cap the trunnion and to be screwed in position where the screw holes are marked. It will be noticed that the application of the device is very simple, and makes a handsome appearance where an open underfinish to a roof is desired. For fastening a rafter of the class shown to a frame structure a style of anchor is supplied fashioned on the principle of a serrated spike, which holds the rafter in a substantial manner. The device is made of malleable iron, and is described as being strong, simple and inexpensive and as being cheaper in application than the ordinary method of fastening.

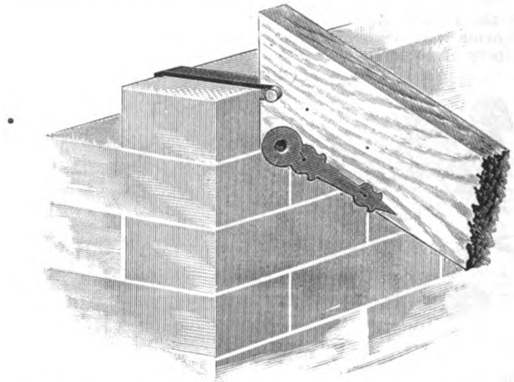


Fig. 13.—Safety Support for Rafter, the latter being shown in Position for Fastening.

The Bolles Revolving Sash.

An improved form of window sash which is being introduced to the trade by the Revolving Sash Company, with office in the American Tract Society Building, Nassau and Spruce streets, New York City, is illustrated in Fig. 14 of the engravings. The construction of the sash is such that either or both sides of the glass may be readily cleaned by a person standing within the room, thus removing a prolific source of danger to the cleaner of windows. The sash may be turned to a slanting or horizontal position for the purpose of ventilation, or it may be moved up and down in the ordinary way. The important feature of novelty is in connection with the stile of the sash, which is made of two pieces pivoted at the center, the outer strip having fastened to it the chain or cord by which the window is raised or lowered. This part of the sash is convex on its inner surface, and fits into a corresponding groove in the other half of the stile. The two portions are secured together by a pivot, at the outer end of which is a coiled or flat spring which serves to hold the parts tightly together in whatever position the window may be placed. When it is desired to turn the window to a slanting or horizontal position, similar to that shown in the engraving, for example, it is only necessary to slightly raise the sash and push outward on the bottom rail. Near the ends of the strip to which the sash cord is attached are springs, which pressing against the window jamb tend to prevent the window from rattling when the sash is in a vertical position and holds each end tight. The upper window is similarly arranged, and with the lower can be turned so as to give the full opening of the frame when ventilation if desired. The engraving which we present so clearly illustrates the various features of ar

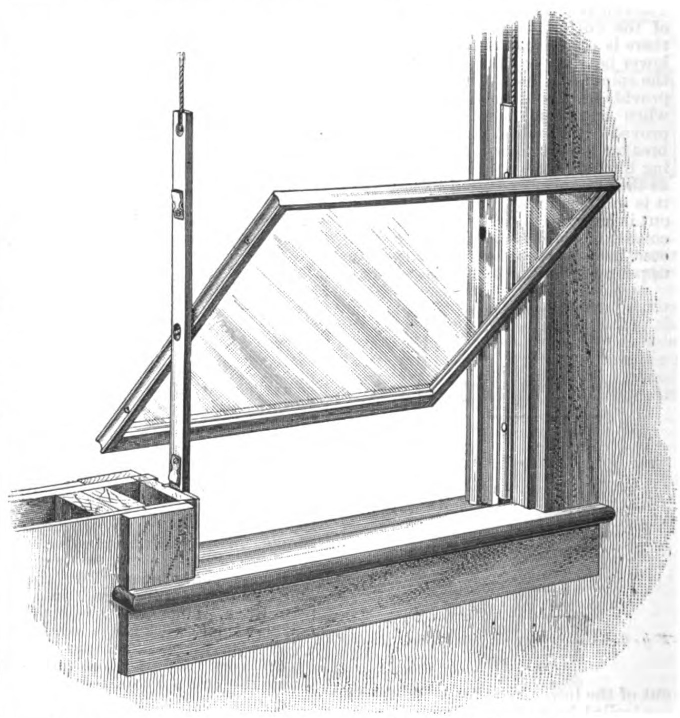


Fig. 14.—The Bolles Revolving Sash.—View Showing Construction Employed.

rangement and construction that further description would seem to be unnecessary. The manufacturers refer to this revolving or reversible sash as being "entirely practical, absolutely simple and thoroughly reliable." It is said to cost but a trifle more than the old style sash, and that the idea can be applied to old as well as new windows. It is claimed to do away with the necessity of weather strips, and as its construction is such as to enable the sash to be revolved, either way thus permiting of easy cleaning of the glass from within the room and at the same time giving more or less ventilation as circumstances may require, it is of more than ordinary interest to architects, builders, contractors and house owners.

TRADE NOTES.

A. L. ADAMS, Bridgeport, Conn., manufacturer of the art auger bit, advises us that having had calls for large rosette bits, 2, 2¼, 3, 3¼ and 4 inch, he will soon add bits to his list that will make rosettes from 2 to 4 inches in diameter. Mr. Adams has made bits as small as ⅜ inch and as large as 4 inches to order.

THE EXPANDED METAL FIRE PROOFING CONSTRUCTION COMPANY, W. P. Tostevin, manager, and the Central Expanded Metal Company, Merrill Watson, manager, have moved their office to 256 Broadway, room 1202, Home Insurance Building, New York, where they will be pleased to receive calls from the trade.

MERCHANT & CO., INCORPORATED, Philadelphia, have just issued, under the title "Overhead," an exceedingly handsome booklet descriptive of their Spanish Tiles, Star ventilators and tin roofing plates. The booklet is composed of 20 9 x 5 pages of artists' heavy water-color paper, containing eight beautiful reproductions of drawings of buildings covered with Spanish tiles, a view of New York harbor, showing Ellis Island buildings covered with Merchant's roofing plates, and a combination view of some of their prominent manufacturing departments, all in water colors. The pages opposite those containing the drawings are occupied by tinted illustrations of buildings covered with Spanish tiles, of the tiles themselves, in both plain and graduated styles, and of Star ventilators. The text is bright and pointed, and refers in concise terms to the advantage possessed by the goods shown, while it is left to the drawings to admirably portray the congruity of art and shelter. The booklet is bound by a silken cord within covers representing a coarse duck fabric, on which are reproduced artists' wash drawings representative of old time roofs. The booklet will no doubt be appreciated by architects, roofers and builders, and on account of its artistic character is well worthy of preservation.

THE Folsom Snow Guard Company of 178 Devonshire street, Boston, Mass., send us a circular calling attention to the snow guard which they are offering for the protection of roofs from snow slides. The device is referred to as the "ideal and perfect snow guard," and as being constructed upon scientific principles. The snow is held so that it cannot move and it does not crowd into the gutters and form ice, consequently the water does not overflow to injure the paint or wet the interior of the building. The circular which they are distributing carries a representation of a railroad station in the winter time, the snow covered roof being protected by the Folsom snow guards.

EDWIN A. JACKSON, senior member of the well-known grate manufacturing firm of Edwin A. Jackson & Brother, 50 Beekman street, New York City, died on Monday, February 24, at his home in New York City. He was born in Philadelphia, October 15, 1834, and early in life came to New York, where in 1864 he identified himself with the firm of W. H. Jackson & Co., grate and fender manufacturers, his business being that of orginator of designs for these goods. His name is more particularly connected, however, with his invention of the Jackson ventilating grates, well known to the building trades of the country. In 1880 Mr. Jackson, with his brother William M., formed the present firm, which is favorably known the world over. On some of its designs in grates the concern won the highest award at the World's Fair at Chicago.

THE Burlington Venetian Blind Company of Burlington, Vt., favor us with a copy of a new catalogue which they have issued illustrative of the Burlington patent inside sliding blinds, patent improved Venetian blinds, window screens and screen doors. In offering this catalogue to the trade, the company call attention to their facilities for manufacturing, and to the satisfaction which their goods have given, as evidenced by numerous testimonial letters presented. Scattered through the pages of the book are engravings of buildings in connection with which the company's products have been employed. These cover an interesting variety, embracing hotels, apartment houses, school houses, hospitals, office buildings, &c. The advantages claimed for the company's sliding blinds are set forth, as well as the method of applying them. The arrangement of the matter is such as to interest architects, builders and contractors in the building line, while a comprehensive index facilitates reference.

THE National Lead Company, Room 242, Broadway, New York City, favor us with a package of a dozen cards, 3½ x 5¾ inches in size, one side of each of which carries suggestions for house painting with the company's brands of pure white lead and tinting colors. The houses shown are of varied design, the colors being such as produce pleasing effects. In the lower left hand corner of each card is an indication of the colors which are used in connection with the design shown. Upon the back of each card is matter relating to painting and to the advantages resulting from the use of the company's paints. The cards are very tastefully printed and constitute an interesting collection of house designs. We understand that a set of these cards will be sent to any architect or builder who may apply.

DURING the last few years so many changes have taken place in the construction of buildings that scarcely any part of a structure erected at the present day is made of the same kind of material as would have been employed some years ago. It is probable that no greater departure has been made than in roofing materials. Formerly all pitched roofs were covered with slate or wood shingles, but at the present time these materials divide the honors with metallic shingles, which are rapidly becoming popular with architects, builders, contractors and owners. Prominent among the metallic shingles now on the market is the Eastlake, which is made in clusters of nine shingles each, thus reducing the cost of manufacturing and laying, as well as reducing to a minimum the possibility of leakage. The process of manufacturing has reached such a stage of perfection that one stroke of the machine stamps the imprint of nine shingles on a piece of metal measuring 20 x 28 inches, while another stroke makes the locks. The Eastlake is manufactured of tin, steel or galvanized steel, to suit the purchaser, by W. J. Burton & Co. of Detroit, Mich.

THE KELSEY FURNACE COMPANY of Syracuse, N. Y., call the attention of architects, builders and contractors to the line of hot air furnaces which they manufacture. The device is known as the Kelsey warm air generator and embodies features which have called forth the admiration of those who have practically demonstrated its merits. In their advertising card this month they give a testimonial letter from an architect, who refers to the heater in very flattering terms.

THE ACADEMY OF ARCHITECTURE AND BUILDING of St. Louis, Mo., by means of a circular which they have issued, direct the attention of young men interested in obtaining a trade education to the fact that they give lessons by mail at reasonable rates. The circular sets forth the advantages of home instruction by mail and accompanies the particulars with opinions of well known educators.

THE MARTIN SCHNEBLE'S SONS COMPANY, with office and works at 437 East First street, Dayton, Ohio, favor us with a copy of a neat little catalogue which they have issued calling attention to the Pickering motor pump. The device is intended principally for pumping water to a tank in the attic for the use of the bath and laundry or any other purpose for which it may be desired. The motor pump consists of two parts and may be used for pumping in all places where there is a hydraulic pressure of over 10 pounds. The pump is usually placed above the kitchen sink on the drip pan and brackets which are provided with their motor. The little pamphlet describes the device, while a table shows the sizes made and the price at which they can be had. The company call attention to the Pickering water motors in their advertisement presented in another part of this issue and state that a copy of the catalogue mentioned will be mailed to any one on application.

BOMMER BROTHERS, Brooklyn, N. Y., have issued a price-list, dated March 1, which contains prices of Bommer spring hinges in various finishes including silver plated on bronze and on steel, old copper, dull brass, nickel plated, rustless dead black, &c. They direct special attention to unpolished Steel Hinges in the different finishes as of importance to dealers figuring on contracts where close estimates are exacted. These goods are referred to as being attractive in appearance, somewhat resembling sand blast finish, and they can be sold, it is remarked, at about half the price of the same identical goods fully polished. They are not, however, introduced as a substitute for the fine polished goods, which are still made in all the finishes.

THE REVOLVING SASH COMPANY of the American Tract Society Building, New York City, refer in their advertising space this month to the revolving or reversible sash which they are introducing to the trade. They speak of the device as having no hinge, catch or lock to cause trouble, and that the window may be reversed or placed in any position desired for the purpose of cleaning the glasses or ventilating the room.

THE WILCOX MFG. COMPANY of Stone avenue, Aurora, Ill., are making a very large and complete line of house and barn door hangers adapted to meet varying requirements. Among the goods may be noted the Wilcox trolley steel ball bearing hanger, the application of which is shown in the illustration which they present in another part of this issue. Some of the other devices are the Richards steel single track hanger, the Cycle ball bearing hanger, the New Era roller hanger, the Bike steel barn door hanger, the Aurora steel barn door hanger and the O. K. steel barn door hanger. The company also offer a line of door holders known under the name Wilcox. The catalogue which they have issued contains full particulars of these goods and a copy of the publication will, we understand, be sent to any one on application.

THOSE of our readers who have need of an engine of small horse-power are likely to be interested in the announcement made in their advertising space this month by Proctor & Percy of 200 Summer street, Boston, Mass. This firm call attention to the Shipman oil engine, which is made in various sizes covering 1, 2, 4, 6 and 8 horse-power. It is stated that steam can be generated in 12 minutes from cold water, and that the engine requires no attention after it has once been started. A catalogue which fully describes the Shipman engine will be sent to any one who may apply to the address given.

THE CANTON STEEL ROOFING COMPANY of Canton, Ohio, favor us with a copy of their twentieth annual catalogue, which supersedes all others. The volume is made up of 128 pages of letterpress, neatly printed, profusely illustrated and arranged in a way to interest architects, builders and contractors generally. The engravings are such as to show the goods to advantage, while the binding is in colored paper covers of attractive design. In offering the catalogue to the trade the company state that they begin their twentieth year with greatly increased facilities for furnishing a complete line of sheet metal goods of all kinds, including many new and improved styles, all of the best quality, design and workmanship. Attention is given to a great variety of styles of ornamental steel ceilings, roofing, siding, finials, crestings, conductor pipe, skylights, ventilators, eave trough and hangers, pediments, window caps, speaking tubes, ornamental conductor heads and bands, rolling steel shutters, doors, blinds and partitions, fire doors, building fronts, corner finish, pilasters, ridge roll and capping, corrugated iron, roof lining, metal shingles, Smith patent roofing, &c. A telegraphic cipher code and a general index are features of the closing pages of the catalogue. The company have equipped themselves in a thorough manner for the manufacture of fancy stamped steel ceilings and are now prepared to do work of this kind in all its branches.

WORTHLEY'S ODORLESS STALL FLOORS with hinged or slatted plank are the basis of an announcement in another part of this issue by the Broad Gauge Iron Stall Works of 53 Elm street, Boston, Mass. The construction of these floors is illustrated and described in a catalogue which the manufacturers have issued and a copy of which will be sent to any interested applicant. The company also refer to their "slow feed" oat manger, for which many claims are made.

THE L. M. JONES COMPANY of West Winsted, Conn., send us a copy of a price-list and illustrated catalogue which they have issued to the trade. Attention is given to wood turnings of various kinds in foreign and domestic woods, covering such articles as wooden faucets, handles, base knobs, &c. The company make a specialty of wood work to order for manufacturers, such as lignumvitæ, apple wood and maple wood caster rolls, brace heads and handles, buggy spindles, cork screw handles, knife handles, twist work, &c. They also carry in stock lignumvitæ, cocobola, mahogany and other foreign woods, as well as a full assortment of well seasoned domestic lumber.

WM. H. JACOBUS, 90 Chambers street, New York, representing the Samson Cordage Works, Boston, Mass., directs attention to the Samson spot sash cord, which is so made as an aid to architects, builders and others who specify for certain grades in contracts. The colors are blue, pink and yellow, interwoven in the best brand of Samson sash cord only, and protected by a trade-mark, so that those inexpert in this class of goods may know that the proper material has been used. Mr. Jacobus has recently taken the agency for Eastern territory of the Cincinnati Tool Company, Cincinnati, Ohio, who manufacture a variety of small tools, among which are twist drills, cabinet clamps, spokeshaves, adjustable hollow augers, belt punches, clamps for various uses and other goods of this character.

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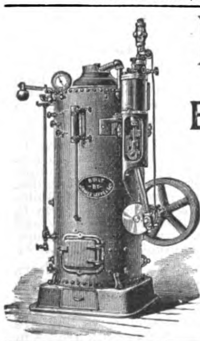

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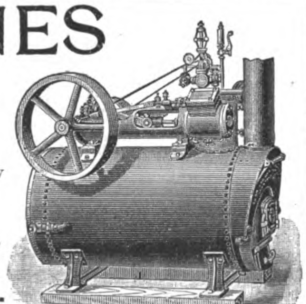

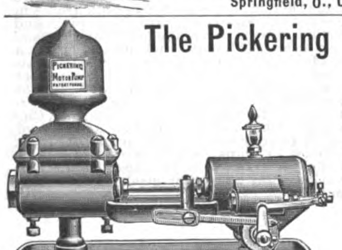

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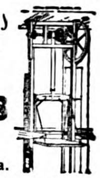

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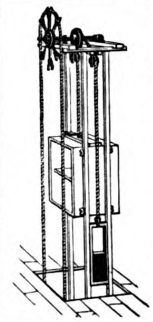

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Willie (to lady): "You needn't be afraid, ma'am. Your boy will keep out of my way after this."—*Harper's Bazar*.

— DOCTOR: "Now, Tommie, will you promise me to take your medicine like a man?" "No, sir; when a man takes medicine he makes a bad face and swears."—*Yonkers Statesman.*

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DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
96-102 READE STREET, NEW YORK.
MAY, 1896

Apprenticeship for Trade School Graduates.

The editorial which appeared in our last issue relative to the bill before the New York State Legislature, in which an apprenticeship of four years is sought to be imposed upon all candidates for work in the masonry and bricklaying trades in this city, has brought out a very interesting communication from President R. Fulton Cutting of the New York Trade School. In it he clearly shows that the proposed legislation, so far as it concerns the apprenticeship provision, is a reactionary measure, antagonistic to the best interests of good tradesmanship and unwarranted by the conditions of modern trade life. It would be, moreover, a manifest injustice to those intelligent and industrious young mechanics who have fully qualified themselves by a course of study and a subsequent period of practical work to undergo any reasonable examination in their trade, to keep them waiting four years before they are allowed to earn the full wages which their qualifications merit. It is gratifying, however, to know that there is some prospect of Assemblyman Leonard's bill being amended so as to modify the apprenticeship provision in the case of trade school graduates. It would be better, however, to strike out altogether the compulsory apprenticeship term, for in all fairness no such restriction should be imposed on any young tradesman who after a year or two of service in the trade can satisfy an honest and competent board of examiners of the sufficiency of his theoretical and practical knowledge and of his ability to perform the work of a journeyman. The desirability, and even the necessity, of an examination in all trades is freely admitted by the trade school authorities. In fact, they encourage the idea to such an extent that they offer, free of cost, to place the buildings and appliances of the New York Trade School at the disposal of any officially appointed examining committee.

Rise in Wages in the United States.

United States Commissioner Carroll D. Wright, in a recent signed editorial in the Bulletin of the Department of Labor, makes some very interesting comparisons, which show how steadily the remuneration for labor has increased in the United States in the past 40 years. Mr. Wright's primary purpose in inditing the article in question was to refute an erroneous statement which has obtained considerable currency, ostensibly based upon the figures of the census of 1890, that the employer of labor gets an excessive share of the fruits of labor. In controverting this statement Mr. Wright brings out the fact that the average wages paid to the employees in the manufacturing and mechanical industries of the country have shown a progressive increase from an average of $247.38 in 1850 to $288.94 in 1860, to $302.08 in 1870, to $346.91 in 1880, and to $444.83 in 1890, the last decade showing a really remarkable advance. Taking the eleventh census, that for 1890, it is found that the value of the gross product *per capita* for the number of employees engaged in manufacturing and mechanical industries was $2204, and the average annual wages per employee was, as above stated, $444.83. In other words, of the total product *per capita* in 1890, 20.18 per cent. went to labor, whereas in the census report for 1880, of an average product per employee of $1965, only $347, or 17.7 per cent. of the gross value of the *per capita* product, went to the laborer. This shows that labor is better paid than it was in 1880 and that its product brings more money, while lower prices were in most cases the rule at the later date. This indicates that the workingman to-day not only gets more money for his labor, but also gets more of the fruit of his labor and that of others for his money.

The Hudson Office Building.

One of the latest contemplated additions to the rapidly growing colony of towering office buildings in the lower portion of New York City is the structure which will be known as the Hudson Building, having a frontage of 53 feet on Broadway and extending through to New street, a distance of about 200 feet. It will be 18 stories in hight, including cellar and basement, and about 230 feet above the curb line. There will be a light court, 15 x 100 feet, and as this will leave a very narrow portion lengthwise of the court, special attention has been given to the matter of wind bracing, this being effected by means of heavy gusset pintle plates and brackets. The building will be of steel frame construction combined with brick, Indiana limestone, granite and terra cotta. The foundations will go to solid rock 55 feet below the curb line, and in sinking them pneumatic caissons will be employed. Steam heating and electric lighting plants will constitute features of the equipment, and the ventilating system will involve the use of electric power. The plans of the building have been prepared by Clinton & Russell, who estimate the cost at about $300,000. It is hoped that by May 1 of next year the structure will be ready for occupancy.

Other Office Buildings.

Other notable office buildings for which plans have lately been filed with the Bureau of Buildings of the City of New York include a 25-story structure which will be built on Park row opposite the Post Office, to cost in the neighborhood of $600,000; an 18-story bank and office building, 104 x 108 feet in area, at the corner of Nassau and Cedar streets, to cost in the neighborhood of $850,000, the architect being J. B. Baker; a 12-story business building at 585-587 Broadway, to cover an area 50 x 200 feet, and costing about $450,000, the architects being Cleverdon & Putzel, and a 20-story building at the corner of Broadway and Rector street, the lot having a frontage of 78 feet on Broadway, 223 feet on Rector street and 50 feet on Trinity place. The architects are Kimball & Thompson, who planned the sky scraping structure of the Manhattan Life Insurance Company, just across the street. An interesting feature in connection with this new building is that the foundations will be sunk by means of caissons before the old building now occupying the site is demolished, as many of the present tenants hold leases for offices which do not expire until May of next year. It is expected to have the new building ready for occupancy by the summer of 1898. The New York Life Insurance Company propose to tear down their old building fronting on Broadway, and erect on the present site a 12-story structure, which will cost in the neighborhood of $1,000,000. The architects are McKim, Mead & White. The Queen Insurance Company contemplate erecting a 15-story structure on a plot 45 x 70 feet, at William and Cedar streets; the Metropolitan Telegraph & Telephone Company are erecting one of 12 stories on Dey street, and it is intimated that a 20-story building, to include offices, stores, bachelor apartments and club rooms, will be put up on Forty-second street. A

16-story fire proof office and bank building, from plans prepared by Berg & Clark, will be erected on a plot 25 x 75 feet at the corner of Wall and Nassau streets, the basement, first and second floors to be occupied by the Manhattan Trust Company, who have taken a 20-years' lease, and the Central National Bank will put up a 15-story building on a plot, 75 x 100 feet in size, at the corner of Broadway and Pearl street.

Old Swedes Church.

One of the supplemental plates presented with this issue represents two views of what is known as the Old Swedes Church, erected in Wilmington, Del., in the year 1698, the corner stone being laid on May 28. The plans of the church were prepared by the Rev. Eric Bjork, who was also its pastor. The original structure was a plain rectangular building without porch, tower, or belfry. All these have been added since, and the interior has also been changed. The original floors of brick have been replaced by wood, and a gallery, which now contains some of the original pews, has been added. An effort is being made to have the interior of the church completely restored. The dedicatory services were held on July 4, 1699, which was an auspicious day for the congregation.

Demolition of a Huge Mill Chimney.

In the recent demolition of a huge mill chimney in Manchester, England, a method was employed which to many of our readers may possess features of interest. The chimney was octagonal in shape, each side being 11 feet 4 inches wide, while the hight was 270 feet, with a taper of 5/8 inch to the yard. About 100,000 brick were used in the foundations, which were nearly 25 feet deep, while more than 1,000,000 brick were used in the superstructure. There was an inside brick lining 1 foot 6 inches thick, faced with 4½-inch fire brick, and a cavity of 2 feet; but the inner and outer walls were tied together by eight midfeathers, 14 inches thick, and the outside shell or case was 4 feet 2 inches thick at the bottom and 14 inches at the top, the diameter of the flue at the base being about 13 feet. The estimated weight of the column was 4000 tons. There was a lean or cant of over 2 feet in a northerly direction, and although it was not alleged that the structure was unsafe, still there were perpendicular cracks up each corner, thus making the preparation for the "dropping" of the stack a most hazardous undertaking.

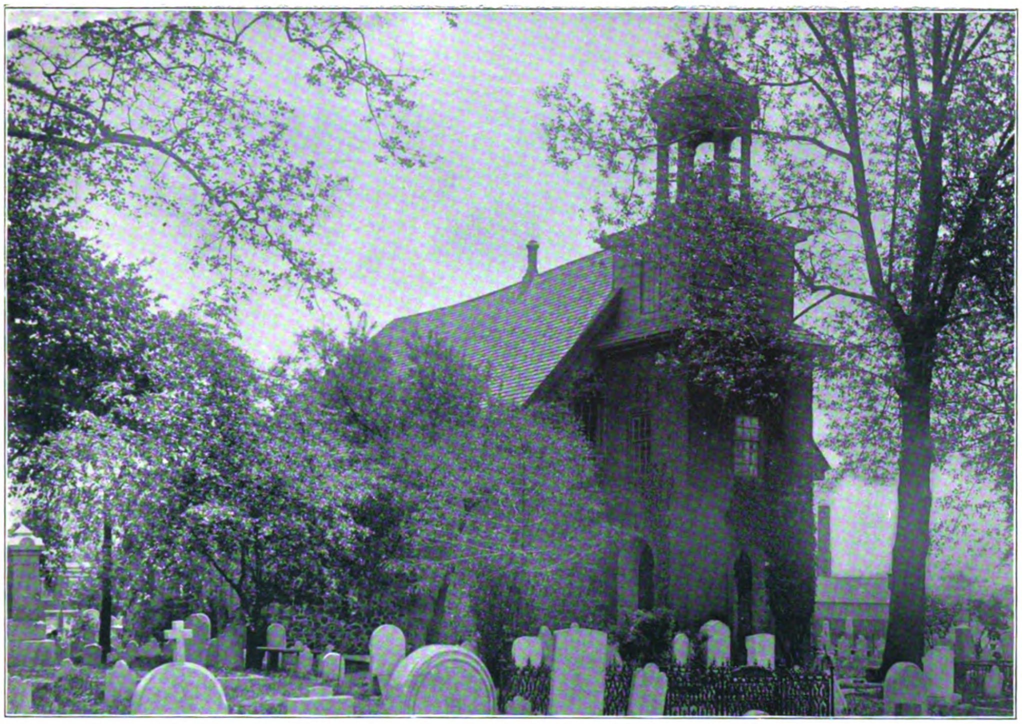
The man undertaking the work of demolition caused to be cut away a portion of the base on five sides, and about 5 feet 6 inches high. As the cutting away of the brick work proceeded timber lintels or carriers were inserted and supported on props, wedges being used to pack up the bricks. This was a most difficult operation, considering the thickness of the walls and the cavity to be provided for—7 feet 8 inches—and all on the same bearing. The timbers used were of common spruce, 9 x 5 inches, the number of props being 130, placed 7 inches apart, and perforated for the reception of rosin and other inflammable substances to insure quick combustion. After this part of the work had been completed the spaces between the upright timbers and surrounding them were filled with shavings, pieces of wood, pitch, tar, &c., over which was poured creosote and paraffine oil. The match was then applied and the flames fed with more oil at various places where it was desired the timbers should be more quickly destroyed, the object being to have the chimney fall in a southerly direction. Soon the structure began to lean to the south, and it had not gone far out of the perpendicular when the portion near the base dropped into itself, and the support being thus removed the remains of the structure literally collapsed in telescopic form and fell in the direction intended, the whole of the debris covering an area of about 75 feet long by 45 feet wide, and in the position indicated by the operator before the fire was lighted. The time occupied in the destruction of the timber supports, that is, from lighting the fire until the fall, was about seven minutes. Two tons of coal, one barrel of cresote, two barrels of paraffine oil and about 350 cubic feet of timber in props, lintels, &c., were used in the destruction of this giant of chimneys.

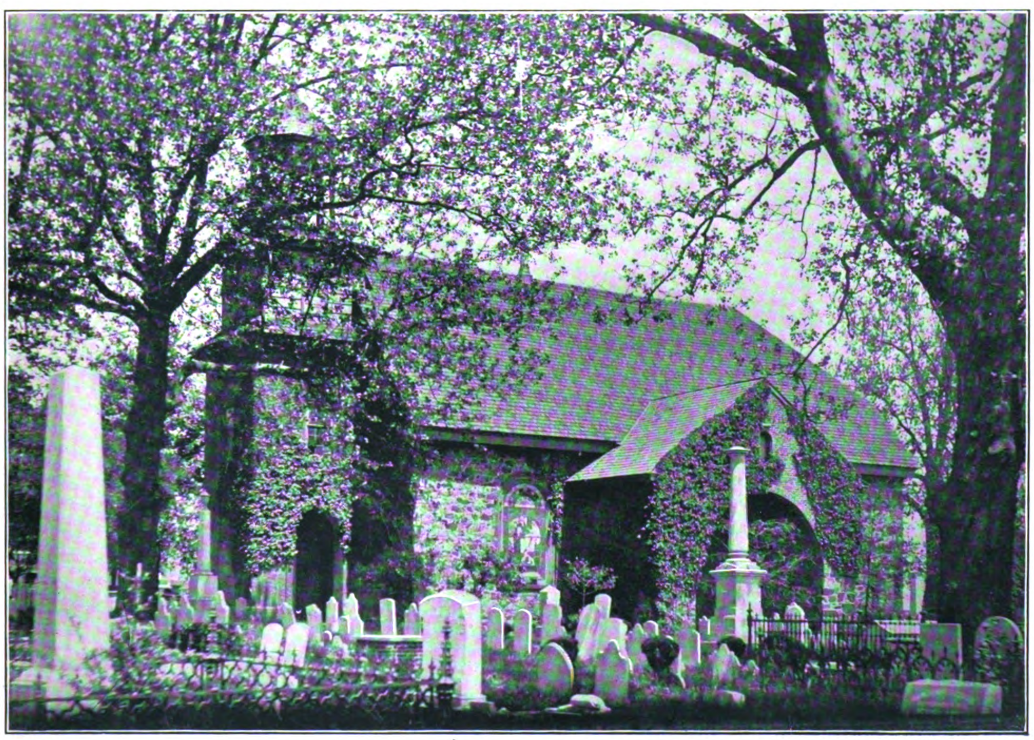
New York Trade School.

The fifteenth annual commencement exercises of the above named institution were held in the building on First avenue, Sixty-seventh and Sixty-eighth streets, New York City, on Thursday evening, April 9, a large number of guests being present. The bricklaying class room, which is the largest hall at present possessed by the school, was fitted up as an auditorium, the walls being tastefully draped with the national flag, while gas jets spanning the room gave light and brightness to the scene. At one end of the hall a raised dais was erected, draped at the back with crimson hangings, adorned with the Stars and Stripes and two large brass eagles surmounting shields bearing the arms of the United States. At the further end of the room was a handsome brick arch which formed a portion of the work of the bricklaying class for the past year. The school was thrown open early in the evening, so that the work of the pupils, which was laid out in the various class rooms, might be inspected by the many invited guests. At 8 o'clock the meeting was called to order by President R. Fulton Cutting, who congratulated the young men who had assembled there to receive the fruits of their season's work in the form of diplomas of efficiency. Mr. Cutting remarked that he was much pleased to state that the instructors had informed him that the 1895-1896 classes had shown a greater degree of proficiency in their work than any of the classes hitherto. He addressed to the young men words of counsel and advice as to their future course as tradesmen and citizens, dwelling earnestly on the importance of character which, combined with the necessary skill and industry, would enable them to grasp the highest measure of success in their trades or any other walk of life. John Mitchell of New York City, ex-president of the National Association of Master Plumbers, then addressed the graduates, after which certificates were presented. William H. Oliver gave out those to the classes in house, sign and fresco painting; Vice-president Stonebecker of the Society of Mechanics and Tradesmen of New York, presented certificates to the members of the class in carpentry; E. Van Houten to the class in bricklaying; Mr. Halliday to the graduates of the printing class and class in cornice work; Charles J. Gillis to the graduates of the classes in blacksmithing, horseshoeing, stone cutting, plastering and steam fitting, while James Muir and Edward Murphy attended to the members of the class in plumbing.

The evening before the graduating exercises, a musical entertainment was given by the students, the programme being arranged by an executive staff composed of Louis A. Will, chairman; David Graham, John S. Hyers, George Leiss and James Allen, Jr. The attendance was large, there being over 600 young men and their friends present. Several members of the various trade school committees, as well as instructors and invited guests from among prominent members of the trades, were in the audience.

The twelfth annual term of the Hebrew Technical Institute, New York City, has just been completed and the annual reports published. These show that during the past year the contributing membership of the institute grew from 660 to 850. Two hundred pupils have been instructed in various trades and useful subjects during the term just ended, the studies including pattern making, wood turning, metal working, electrical construction, mechanical drawing and other branches of education. In December of last year a fair on a large scale was held in Madison Square Garden, New York, for the benefit of the institute, the results of which will enable the institute to extend its work for the next term, wiping out previous indebtedness and providing the funds for necessary improvements.





OLD SWEDES CHURCH, ERECTED IN 1698, AT WILMINGTON, DEL.

REV. ERIC BJORK, ARCHITECT.

SUPPLEMENT CARPENTRY AND BUILDING, MAY, 1896.

COTTAGE OF MR. R. P. HOUGH, AT MANCHESTER, TENN.

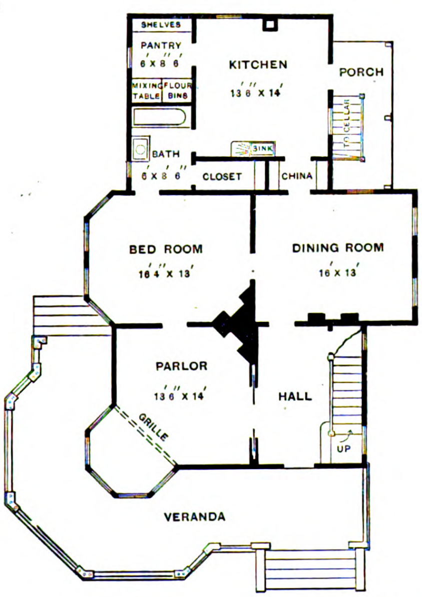
F. K. THOMSON, ARCHITECT.

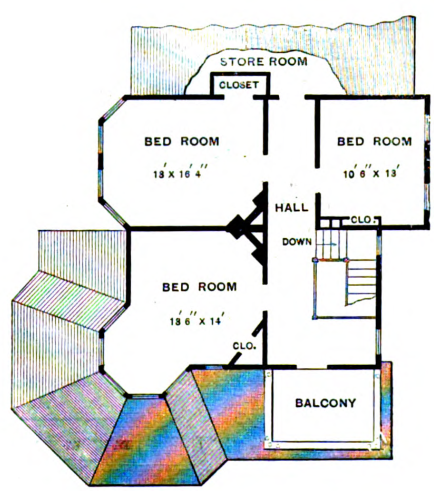
SUPPLEMENT CARPENTRY AND BUILDING, MAY, 1896.

COTTAGE AT MANCHESTER, TENN.

A FRAME cottage of neat design and convenient arrangement for a small family forms the basis of one of our half tone supplemental plates, the view being a direct reproduction of a photograph taken especially for the purpose. The elevations, floor plans and details presented upon this and the following pages give an idea of the construction employed. The cottage was erected last fall in Manchester, Tenn., and the design will doubtless prove interesting to many of our southern readers. Features which at once attract the eye are the veranda, extending across the front and a portion of th side, the balcony over the front entrance, and the octagon tower at the corner. The cottage was built for R. P. Hough at a cost of $2500, from plans prepared by F. K. Thomson, architect, of Knoxville, Tenn. From the

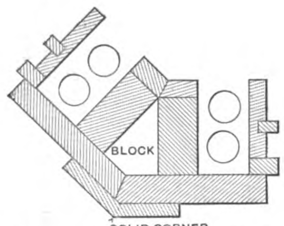
Section and Front Elevation.—Scale, 1/8 Inch to the Foot.



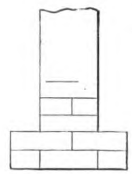


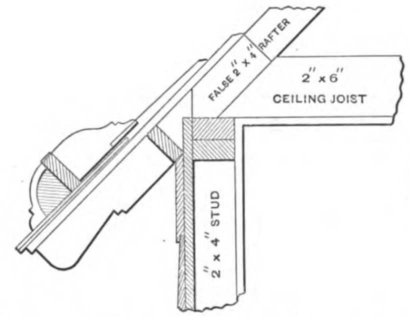
First Floor. Scale, 1-16 Inch to the Foot. Second Floor.

Cottage at Manchester, Tenn.—F. K. Thomson, Architect, Knoxville, Tenn.

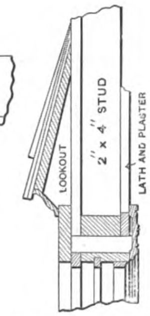


Section through Corner of Octagon Tower.—Scale, 1½ Inches to the Foot.

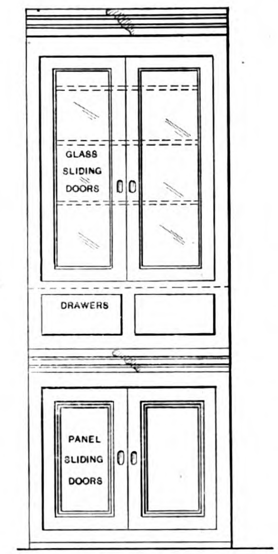

Section of Foundation Wall and Footing.—Scale, ½ Inch to the Foot.



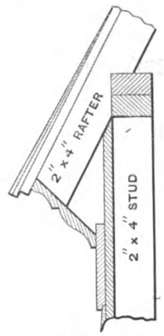
Detail of Main Cornice.—Scale, ¾ Inch to the Foot.



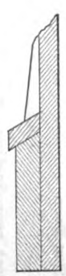
Detail of Belt Course.—Scale, ¾ Inch to the Foot.

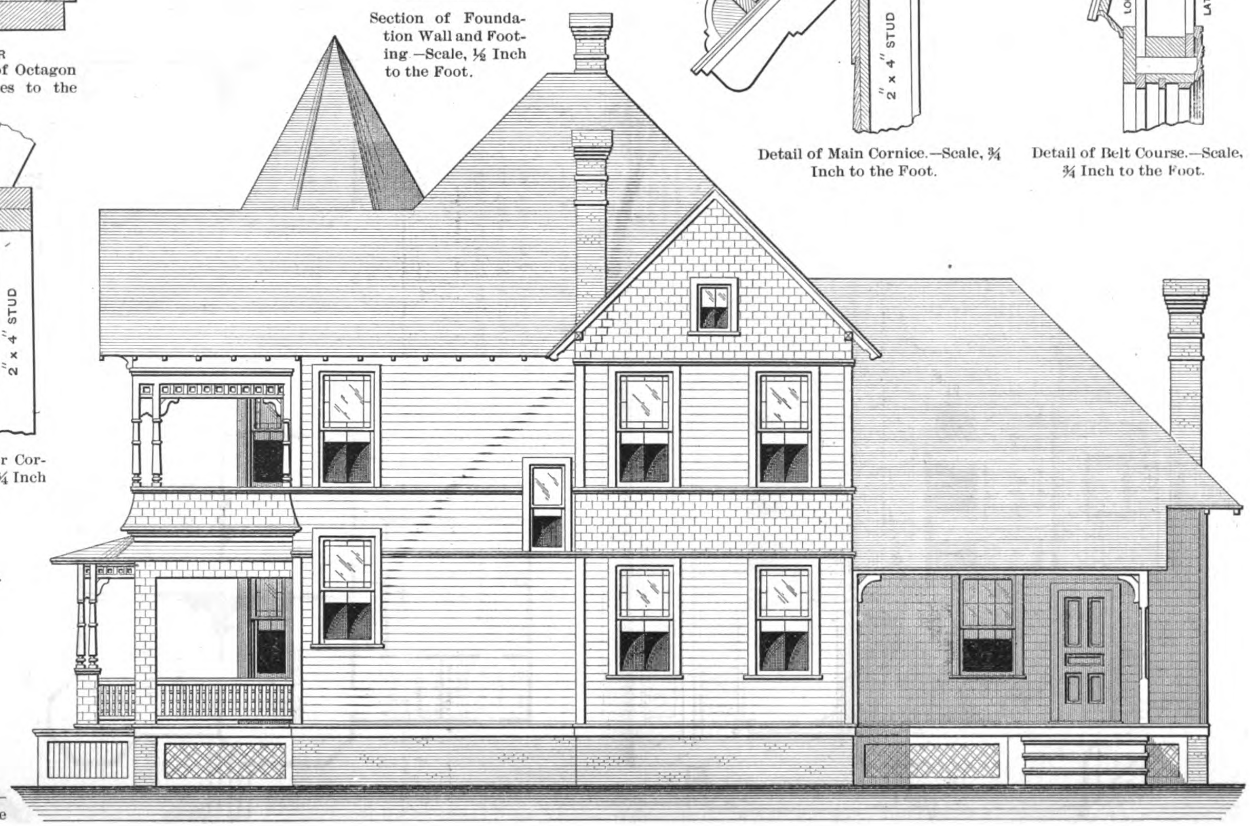


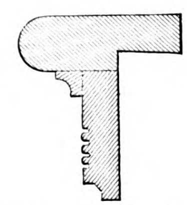
Elevation of China Closet.—Scale, ½ Inch to the Foot.



Detail of Tower Cornice.—Scale, ¾ Inch to the Foot.


Detail of Water Table.—Scale, 1½ Inches to the Foot.


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

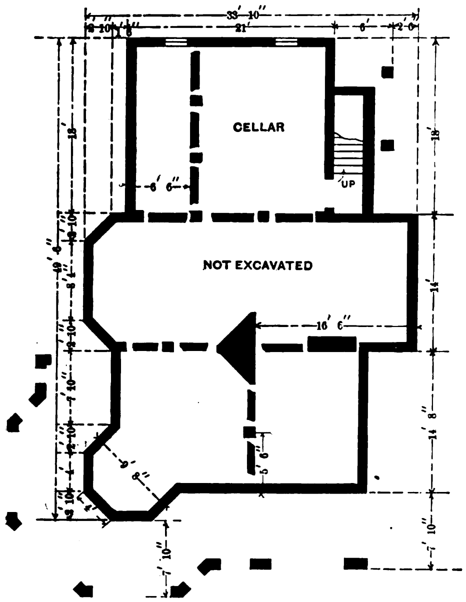

Detail of Window Stool and Apron.—Scale, 3 Inches to the Foot.

Miscellaneous Details and Side Elevation of Cottage at Manchester, Tenn.

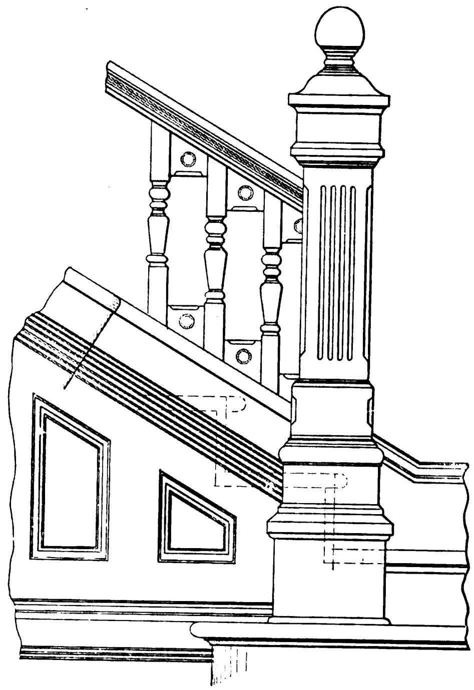
author's specifications we learn that the foundations are of hard brick faced above grade with good quality pressed brick laid in red mortar. The studding is 2 x 4 inches; the first floor joist 2 x 10 inches; the second floor joist 2 x 8 inches; the ceiling joist 2 x 6 inches; the rafters 2 x 4 inches, and the hips and valleys 2 x 6 inches. The outside of the frame is covered with $\frac{7}{8}$-inch sur-

coats lead and oil, finished in colonial yellow with white trimmings and gray belt course and gables.

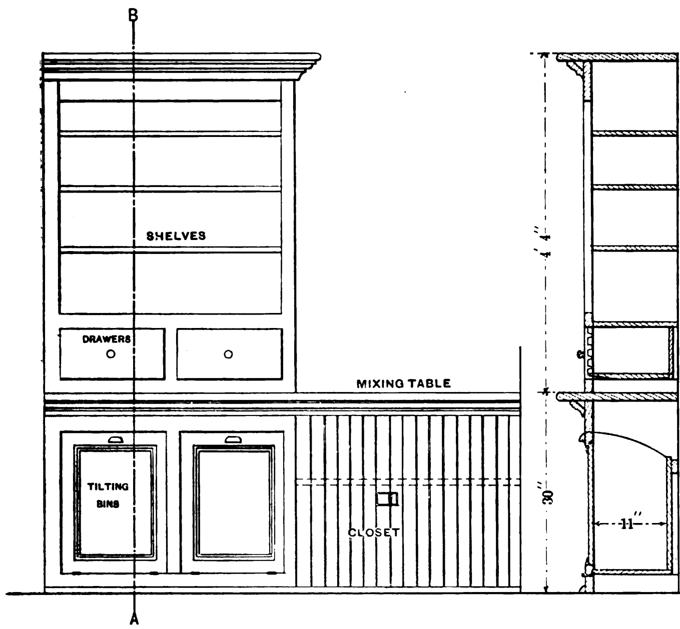
The hall, parlor and dining room are finished in oak while the balance of the house is finished in yellow poplar. All interior wood work, with the exception of the kitchen, pantry and bathroom, which are painted, is



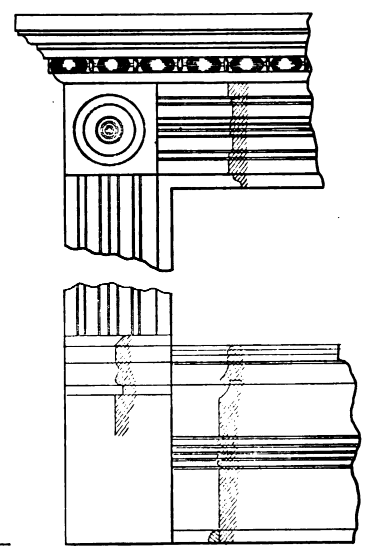
Foundation.—Scale, 1-16 Inch to the Foot.



Detail of Main Stairway.—Scale, ¾ Inch to the Foot.



Elevation of Pantry Shelving, Bins, &c.; also Section taken on Line A B.—Scale, ½ Inch to the Foot.



Detail of Trim, Corner Block and Base.—Scale, 1½ Inches to the Foot.

Miscellaneous Details and Foundation Plan of Cottage at Manchester, Tenn.

faced sheeting put on diagonally, and this in turn is covered with building paper and ½-inch beveled poplar weather boarding. The roof is covered with 4 x 16 inch cypress shingles laid 5 inches to the weather. The gables and belt course are covered with the same material, the general style being indicated on the elevations. The porch and balcony floors are laid with 2½-inch oak flooring with white lead joints. The exterior is painted three

treated with Berry Brothers' hard oil finish. The bathroom floor is treated with four coats water proof floor paint, and is fitted with marble wash bowl and enameled bathtub. Hot water is furnished to all fixtures from a 30-gallon tank in the kitchen. The closets throughout are lined with red cedar, which is a feature likely to be appreciated by the occupants of the house.

An inspection of the plans shows four rooms and a hall on the main floor, one of the apartments being a sleeping room, an arrangement common in many sections of the country. Opening from the bedroom as well as from the kitchen is a bathroom, while opening from the latter is a large closet. The kitchen has opening from it a good sized pantry provided with a mixing table, flour bins, shelving, &c., and there is a china closet between the kitchen and the dining room. An interesting feature of the parlor is the octagon extension separated from the main room by an ornamental grill. The octagon tower at the corner gives added space to the sleeping room on the second floor, which is also fitted with open grate and closet. There are two other sleeping rooms on this floor, as well as a storeroom.

GREENHOUSE CONSTRUCTION AND MANAGEMENT.

A FEATURE of the winter's course at the School of Horticulture, Cornell University, Ithaca, N. Y., was a series of 11 lectures on Greenhouse Construction and Management delivered at stated intervals during the school year. Among the first delivered was one by W. M. Munson, which dealt especially with the walls and foundations of greenhouses. A synopsis of this address was furnished *The Florists' Exchange* by Ernest Walker, and as it is of no little interest to a large class of our readers we present it herewith.

It is axiomatic, said the lecturer, that the best greenhouse wall is that which, at reasonable cost, is most effective as a non-conductor. Next to this is durability. Walls need not be heavy, but they need to be rigid, so as to withstand any lateral pressure that may come from the settling of the roof, and the outward pressure which tends to be exerted. The heaving action of frost must be guarded against, so posts, or foundations must be set or laid sufficiently deep to secure rigidity and guard against the effects of frost. In the different parts of the country, and in different soils, the depth at which it is necessary to lay foundations or set posts of course varies. These things a builder will naturally take into account.

The first kind of wall discussed, and the one most generally in use at the present time, especially in commercial places was the wooden wall with a dead air space.

These consist of posts, wooden walls of matched sheathing lined with tarred paper, and having an air space between.

In constructing such walls, select durable posts. They may be of cedar, locust or cypress. They should be of uniform size, say 6 inches square, then set about 4 feet apart and at least 3 feet deep. The bottom of the post should be set on a flat stone or in concrete. Although more expensive, it will give greater firmness and render the post more durable to fill the hole around the post with concrete. The durability of a post is also increased by dipping the bottom end in crude petroleum, or charring it.

The tops of the posts are then sawed off horizontally in line or beveled. They are sometimes beveled, but it is unimportant which is done. The object is to secure an inclination of the plate for shedding drip water If the posts are not beveled the plate itself must be beveled on the upper side. The width of the air space provided varies, but it is of the utmost importance that the air space be truly dead, as in this lies the value of such walls. Dead air is one of the best non-conductors. A perfectly dead air space also secures greater durability, as it provides greater dryness within the air space.

Wall With Filled Air Space.

Another form of the wooden wall mentioned was that in which the air space of the wall is filled. In this wall there is an air space provided for as before, but instead of being left empty it is filled with sawdust, shavings, straw, or other material.

In this wall it is highly essential to exclude all water and have the interior dry. Thus made it is preferable to the first mentioned wall. Here, instead of a single air space, the interior of the wall is broken up into a great number of air spaces which secures greater warmth. This kind of wall was recommended by Henderson years ago.

Some have used, and with satisfactory results, a double mulched board wall, one against the other, with two thicknesses of tarred paper between, the theory in this case being that the thickness of the air space is of less importance than the prevention of all circulation of the inclosed air, and beyond doubt this result would be better accomplished in this way than with the larger space.

In any wooden wall the use of a good quality of paint and oil is a practice that cannot be too much recommended. The cost and trouble in the start is greater, but it is more than compensated for in increased tightness and durability and the saving in repairs. Not only the ends of pieces and all joints should receive a coating of paint, but also the tongues and grooves of matched boards.

Brick Walls.

These are much used, but are much better for the warmer parts of the country than for cold regions. In cold places the most serious objection to them is their tendency to absorb water which, freezing, results in surface cleavage, crumbling, and disintegration. If it be desirable to use brick walls, the brick should always be well burned and hard. Leucher in his "Hothouse Plans" gives as a general rule: "Bricks should not absorb more than one-fifteenth of their weight when placed in water." It is an easy matter, however, to select the proper kind of brick.

Another general rule which it is well to know is: No pillar or support of brick should ever exceed in hight 12 times its least thickness at the base, nor be loaded with more than 2 tons per square foot of base if laid in mortar, nor more than 3 tons if laid in cement.

In southern places walls may sometimes be rather light (as to thickness). In more northerly places, however, such as Central New York, it is never desirable to build less than a three-course wall (13 inch). Like wooden walls, those constructed of brick may be made warmer and somewhat more durable by providing for a dead air space.

As to the size of the air space practice varies. The lecturer had found a wall with 2-inch air space quite satisfactory. In this case the interior surface of the outer wall was lined with tarred paper. In these double walls the two parts should always be linked together with brick or rods at frequent intervals, to secure greater stanchness. Bolts should also be set firmly in the wall, and project from the top at intervals to bind down the plates.

Some have recommended instead of a three-course wall, a two-course wall, with the third course extending only part of the way up outside. This serves for a kind of brace. Professor Taft recommends this kind of wall.

Again, it has been recommended to have steam or hot water pipes in the air space, with openings ⅝ inch in diameter in the inside wall to secure circulation of air. This is used in Germany to some extent and is recommended by Buche, who also recommends a layer of slate or tile embedded in cement near the base of the outer wall to turn away water and prevent the upward absorption of water from the soil. Also near the base of the inner wall, say 6 to 8 inches, a layer of cement to check capillary absorption.

One of the best brick walls is that which has been tested and recommended by Professor Green in Bulletin No. 7 of the Minnesota Experiment Station. This consists of a 4-inch brick wall on each side of a wall of 3-inch (hollow) tile, with a 1-inch air space on each side of the tile. This makes a 13-inch wall, and secures three separate dead air spaces. This is an excellent plan, for a wall should prove very warm.

(*To be continued.*)

WATER PROOFING A CELLAR.

BY JAMES F. HOBART.

CELLARS and basements which are so unfortunate as to be located below the water line of tide or springs will always be damp, if not uselessly wet, unless stringent measures are taken to render them absolutely water proof. There are several so-called methods of water proofing in the city and vicinity of New York, which are very costly, and are not altogether certain in their purpose. I refer to the method of water proofing by the application of tar to the walls and bottom of the cellar or basement. While some examples of this kind of work are excellent, most of the attempts to water proof in this manner, have resulted in failure, owing to the cracking or breaking of the film of water proofing material. That substance is so thin that it cannot resist the strain of ordinary uses to which the place is subjected. In some instances it has been known to break away from the mere place. One barrel of sand mixed with one barrel of cement gives as great strength as is required, and one barrel of clean broken stone may be added without diminishing the strength of the mixture. It is a well-known fact that stone may be put into good cement mortar without detracting from the strength of the latter, so long as the quantity of stone is kept within certain limits. One barrel of broken stone to one each of cement and sand is well within the allowable quantity which the cement will "carry" without losing any of its strength.

The cellar must first be prepared for the coating of cement by a thorough cleaning. Everything that is not to be covered in should be removed and the surfaces scraped until all the old whitewash, paint or other coating has, so far as possible, been removed. Then go over the wall surface with a mixture of water and carbolic acid in the pro-

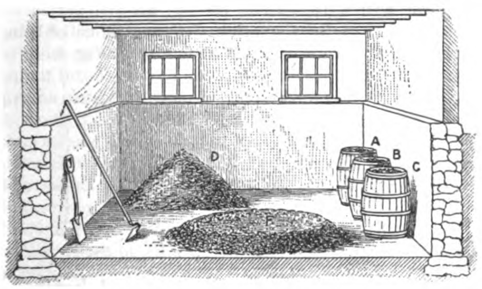


Fig. 1.—Interior View, Showing Method of Preparing the Cement for Use.

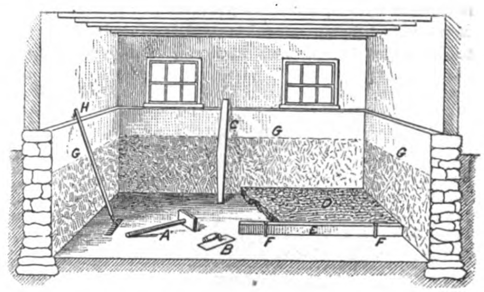


Fig. 2.—The Cellar Walls Washed and Scraped and the Work of Laying the Cement Begun.

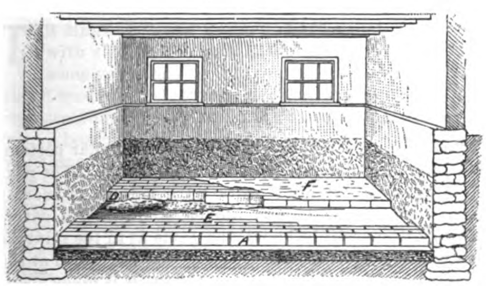


Fig. 3.—Showing Method of Piling the Brick Ready for Use; also a Section of the Work in an Advanced Stage.

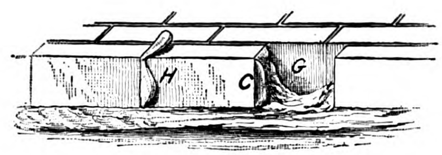


Fig. 4.—Method of Securing Full Corners.

Water Proofing a Cellar.—Illustrations Showing Early Stages of the Work.

yielding of the foundations and the bottom of the cellar when subjected to different loads or weights.

In order then to actually and thoroughly water proof a cellar, something must be put into it which is strong enough to stay in place under the conditions of heavy usage. Cement fills these requirements pretty thoroughly and cement will do the business, provided enough of it is employed. It is of no use whatever to spread an inch of cement, however good the quality may be, over the floors and walls of a cellar, and expect it to be water proof, for it won't. Cement makes an excellent cistern for holding water, and when properly applied of the right thickness it is about as water tight as a tank made of boiler iron. If the cement will keep water in it will also keep it out, and the way to successfully water proof a cellar is to make a cistern of it—with all the water outside. To do this effectually, there will be required at least three coats of material of different nature and application, for the reason that strength and solidity are to be given as well as imperviousness to water.

In the first place at least 4 inches in thickness of cement and sand must be applied and well rammed into portions of 20 to 1, which causes the cement to adhere to almost any substance to which it may be applied. The broken stone should not be over 1 or 1¼ inches, but it requires considerably more work to get it into shape, as the larger pieces do not pack as readily as the smaller ones.

The method of measuring and preparing the cement is indicated in Fig. 1 of the illustrations. The three barrels, A, B and C, contain, respectively, measures of cement, sand and broken stone, and are emptied into a heap, as at D, and then shoveled over at least twice so as to thoroughly mix them before they are wetted. After this has been done the pile is flattened down, as at F, and is sprinkled upon with an ordinary watering pot. Too much water should not be put on, as when the mixture is in place and rammed up it becomes apparently much wetter than it appears when in the pile, and if seemingly barely wet in the heap it becomes thoroughly wet when rammed up and water will stand in small pools on top. The next step of the work is indicated in Fig. 2. A piece of scantling, 3 x 4 inches, is laid on the bottom of the cellar and temporarily secured in place by dock spikes, F F, driven in the ground, as shown, or if the bottom, of the cellar is too hard to admit of this, the joist must be secured in some other way, as, for example, by shoring down from the overhead timbers. The line G G G around the cellar shows where the scraping and washing terminated, and this line is located at a hight depending upon the depth of the cellar below the water line. In the instance illustrated, the bottom of the cellar is about 2 feet below high tide mark and the water proofing is to be applied 3 feet high, allowing 1 foot to head off capillary attraction.

About all the tools required for this part of the work are shown in Figs. 1 and 2. The rammer A of Fig. 2 is made of cast iron about 2 inches thick and 6 inches wide by 10 inches long. A wooden handle is inserted in a hole cast in the center of the iron, completing the tool. The mason's trowel B is of the ordinary variety and the straight edge C is a simple strip of pine board 4 or 5 feet long. The scantling E being placed in position the floor is first sprinkled with water from the sprinkling pot, unless the floor is already wet, and the three barrels of material already shoveled in to the space shown at D, where it is at once leveled and well rammed. The straight edge is constantly employed to prevent low places from being rammed, while the trowel is used to give finishing touches to the edges of the sections. An ordinary garden rake, D, and the slight spreading given by the mason before he lays the brick is exhibited at E. The method of securing full corners, which is very essential in this work, is shown at C G of Fig. 4. It is known as the "sliding method," the brick being laid down a few inches from its proper place, as shown, and then slid home as indicated at H, carrying with it enough mortar to more than fill the end joint. The excess is wiped off with the ordinary trowel and is used for filling any part of the long joint, which extends the entire length of the brick. After filling that joint, some mortar will remain on the trowel, which should be wiped off on the free end of the brick C in the manner shown, this going far toward making perfect the next joint. It is very necessary that the joints be thoroughly filled and that the adhesion of the mortar to the brick be perfect. This state of things is an inherent peculiarity of cement, provided its contact is perfect. In practice, therefore, it is only necessary to secure perfect contact in order to meet all conditions; but the mortar must be thin and evenly mixed in order to do this. After laying a strip of brick 2 or 3 feet wide, it is well to throw a pail of water over it, and with a broom rub smooth all the projecting bits of mortar, giving the brick the appearance of being finely plastered with cement, as shown at F, Fig. 3.

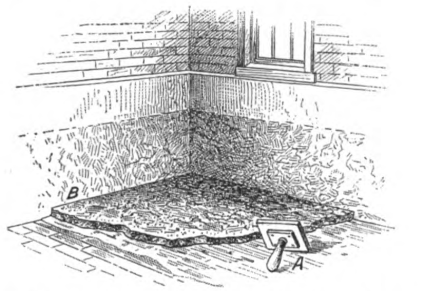


Fig. 5.—Applying the Coating of Mortar, Cement and Broken Stone to the Brick Work.

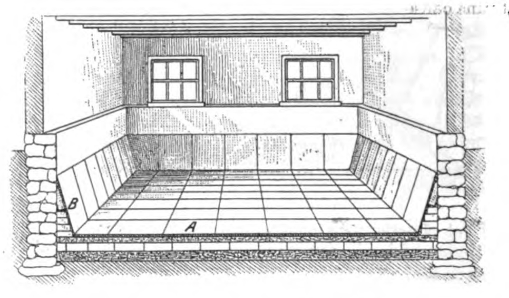


Fig. 6.—Appearance of the Finished Cellar.

Water Proofing a Cellar.—Illustrations Showing the Finishing Stages.

H, is a very handy tool for both mixing and leveling the cement mixture and should be freely used. One barrel of cement with its admixture of sand and stone will cover about 18 or 20 square feet of surface to a depth of 4 inches. But one cask of cement should be mixed at a time and it should be put in place and rammed immediately it is wetted down. If a large gang of men is employed they may be broken up into small squads, each gang working a separate mixture and ramming the mix ture one barrel at a time. There can, however, be a number of barrels of cement mixed, but dry, with the sand and stone and so kept for a limited time—that is, several hours—without causing trouble. In this way the work of preparation may be facilitated. As soon as the wooden guide E is removed the edge of the finished section should be scored or "notched" to form an irregular surface instead of a straight smooth one, with which the next section of cement may join. The old surface should also be well wetted before the adjoining section is made on to it.

The 4-inch course of concrete having been finished, put down next a layer of hard well burned brick set up edgewise and the joints, not over half an inch thick, well filled with mortar. There is a way of laying brick in this manner with very little expenditure of time. To accomplish it the mortar, mixed half and half, is made very thin, so much so that it will hardly stay on a shovel. With this tool in the hands of a helper the mortar is put directly in place one shovelful at a time, while the mason slides the brick into place about as fast as he can pick them up from the floor. As fast as brick are received they should be piled in the manner shown at A, Fig. 3, and when thus disposed of they are not in the way and can be readily wetted by sprinkling with the watering pot or with a hose. The manner of spreading the cement is noted at

Proceed in this manner over the entire cellar bottom, taking care that not one defective joint exists. The next step is to cover the brick work with a layer of mortar cement with all the ¼-inch broken stone it will carry. The proportions will be about the same as in the mixture made with the coarser stone which was put down at the beginning of the work. The last thickness is made about 2 inches, and the material is spread with the trowel, assisted by the garden rake and a sort of "mortar hawk," as shown at A of Fig. 5. A coating of cement is spread as evenly and solidly as possible, the latter condition being secured by going over the entire surface with the ram A, Fig. 2, after which the surface is smoothed with the mason's trowel and the whole left to set. Before this coating is applied, however, the walls should receive attention by building them up with brick, as shown in Fig. 6. The corner or batter is made about 10 inches thick at the bottom and runs out at the line beneath the windows, which forms the top limit of the cleaning and scraping above mentioned. The brick batters are to be laid up as shown in Fig. 6, with the outer face of the brick true with the batter line. Then back of the brick wherever there is room is to be filled with the fine broken stone mixture used for the top coating. Great care must be taken to fill every corner or crevice back of the brick with this fine stone mixture. It should be crowded in with the handle of a hammer or a piece of stick, but it should not be tamped sufficiently to force the brick out of their proper position. After filling completely with the mixture apply some of the soft, thin mortar and then rub down the next brick, applying the mortar plentifully, splashing it against the wall and working it through with a trowel so as to secure a good contact between it and the stone work. It is well to give the sides of the cellar another sprinkling of acid and water just before laying up the batter walls. This will insure a particularly good union between the old and the new work. Having laid up the walls, as shown in Fig. 6, coat them with from 1 to 2 inches of the fine mortar composed entirely of sand and cement, as previously described. As the mortar sets it may be smoothed with float and straight edge precisely as the plastering of the building was finished. It then can be cut up into panels by marking vertically and horizontally, as indicated in the last mentioned figure.

The cellar is now finished except the floor, which should be covered about 2 inches thick with a final coating of fine mortar. This is also indicated at A, Fig. 6, while the side wall coating is visible at B. The bottom is finished in a manner similar to the sides, and a very neat appearance may be given to the whole job if the cement be tinted with a little lamp black mixed in dry with the cement and sand. Do not color cement or any other mortar after it has been wet, for the reason that a uniform tint cannot be obtained by so doing. If, however, a dry color be sifted in with a little dry cement and that scattered into the whole mass a good job and uniform work can be secured.

A cellar water proofed in this manner is strong enough to resist the breaking action of almost any load that could be put into it as well as to withstand a great many of the strains caused by the settling of foundations, &c. In fact, it strengthens the building immensely, and because it is thus strong it will stay in place, and not develop cracks through which water may find its way into the cellar. The operation, however, is costly, as a cellar 100 feet long by 40 feet wide, being water proofed 3 feet, will probably cost $1700 or $1800. Once the work is done, however, it will last a lifetime and no further renewals will be necessary.

Designed by a Blind Architect.

The Perkins Institution for the Blind at South Boston, Mass., is to have a new dormitory, and the wonderful part of it is that the plans for it have been drawn by one of the blind *attachés* of the institution, Dennis A. Reardon. It is said to be the first case in the world where a blind man has drawn the plans for a public building. Mr. Reardon has been totally blind since boyhood, and received all his training in the Perkins Institution. He now has charge of the printing department in the institution, and of all the real estate owned by the corporation as well. He is 65 years old and lives in his own house, which he designed, at 244 East Fifth street, South Boston.

The new dormitory will be built on the Bradford estate, which adjoins the institution grounds on Broadway. The building, says the Boston *Globe*, will have a frontage of 25 feet, and will be 60 feet deep and four stories high. It will be built of brick and light sandstone, and will be ready for occupancy, it is expected, by next June.

A DISTINGUISHING feature of modern house planning is the wide portiere entrance between apartments on the ground floor—which apartments open into a square hall. Heating contractors complain that this kind of plan renders exceedingly difficult the proper warming of the house, for it is claimed that if the radiating surface in a house of this description is evenly proportioned as between up and down stair apartments, the latter will be very inefficiently warmed, while the temperature of the former will be uncomfortably high. A heating contractor told the writer, says an exchange, that he got over the difficulty by giving to the down stair apartments 75 per cent. more radiating surface than was called for by the rules of the heating authorities, and deducting in equal ratio from the up stair rooms. This arrangement is said to have worked satisfactorily.

METHODS OF CONSTRUCTING FLAGSTAFFS.*

THE dimensions and manner of constructing a flagstaff with a cross tree and a topmast, which was put up some years ago in Pittsburgh, Pa., and when completed was 108 feet from ground to the top of ball, are represented in Figs. 5 and 6. The lower mast was made from a beautiful spar, which was floated down from the Mahoning, and when sawed and delievered was 71 feet long and 16 x 16 inches for 12 feet at the butt; then tapered to 12½ x 12½ inches at the top. The topmast was sawed 54 feet 4 inches long, was 9 x 9 inches for 20 feet and then tapered to 3 x 3 inches at the top. The elevation, Fig. 5, shows the appearance of the pole when completed and set up In constructing it was set 10 feet in the ground, and secured by cross beams, placed 1 foot below the surface, so that the soil and vegetation might extend close around, it being on the border of a driveway. The cross beams were 10 x 10 inches by 10 feet long, and were bedded in concrete. The last 2 feet of the excavation, in this case, was in slate or shale rock, and a square was cut simply large enough to admit the mast and so obviated the necessity of concreting for the entire depth. The opening B in the cross beams was made 2 inches larger each way than the size of the mast, this being done in order to allow for plumbing and wedging the lower mast to place after the beams were concreted.

The lower mast was dressed for the first 12 feet to 16 x 16 inches square; for the next 16 feet it was octagon; for 7 feet at the top it was 9 x 9 inches square, while the intervening 36 feet were round and tapering to the shoulder O, which is banded by an iron ring ½ x 2 inches and 12½ inches inside diameter. Upon this shoulder sits the cross tree E. To prevent the cross tree from tilting when the topmast was in place, an iron brace, F, was bolted in after the cross tree was put on.

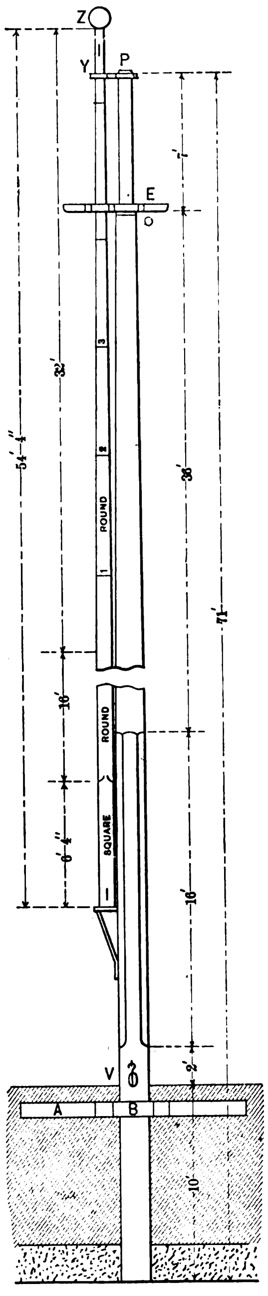
This brace was ½ x 2 x 15 inches long. On the top is an iron band, P, made from ¾ x 2 inch iron, 9 x 9 inches on outside of square; 9 inches inside diameter of circular part and 11½ inches center to center of openings, so that the masts will line up when in place. To guard against tilting when hoisting topmast, the iron L was fitted and bolted in same manner as that below at F. At H is an eye for hanging the block Q. At R, on the opposite side, is an eye for the tying end of the rope. For 6 feet 4 inches, the topmast was dressed 9 x 9 inches square; for 16 feet, round, 9 inches in diameter, while the remaining 32 feet tapered to 3 inches diameter at the top.

This timber sprung badly while being dressed, and to remedy the defect it was ripped down the center from the top for 32 feet and after being carefully straightened and the parts nailed together six bands of iron, ¼ x 1¼ inch each, were shrunk on at the points indicated by the figures 1, 2, 3, &c. At Y is a ⅝ x 4 inch sheave for the halyards. The ball Z is 14 inches in diameter, made of copper and gilded. At S of Fig. 6 is shown the bracket which holds the topmast in place when lowered. The iron band D is ⅜ x 2 inches and 9 x 9 inches outside dimensions, or the size of the mast, and is set 2½ inches past the lower end. The bracket M is the same size as D, so that when the mast is lowered the band D rests squarely on M. Projecting from the center of M, on the side next to the lower mast, is a shank, sharpened and driven well into the wood. The brace under is ¾ x ¾ inch, with shoulder and machine bolt at M, and ½ x 4 inch lag screw at lower end.

The cross tree E is of well seasoned white oak, 2½ x 5 inches. The five pieces are ship lapped and a ½-inch bolt put in through each end at I. To further insure against accident from splitting a ½-inch bolt was put through each end of each piece. The plan of the cross tree is shown at E, and the section at W of Fig. 6. At J is shown the method of raising or lowering the topmast. The rope for hoisting works through the block at V on the lower mast, then up to and through the block at Q; then down through the sheave at T in the topmast; then up to R, where it is tied. The "fall" is worked by hand. A better plan, however, would be to have a small crab fastened permanently at V of Fig. 5. At G is a key to

(* Continued from page 83, April issue.)

hold the topmast in place when raised. It is made of oak, 2 x 4 inches, and ½ inch wider in the middle, so as to drop snugly between the arms of the cross tree. This prevents the key from working out of place by the swaying of the mast in the wind. A loop of rope is tied in the



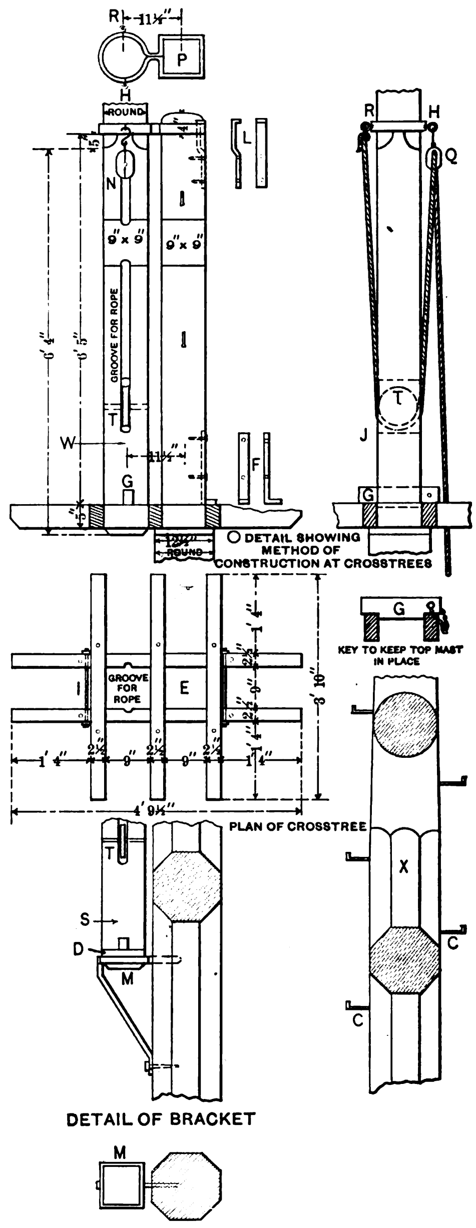


Fig 5.—Elevation of Flagstaff with Cross Tree and Topmast.—Scale, ⅛ Inch to the Foot.

Fig. 6.—Details Showing Method of Construction.—Scale, ½ Inch.

Methods of Constructing Flagstaffs.

end of the key, to hang on the iron step C of Fig. 6, when not in use. Beginning at a point 10 feet from the ground and continuing to the top of the lower mast at intervals, as indicated in the detail X, were driven iron steps such as are used for telegraph or electric poles. All the timber, except the oak for the cross tree, was green when dressed, and to prevent splitting or checking by the sun and air it was treated to two coats of linseed oil, put on boiling hot and sopped in as long as the wood absorbed it. This experiment had been tried before on a tripod for a gin, and in that case, as in this, it was a complete success. After being set up, both the masts and cross tree were painted two coats white lead and oil.

This is an iron age, and even in providing a mast from which to float the flag of our country, we begin to resort to that stronger and more durable material. Owing to the growing scarcity of local pine of the requisite quality and the consequent increase in its market value, combined with the very low price of iron tubing, the difference in cost is not great. Fig. 7, which needs little explanation, represents a flagstaff as made from standard size tubing and is now standing on one of the prominent buildings of Pittsburgh. The first section at the bottom is 6-inch pipe, inside diameter, the second section, 5 inch, and so on to the top, which is 2

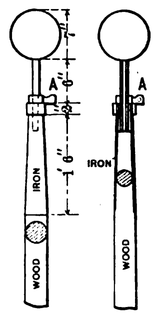


Fig. 9.—Elevation and Section of a Device for Finishing a Wooden Mast. — Scale, ½ Inch to the Foot.

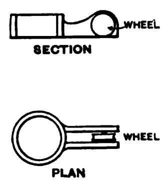


Fig. 10.—Detail at A of Fig. 9 —Scale, 2 Inches to the Foot.

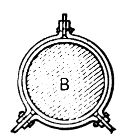


Fig. 8.—Section through Flagstaff 8 Feet Above the Roof, Showing Draw Band and Braces Made of ⅝ x 2 Inch Iron.

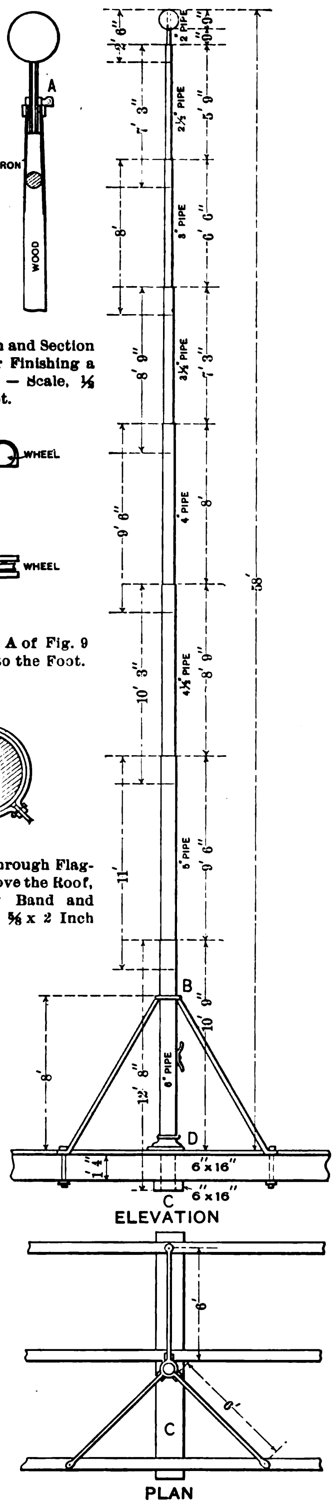


Fig. 7.—Plan and Elevation of an Iron Flagstaff for a High Building.—Scale, ⅛ Inch to the Foot.

Methods of Constructing Flagstaffs.

inches in diameter. The laps or splices are 18 inches and swedged. The ball for this pole was ordered with a shank to fit the inside diameter of the 2-inch pipe at the top, and is fastened by a rivet through both. In this instance the roof beams are the ceiling beams, and the sketch shows the plan and elevation of the stays as well as a method of securing the pole in place. At C is an oak beam, 6 x 16 inches by 10 feet long, bolted to the roof beams, which are also 6 x 16 inches. Upon this beam the pole was set up. At D is a casting put on after the roofing was done. In Fig. 8 is shown a detail of the draw band into which the stays were bolted. The stays were also bolted to the roof beams, the bolts extending through with nut and washer on the under side. A detail of an arrangement used for finishing the top of a wooden mast, and first used on a pole similar to that described in Fig. 1, is illustrated in Fig. 9. This device consists, first, of a piece of 3 inch tubing 20 inches long, with thread and cap on top; the lower end being forged on the mandrel to correspond with the taper of the mast. In the center of the cap a hole was drilled to admit a piece of 1½-inch gas pipe. The 3-inch pipe, before described, was first driven tightly on to the top of the mast; then the 1½-inch gas pipe was driven through the cap and into the wood. On the shoulder thus formed was set the ring and sheave A. This band, having a slightly larger inside diameter than the outside of the 1½-inch pipe, works as a swivel, allowing the halyards to move always in the direction of the wind when the flag is flying. The shank of the ball being ordered to suit the inside diameter of the pipe, was dropped in and secured by a rivet. The detail of band and sheave needs no explanation. The sheave used in connection with the pole, shown in Fig. 7, was the same, except that the ring was made for 2-inch pipe.

The inquiry may be made as to how to determine the size of ball on top of the mast. A gentleman of the city, who had been for many years engaged in the lightning rod business, once gave me this rule: For a pole 10 feet high, allow 4 inches for size of ball and then 1 inch in diameter additional for every 10 feet in hight above that. Another method of obtaining the same result will be obvious to most readers of *Carpentry and Building*, viz.: Divide the whole hight of mast by 10 and add 3; as for Fig. 5, for example, $\frac{108}{10} + 3 = 13.8$ (see table below). Experience and the surroundings will indicate when the rule may have to be modified: as for instance, in Fig. 3, while the mast was only 25 feet high, the top stood 61 feet from the ground; and, according to the foregoing, would require a 9-inch ball, but which, under the circumstances, was decided too large, and that a 7-inch ball would be a better proportion. Also, at Fig. 1, the whole distance from street to top of pole was 171 feet; but here only the length of the pole above the roof was considered in determining the size of ball.

The following table will further illustrate the rule and practice, using the hights given in the foregoing sketches:

Sketch.	Hight of pole.	Size of ball by rule.	Size used.
Fig. 1....	41 feet.	$\frac{41}{10} + 3 = 7.1$ inches.	8 inches,
Fig. 3..	25 feet.	$\frac{25}{10} + 3 = 5.5$ inches.	7 inches.
Fig. 5...........	108 feet.	$\frac{108}{10} + 3 = 13.8$ inches.	14 inches.
Fig. 7...........	58 feet.	$\frac{58}{10} + 3 = 8.8$ inches.	9 inches.
Fig. 9...........	32 feet.	$\frac{32}{10} + 3 = 6.2$ inches.	7 inches.

A contract for 2200 tons of steel beams and girders was recently awarded to the Pacific Rolling Mill Company of San Francisco, to be furnished for the new building of the San Francisco, Cal., *Call*. The building will be 19 stories high, and will be the largest steel building on the coast. The contract for the structural steel is not only said to be the largest thus far let on the Pacific coast, but it is unique in its adaptation to the limitations of the home rolling mills. The architects were instructed by Claus Spreckels, the owner of the building, to design the shapes of the beams and girders so that the home mill would be able to furnish them. This is unusual, as it is customary to force a mill to comply with the designs of an architect or engineer, but it is stated to be in accordance with Mr. Spreckels' policy of patronizing home industries.

SLATE AS A ROOFING MATERIAL.

THE proper method of putting on a slate roof is a phase of the building business in which every carpenter and builder is deeply interested. He may have a way of his own for doing the work, yet he is not averse to knowing how others accomplish the same thing. In a little pamphlet recently issued by the Bangor Excelsior Slate Company of Easton, Pa., is to be found a great deal of information about slate and its advantages as a roof covering, while a description of the manner in which a roof is slated is of such a nature that we reprint it and the accompanying diagram herewith.

In slating, as in shingling, we commence at the bottom and work up. By reference to diagram No. 2 in the accompanying illustration it will be seen at *e f* that the slates in the first course are short; that they are covered by the second and overlapped by the third course, &c. This overlapping, as shown at *c c*, *d d*, diagram No. 2, is continued, and is termed by slaters the "lap." If it covers a space of 3 inches it is called a 3-inch lap; if 4 inches, a 4-inch lap, &c.

The length of the slates in the first course is governed by the length of the slates selected for the roof, and is ascertained in the following manner: For example, Fig. 1 may represent a slate 20 x 10; allowing 3 inches for lap

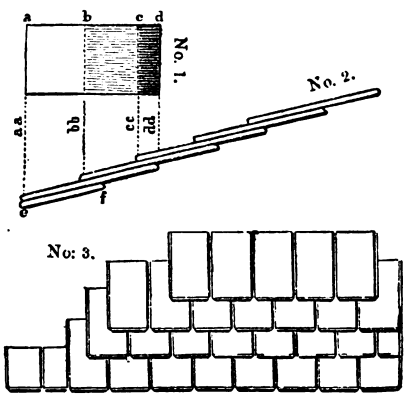


Diagram Showing how Slate are put on a Roof.

Slate as a Roofing Material.

(*c d*), 17 inches remain, which are equally divided at *b*, leaving 8½ inches *a* to *b* exposed to the weather; to produce the lap at *b b*, the first course would require slate 11½ inches in length. The rule for lap takes 3 inches from every slate, without regard to length, as shown at *c d*, Fig. 1. By dividing at *b* we determine the width of the courses (*a a*, *b b*, *c c*); and consequently, by adding the (3 inches) lap the length of the slates required for the first or under course *e f* is ascertained. As the work approaches the ridge the proper width for the last course may require a little variation in the lap. The openings in the roof may be secured with lead or copper. The coping for the ridge is formed of sheet lead or zinc. A steep roof is best for slates; we do not advise a less pitch than 3 inches per foot.

To start a slate roof first use ceiling lath by nailing them fast to the eaves. To start the first row by laying a slate crosswise is a bad practice and should be avoided, as the grain runs the wrong way and the slate is liable to break and the lower half fall out—a fact of which all practical slate roofers are aware. It is a fact that any building strong enough for a shingle roof, and properly called a safe building, is strong enough for a slate roof.

Support for Slate.

For a plain roof, the length of the roof is multiplied by the length of the rafters to get at the measure for slate roofing. The thick slate is laid at the eaves, and the thin ones at the top of the roof. The shingle flashing should be laid in with the courses of slate, one piece under the lower end of the first slate or half slate intersecting any wall or chimney, and should be 2 inches longer than the gauge of the slate and 6 or 7 inches wide. There should always be a wood back put in 2 or 4 inches higher in the center of every chimney, so that the tin or other covering may have a good fall to carry the water clear of the chimney. A good slater always insists that tinners, carpenters and others who may have occasion to cross the roof shall lay boards or ladders to walk on. Tinners, carpenters, painters and lightning rod men often damage slate roofs more before the building is finished than ten years of wear will damage them. Sheathing boards should be even in thickness so the slate may lay smooth and even. Boards surfaced to a thickness are the best and should be perfectly sound so that nails may retain a firm hold. They should be narrow boards and thoroughly seasoned in order that they may not warp or shrink and so displace the slate.

Another good support for slate is lath about 2½ x 1¼ inches, and it may be of either hard or soft wood. If hard wood is used, it is better it should be unseasoned and the lath laid on the rafters as far apart as the courses of slate will lay to the weather. Lath costs much less than sheathing, and can never shrink or warp enough to throw the slate out of place. The nails used should be galvanized, tinned or wire nails to prevent rusting.

Piling Slate.

Often in handling slate much loss is occasioned by not piling it carefully. Slate should never be laid on its flat side in a pile higher than the width of one slate, and they should never be piled on the flat side to haul. In selling a square of slate, manufacturers allow 3 inches for lap, and it is the business of an architect to see that the roof is laid with that much lap. A dishonest roofer may gain considerably by laying the roof with a less amount of lap than 3 inches, but in so doing he will endanger the weather proof qualities of the roof. The average weight per square of slate is 650 pounds, and the average thickness of a roofing slate is ¼ inch.

In putting on a slate roof, it is well to bear in mind that while defective slate are not so readily detected by an inexperienced person when they are in the pile and may escape a critical eye when the roof is first laid, yet when they are on the roof a short time the trouble begins and it becomes apparent to the most casual observer that something is wrong.

The following table shows the sizes of slate, and how much should be exposed to the weather on the roof, allowing 3 inches to lap, the rule in lathing, and the number of pieces in each square.

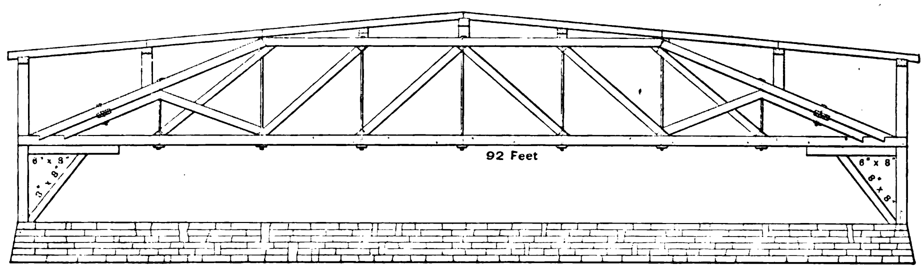
Size of slate. Inches.	Distance of lath.	Exposed when laid. Inches.	Number in each square.
24 x 14	10½	10½	98
24 x 12	10½	10½	115
22 x 12	9½	9½	126
22 x 11	9½	9½	138
20 x 12	8½	8½	142
20 x 10	8½	8½	170
18 x 12	7½	7½	160
18 x 10	7½	7½	192
18 x 9	7½	7½	214
16 x 12	6½	6½	185
16 x 10	6½	6½	222
16 x 9	6½	6½	247
16 x 8	6½	6½	277
14 x 10	5½	5½	261
14 x 8	5½	5½	327
14 x 7	5½	5½	374
12 x 8	4½	4½	400
12 x 7	4½	4½	457
12 x 6	4½	4½	533

There is an erroneous impression that only brick and stone buildings should have a slate roof, but as the number of frame buildings with slate roofs increases, and their beauty and additional safety from fire is better known and more widely appreciated, that impression is rapidly disappearing. Houses are no longer built with such frailty in their construction that they cannot support a slate roof, and when such a roof is rejected for lack of stability in the building it is a dangerously frail structure to use. Frame buildings with slate roofs are the rule and not the exception nowadays, and the reason is that the superiority of the slate roof over all others is very generally acknowledged. It may be said generally that every building should have a slate roof. It is not only that such a roof is absolutely impervious to the weather, but it is also the safest, the most beautiful and the roof that in the event of an accident is most easily and satisfactorily repaired.

CORRESPONDENCE.

Roof Truss for Shipping Shed.

From E. C. M., *Alton, Ill*—I inclose a sketch of the roof truss of the shipping shed of the Illinois Glass Company, Alton, Ill. The building is 300 x 90 feet, and the trusses are 25 feet apart. The purlins are 6 x 8, and the tie beam and braces are made of five pairs of 1¾ x 12, bolted together. The strain beam is solid, 8 x 12, and the small braces are 6 x 6. I did not use angle blocks, but cut the braces to fit the tie beam and strain beam, cutting 8 x 6 between braces and spiking to keep the braces from slipping. I also added the 6 x 8 bolsters and 8 x 8 braces shown at the right and left of the sketch. The roof is covered with four ply gravel. I send the sketch for such interest as it may have for readers of the paper.



Roof Truss of Shipping Shed, Contributed by "E. C. M."

Trouble with a Drafting Board.

From E. E. C., *Whitesboro, N. Y.*—I have had a great deal of trouble with my drafting boards warping, and I should like to know how to remedy the difficulty. In the issue for January, 1895, page 10, there is an article on the subject of drawing boards in which it says the board is glued up with saw cuts in the usual way. Now I would like to know what is the usual way.

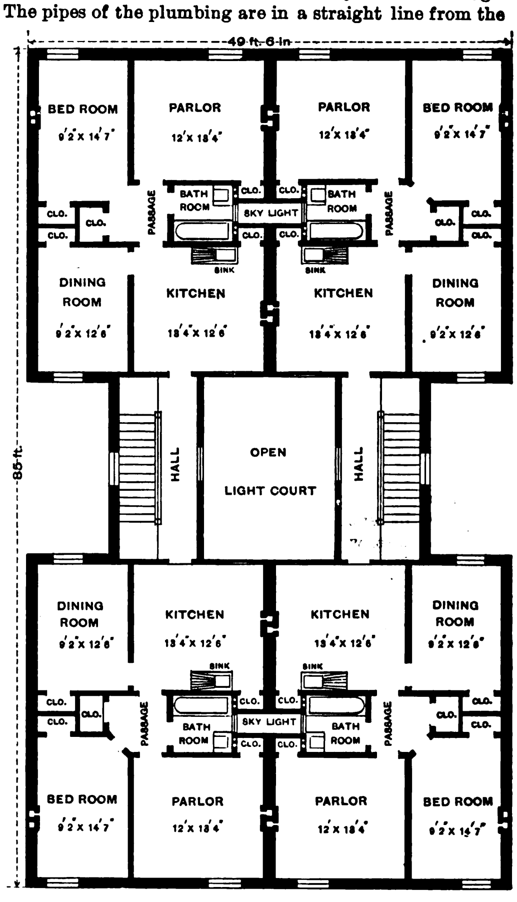
Answer.—Drawing boards as usually made are of dry pine wood about ¾ inch thick, and the wood is glued up edge to edge in order to make a board of the requisite size. It is then run over a circular saw and cut with a number of slits in the back extending about one-half or two-thirds through the board. The object of this is to make it flexible transversely to the grain, so that in the shrinking, which always occurs no matter how dry may be the wood, it will not warp. The board is held flat by means of heavy hard wood cleats fastened to the back. The cleats, which are screwed to the board, pass through oblong slits in it which allow of movement as the wood shrinks.

Trouble with a Damp Cellar.

From J. F. G., *Brooklyn, N. Y.*—About a year ago I put down a cellar floor composed of Portland cement. When the weather is damp drops of water appear, and finally the cellar bottom looks as though water had been sprinkled over it, while in dry or cold weather there is no sign of dampness on the floor. Can any one explain the cause of this or suggest anything to prevent the dampness? There was never any sign of water on the floor previous to the cement being put down. The cement is laid about 2 inches thick, and on earth composed of clay and sand.

Plan of Improved Tenement Building.

From J. H. M., *Cincinnati, Ohio.*—I inclose a blue print of an improved tenement building which will no doubt be of interest to readers of *Carpentry and Building* who have given attention to the subject of the housing of the working people in all large cities. The plan sent indicates the general arrangement of a single floor, the others being duplicates, with the exception of the first or ground floor, which is devoted to stores. The building is three stories and basement in hight and is divided into 12 living apartments, each apartment having four rooms and a few of the modern improvements. It is designed to occupy a 50 x 100 foot inside lot, the entire width of which would be taken up, as well as four fifths of the depth. In addition to the necessary halls, passages, light shafts and the two stairs, it has 12 bathrooms, 60 closets and 48 living rooms, each of which has outside air and light and can be properly ventilated. The apartments are arranged in regular order, and all being exactly alike, require no special design or work for each apartment, consequently the cost will be less than that of many other buildings. The pipes of the plumbing are in a straight line from the basement to the top floor, thus rendering them easy to construct and not liable to get out of order. As they are located in the center of the apartments they are well protected from frost. The entire building is under one roof and has no stairs exposed to the weather and no porches liable to decay.

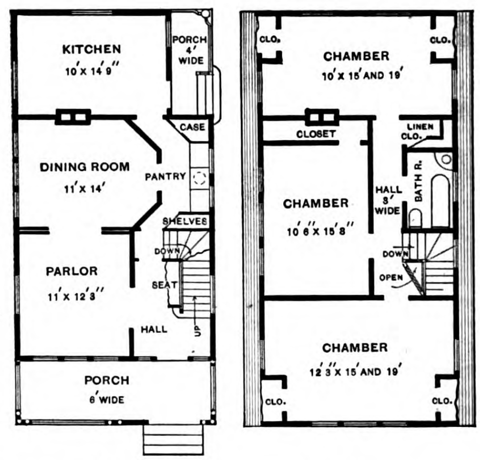


Plan of One Floor of an Improved Tenement Building.—Scale, 1-16 Inch to the Foot.

Design of a Workingman's House for a City Lot.

From WALTER P. CRABTREE, *Holyoke, Mass.*—In reply to "W. R.," New York City, I contribute the accompanying sketches of a house suitable for erection on a city lot 25 x 100 feet in size. The house is 20 feet wide and 42 feet deep. It could hardly be made 28 or 30 feet deep, as the correspondent wished. The house is designed in the Colonial style and is covered with shingles, as indicated by the elevations; the underpinning is of field stone above the grade; the chimney is of brick. A porch 6 feet wide extends across the front, with three columns at the corners and two in the center, with half columns against the house. There are shingled buttresses under the columns, with balusters between. The house is entered through a Dutch front door with side lights, which have plain glass leaded. Between the door and the side lights are pilasters. There is also a leaded glass fan transom over the door and side lights. Entering the house one finds on the right of the hall the main stairs, with a stained glass leaded window near the bottom. At the side of the stairs is a seat, so that the hall can be used as a reception room should circumstances require. Opening from the hall at the left is the parlor, communicating with the dining room beyond by means of folding doors. The parlor is lighted by means of three windows at the front and a wide one at the side. In the dining room is a set of triple windows. An interesting feature of the arrangement is the communication between the kitchen and hall, which is such as to avoid passing through either of the principal rooms. There is a door between the pantry and dining room, but no door to the kitchen from this room, as it is best to have at least two doors between the kitchen and the rest of the house in order to keep out the odors of cooking. The kitchen is fitted up with case having glass door, shelf and molding board. Under the latter is a closet for flour barrel, and there are cupboards on each side. The two windows by which the pantry is lighted swing in instead of raising and lowering. The kitchen, which is at the rear of the house, has windows on three sides, making it cool and comfortable in the summer. The side entrance is from a porch 4 feet wide. On the second floor are three large chambers, each provided with closet room; a bathroom and a small linen closet. An opening in the ceiling between the linen closet and the bathroom gives access to the attic, which is reached by means of a ladder, which when not in use stands in the linen closet.

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



First Floor. Second Floor.

Scale, 1-16 Inch to the Foot.

Design of a Workingman's House for a City Lot—Walter P. Crabtree, Architect, Holyoke, Mass.

Laying New Flooring Over Old.

From S. F. B., *Wellington, Ohio.*—In answer to "J. J. D." of Cornwall, Cal., I would say, let the old floor alone and lay a new floor diagonally over it. I have laid several floors in this way and they are a success. If there are thresholds under the doors knock them out and leave them out. If the correspondent does not care to do this, let him cut from the bottoms of the doors the thickness of the new floor.

Bracing a Store Building.

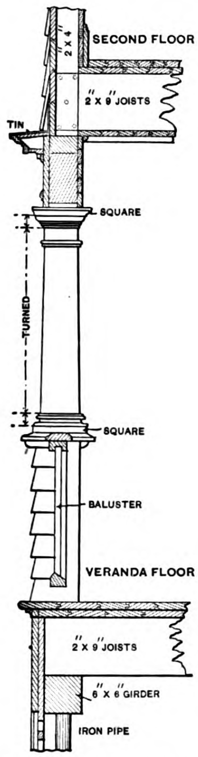
From A. C. S., *Bloomington, Ill.*—I would like to have some of the numerous writers for the Correspondence columns give the best method of bracing a store building 28 feet wide and with walls 24 feet high. The first story is 14 feet high with a clear floor space the full length of the building. I constructed such a store building six years ago, but could not brace it sideways as it had a glass front. The best I could do at the time was to cut in braces diagonally from one corner to the other between the upper joist, but there being a constant wind from the west the building at the front leaned to the east before it had stood two years. The building had been up for about four years when it was destroyed by fire, and I was not altogether sorry, for it was a standing monument to a poor workman on account of its tendency to lay down.

Trouble with Inside Finish.

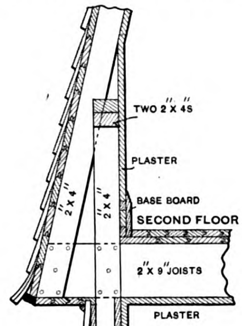
From STRAW, *Shullsburg, Wis.*—I have a question I would like to lay before the readers of the paper with a view to obtaining the opinions of those more experienced than myself. Last fall in finishing a church on the inside it was necessary to bend a piece of base around a circle having a 12-foot radius. I bent it by a rule taken from *Carpentry and Building* of last July, and contributed by a correspondent writing from Vancouver, Wash. In bending, the board broke at the place where it was sawed. It also acted the same way in bending the 1½-inch round piece around a circle top window, the radius of which was about 5½ feet. The finish was of red oak What was the trouble and was it in the material?

Pipe Openings to Chimney Flues.

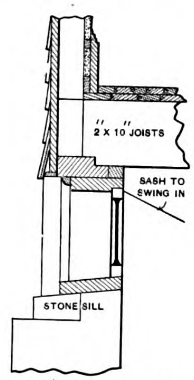
From A. B. A., *Amherst, Mass.*—I would like to call the attention of the readers of *Carpentry and Building* to the subject of pipe openings to chimney flues. It is the custom in a large section of the country, as I know, to leave a space about 14 inches square through the partition where the opening is to occur, to be filled in with brick. when it dries. Insurance men object to cracks, and no good funnel has yet risen to the occasion, at least in this vicinity. I would like to know the practice in other



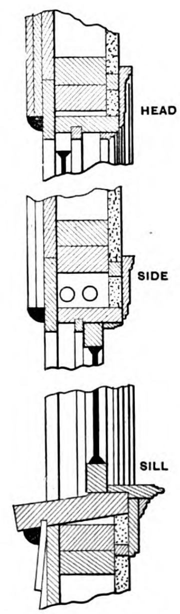
Details of Porch Cornice, Column, Balustrade and Flooring.—Scale, ½ Inch to the Foot.



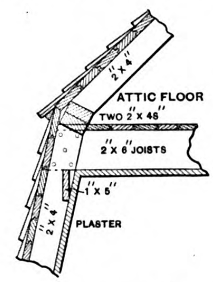
Detail of Main Cornice.—Scale, ½ Inch to the Foot.



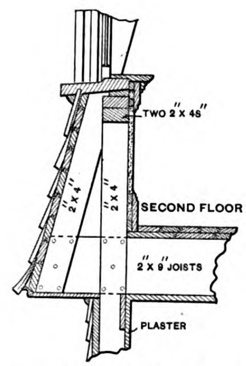
Detail of Water Table.—Scale, ½ Inch to the Foot.



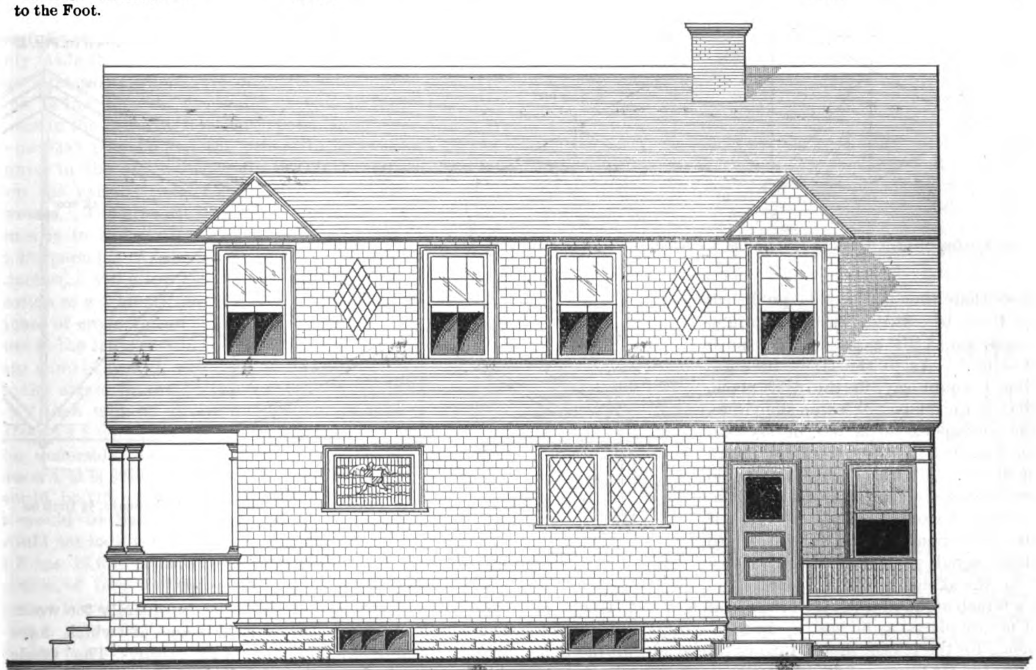
Detail of Windows.—Scale, 1 Inch to the Foot.



Detail of Gambrel Roof.—Scale, ½ Inch to the Foot.



Detail Showing Sill of Dormer Window.—Scale, ½ Inch to the Foot.



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

Design of a Workingman's House for a City Lot—Miscellaneous Details and Side Elevation.

This is bricked in and plastered over with the rest of the wall, but invariably the plaster about the brick cracks places and to know if this grievance has yet been satisfactorily met.

Strength of Truss for Building of Sixty Feet Span.

From F. D. R., *Decatur, Ill.*—As I have been a constant reader of the paper since 1884—in fact, having every volume bound for that period—I thought I would come to the assistance of "A. B. C" of Brandon, Manitoba, in regard to his roofing truss, published in the February issue, for the reason that it does not suit me a little bit the way he has it. I would also say that I think all carpenters should use the Correspondence columns of the paper more than they do, as it is published for their benefit. To use a common vulgarism, "it's a good thing; push it along." As to the truss in question, I would say, in the first place, that a queen post truss as shown by the correspondent is not, in my estimation, just the right thing for a span of 60 feet. A truss of that style should never exceed a span of 45 feet. Then, I think it would have been better if the correspondent had divided it into three equal panels, as shown in Fig. 1 of the sketches which I send. The 4 x 6 inch strut marked A1 in the sketch of "A. B. C." is of no use placed as he has it. In fact, I think it is a detriment, for the reason that it throws the weight of the roof on to the tie beam, which is already weak enough, instead of making the foot of the truss support it, as should be the case. The 2 x 6 inch stringers are entirely too weak. As "A. B. C." does not state how far apart the trusses are placed, I take it for granted they are 16 feet, as he says he has built it in place of the one that fell down, and that one, as I noticed in the issue of *Carpentry and Building* for June, 1895, page 143, had the trusses placed 16 feet apart. Now, as the stringers are 30 inches on centers, they carry a roof area of 40 square feet, and allowing a load of 50½ pounds to the foot, which I think is not too much for that country, where snow and winds are severe, I have a weight of 2020 pounds, uniformly distributed. Now, as a 2 x 6 of that length will only carry with safety a distributed load of 810 pounds using a factor of safety of 5, or 1350 pounds using a factor of safety of 3, I am still 670 pounds short, from which it will be seen that they are entirely too weak. There are several other defects, some of which have already been pointed out by the editor. The whole things to me looks shaky, and it is no wonder the other roof fell down. It seems to me it would have been better if "A. B. C." could have omitted some of the stringers and used 6 x 6 rafters and purlins, as indicated in Fig. 1 of the accompanying sketches. In the diagram Fig. 3, of the correspondent's sketches, representing the joint at C', it would have been better to make a butt joint

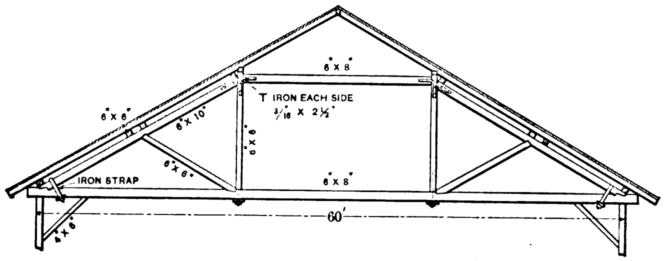


Fig. 1.—Elevation of Roof Truss, Submitted by "F. D. R." as an Improvement Upon that of "A. B. C."—Scale, 1-16 Inch to the Foot.

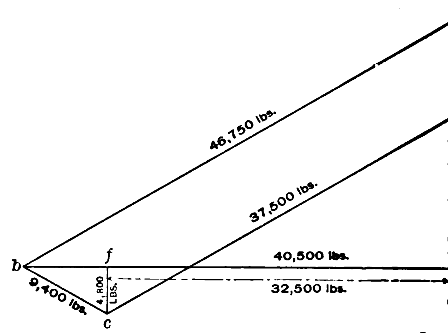


Fig. 3.—Stress Diagram of Roof Truss Shown in Fig. 1.

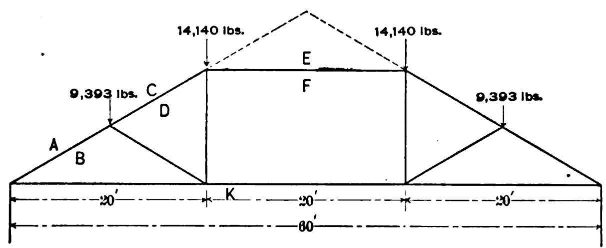


Fig. 2.—Diagram of Truss Shown in Previous Figure.—Scale, 1-16 Inch to the Foot.

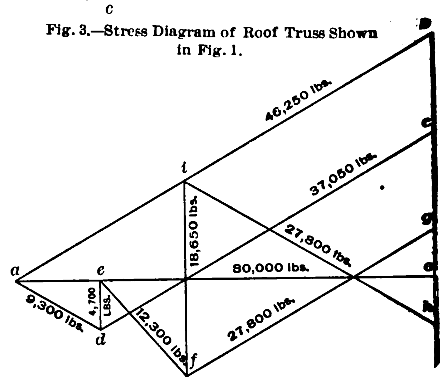


Fig. 6.—Stress Diagram of Truss Shown in Fig. 4.

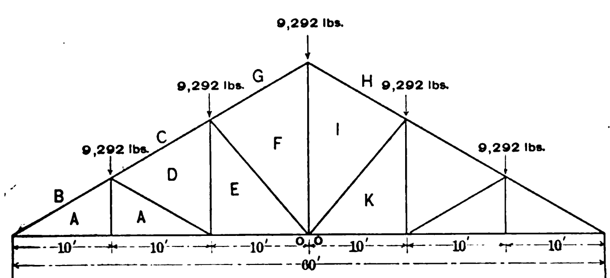


Fig. 5.—Diagram of Truss Shown in Fig. 4.—Scale, 1-16 Inch to the Foot.

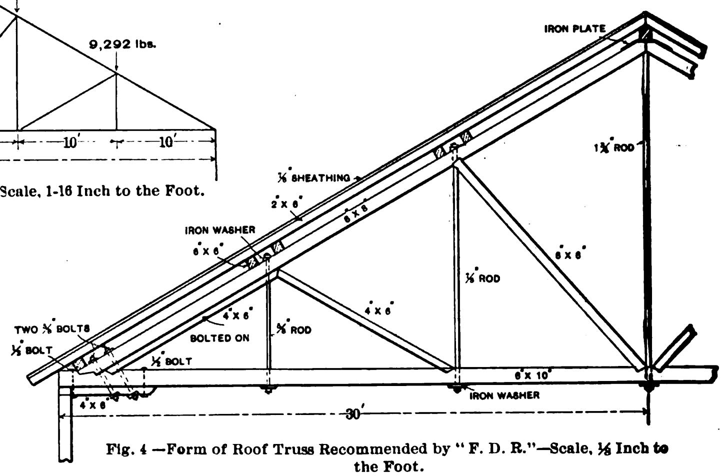


Fig. 4.—Form of Roof Truss Recommended by "F. D. R."—Scale, ⅛ Inch to the Foot.

Strength of Truss for Building of 60 Feet Span.

and use a 1-inch round bolt with nut or washer below, as shown in Fig. 1 of the sketches which I send. It could then be tightened when it became loose through the shrinking of the tie beam, as it surely will. Just why he has the 2 x 6 inch spiked on in the center of the tie beam I do not understand, as it has no work there to perform that I can see. In Figs. 1, 2 and 3 of the accompanying sketches are shown a truss with load and stress diagrams which I think is an improvement on that of "A. B. C.'s," but as I said before, I would not recommend this style of truss for a span of more than 45 feet, and especially for an open truss, as I think it does not look very well. I also think "A. B. C.'s" roof is rather flat for the section of country where a great deal of snow falls, as it undoubtedly does in Manitoba.

I think a great improvement would be made by using such a truss as that shown in Fig. 4. This is for a span of 60 feet, and the pitch is at an angle of 30 degrees. The roofing consists of ⅞-inch boards covered with shingles, and the roof boards might, as suggested by "A. B. C.," be planed so as to show underneath. I have figured the trusses 16 feet apart, as were the old ones, although this is fully as wide as it is well to place them. There will be two truss purlins on each side of the roof, the jack rafters will be 2 x 6 inches, planed, and spaced 20 inches on centers. If "A. B. C." will take his pencil and do a little figuring, I think he will bear me out in saying that the truss shown in Fig. 4 is the form best adapted for the purpose.

I will now proceed to determine the loads to be supported at the points where the purlins rest on the truss. The distance between centers of purlins I find to be 11 feet 6 inches, and as the trusses are 16 feet apart each purlin will support a roof area of $11\frac{1}{2} \times 16 = 184$. The weight per square foot of roof I take at $50\frac{1}{2}$ pounds—that is, 12 pounds for the roof, $26\frac{1}{2}$ pounds for wind and 12 pounds for the snow. The total load carried by the purlins will then be $184 \times 50\frac{1}{2} = 9292$ pounds, which will also be the load bearing on the truss at each of the points A, B and C. In this I have not included the ceiling or anything suspended from the truss. If "A. B. C." will now look at the strain diagram, Fig. 6, he will see how strong to make the members of his truss in order to successfully withstand the loads imposed upon them. I have only made the strain diagram of one-half of the truss, as the stresses are the same on both sides. If I apply the scale to the diagram of strains it will be found that the stress in the rafter A B is 46,250 pounds; the stress in A D to be 9300 pounds, and the others to be as shown by the figures in the strain diagram. From this he can proportion the various parts of the truss to suit the respective stresses. The greatest stress in the principal rafter of the truss is in the section A B, which has a compression of 46,250 pounds. As the length of the section is only 11 feet 6 inches, I will allow 800 pounds per square inch of cross section as working stress in the rafter, which gives 57 13-16 inches of cross section as the required area. As the timbers in the truss should be planed, and as they will be cut into more or less, it will hardly be safe to use 6 x 8, but as the stress in the rafter C D is only 37,050 pounds, a 6 x 8 inch will be strong enough, so we will make the rafter 6 x 8 with a 4 x 6 inch plank well spiked or bolted on the underside, as shown in Fig. 4. The stress in the brace A D is 9300 pounds, and as the required area of this would be $11\frac{5}{8}$ inches a 2 x 6 inch might answer, but as it would be liable to bend, and as the truss is open, it would not look very well, so I will use a 4 x 6. The strut E F has 12,300 pounds, which requires an area of cross section of $15\frac{3}{8}$ inches, so that a 4 x 6 inch timber will answer there, but as it is very long it will be safer to use a 6 x 6. The strain in the tie beam is 80,000 pounds, and as that would require an area of cross section of 44 7-16 inches a 6 x 8 inch is required; but as this beam is cut into for braces, iron rods, &c., I will use a 6 x 10 inch beam. The rod A A has no strain, and its duty is simply to hold up the tie beam, so that a ⅝-inch rod will answer the purpose. The rod D E has a tensile strain of 4700 pounds to resist—allowing a resistance of 10,000 pounds to the square inch for iron—and I need a cross section of 0.47 inch, the diameter of which would be 51-64, so I will use a ⅞-inch rod in order that it will not be necessary to have the screw ends upset. The next rod, F I, has a strain of 18,650 pounds, which would require a cross section of 1 13-16 inches, so I will use a 1¾-inch rod. I would use two ⅝-inch bolts, as shown. Now, as there is a load on each purlin of 9292 pounds, I would use a 6 x 8 inch timber for them. I have now determined the dimensions of each piece of the truss, and feel sure that there will be no danger of its collapsing so long as the timber remains sound.

Plans For Silos.

From H. S. L., *East Pharsalia, N. Y.*—Will some of the readers furnish good plans for silos, as of late the farmers in this section are building a great many?

Truss for a Church Roof.

From D. H., *Jackson, N. Y.*—As yet I have seen no discussion of the letter of "E. E. C.," which was published on page 17 of the issue of the paper for January, the letter being accompanied by a sketch of a truss for a church roof. He wished to know if the truss was strong enough to hold without the rods which he had added, the timber used being Georgia pine. I would say that the truss as shown is sufficiently safe without the rods, although by introducing them the tendency to sag and spread the walls is overcome. It appears to me, however, that the rods will seriously affect the appearance of the interior of the building. By making the principal rafters 4 x 10 or 4 x 12 and the other timbers 4 x 6 the correspondent can safely dispense with the rods. The truss on account of the steep pitch will be affected by the wind more than anything else. The 1-inch suspension rod is entirely too large, as a ⅝-inch rod would have been ample for the purpose.

Materials for Moving Buildings.

From CARPENTER, *Germantown, N. Y.*—Will the readers tell me through the columns of *Carpentry and Building* the experience of some good building mover. What kind of wood is used for rollers, what is their size and how are they turned? Will the correspondent making answer tell me the best make of jack screws and just what is the size of thread best to use on a 2-inch screw—$\frac{3}{16}$ or ¼ inch? Which thread will strip the quicker?

Bracing a Roof.

From C. K. S., *Wayland, Iowa.*—I wish again to call the attention of the readers of *Carpentry and Building* to a method of bracing a roof submitted by me some months ago and published on page 230 of the issue for September, 1895. This, I know, is only a small matter, but as a young carpenter, I do not believe the roof is braced properly, and I wish some of the older brother chips to express their opinions concerning it. Small mistakes sometimes result in big ones before we get through with them.

Patterns for Head Stock and Tail Pin of a Wood Turning Lathe.

From YOUNG CHIP, *Montreal, Canada.*—Will some reader kindly furnish for publication drawings showing patterns for head stock and tail pin of a 6-inch center wood turning lathe? As I notice questions on wood turning occur frequently in the paper, it will no doubt be of much interest to many others as well as myself.

Pierson's Shingle Nailing Machine.

From L. L., *Leroy, N. D.*—Will some reader who has had experience tell me the advantages or disadvantages of the Pierson shingle nailing machine. I want to know where it is manufactured, and to learn the experience of those who have used it.

Making a Lime Kiln.

From S. F. B., *Wellington, Ohio.*—If "J. F. M.," Pocatello, Idaho, will write to the Cobb Lime Company of Rockland, Maine, I have no doubt they will tell him all he wants to know about lime kilns. They have the perpetual kilns and are up-to-date in the lime business

WHAT BUILDERS ARE DOING.

GENERAL conditions in the building trades continue about the same as reported last month, except that the indications are growing steadily more positive. The condition of affairs among the workmen seems to be indicative of some disturbance on May 1, according to the number of local unions that carry out the orders from their several national bodies. It is reported that about 240 local unions of stonemasons, comprising nearly 12,000 members, voted to strike on May 1 should the eight-hour workday not be conceded to them. The American Federation of Labor, it is reported, intends to take decisive steps to bring about an eight-hour workday over the country. The matter was discussed by its Executive Council at a meeting held recently at the headquarters of the Federation at Indianapolis, and was referred to a sub-committee of three to take action. It is said the unions of the United Brotherhood of Carpenters may be selected to take the initiative, which means a general strike of the trade in localities where the eight-hour workday is not the rule.

Atlanta, Ga.

It is predicted that the coming season in Atlanta will be one of the busiest, among builders, the city has known for many years. There were few indications of activity during the months of January and February, but the amount of work in the hands of architects at the present time, and the number of building permits issued during the past month and the latter part of March, show an unusual amount of work in sight. The new work is principally dwellings in the best parts of the city and in the suburbs, although there are several business buildings projected. Everything seems to be quiet among the labor unions.

Boston, Mass.

The favorable indications of a good year for the Boston builders, reported earlier in the year, are proving well-founded, and the prospect brightens as the season advances. Early in April several large contracts were let for building in the business section of the city, the largest being that for a large hotel to cost over a million dollars, and among the others one for a large office building in Scollay Square. Several large storage warehouses and buildings for manufacturing purposes are also contemplated. The amount of building in the residence parts of the city will be satisfactory, many apartment houses and dwellings being projected. Work is being rapidly pushed forward on completing such jobs as the Tremont Temple and the new building on the site of the old Tremont House. The project to tear down and rebuild the old part of the State House is meeting with determined opposition on the ground of its historical value.

The Report of the Department of Building for 1895 shows a total of building permits of all kinds, including alterations, of 11,505, representing on a tax valuation an expenditure of upward of $15,000,000. The actual amount of money invested during the year, however, is estimated at a very much higher amount.

The department has completed its twenty-fifth year of existence, and during that time there have been, according to the records of the office, permits granted for 9300 brick buildings, 29,780 wooden buildings and 52,146 alterations made, 18,599 boilers, engines, heating apparatus, &c., set, 48,266 plumbing operations. During this time there have been 7305 brick buildings completed, at an estimated cost of $159,012,025. There have been 25,375 wooden buildings completed, at a cost of $79 130,684; 49,357 alterations made, at an estimated cost of $49,008,131. There have been 16,199 boilers, engines, heating apparatus, &c., set, at an estimated cost of $6,986,795. There have been 24,572 alterations made in plumbing, at a cost of $4,285,677, making a total of $298,423,312 expended in the improvement of property in the last 25 years, and for which a tax revenue was collectable.

There has been some talk of strikes in May among the workmen in several trades, for higher wages, &c., but nothing serious is anticipated by the employers.

Brooklyn, N. Y.

Buildings Commissioner Bush of Brooklyn reports that there will probably be more buildings erected in Brooklyn the coming season than for many years past. The only large building likely to be constructed this year, however, is the one to be built by the Commercial Bank on the northwest corner of Montague and Court streets. The building has a front on Montague street of 100 feet, and on Court street of 48 feet. George R. Morse is the architect of the building, which will be ten stories in hight, of modern architecture, constructed throughout of steel framework, with an outer facing of stone and brick. It will be an up-to-date building throughout in every respect, with elevators and all modern improvements. The bank will occupy the entire first floor of the building. There will be a fair amount of general building during the season if the building permits issued by the department may be accepted as an indication. The following showing of a week's permits indicates the amount of work being undertaken: 46 new buildings, value $202,475; 35 frame buildings, value $113,030; 68 alterations, value $75,158; total, $390,661.

Buffalo, N. Y.

Recent developments in the building interests of Buffalo have shown great improvement in both real estate and building matters. Although not many projects have been reported in proportion to the large number under consideration, a great part of these schemes have received impetus enough to make them sure. In about a month it is expected that everything will be running well, and it is hoped that buildings can be started by that time. That this year will not by any means be a bad one may be seen from the Bureau of Buildings quarterly report, showing permits in January, February and March for 408 buildings aggregating in cost $1,085,795.50, making the average cost of each over $2600. The favorite building this year is the modern apartment house. More money has been spent so far this year for this class of buildings than for any other, and new projects are reported every day. A large number of these structures have been finished in time for spring renting, and it is a notable fact that all the available space in them is taken before the buildings are finished. Builders see this, and are directing most of their capital in apartment houses.

Affairs among the workmen seem to have settled down to a more satisfactory condition, and save for the general uneasiness incident to the first of May and the opening of the season the outlook is favorable.

The Builders' Association Exchange is hard at work making preparations for the entertainment of the National Association of Builders in September.

Chicago, Ill.

The amount of building in sight in Chicago seems to be below the average of the past few years at this season, but activity of real estate interests point to a better prospect before the season is far advanced. The agreement between the allied carpenters' unions and the Carpenter Builders' Association was not fully understood at once, and for a short time there appeared to be danger of a serious difference between the employers and the men. The matter was explained to all concerned and everything seems to promise to go forward without further unusual friction. The sum of the agreement is virtually 35 cents per hour, eight hours per day, and no union men to work with non-union men. The details of the agreement provide, in addition to other things, for a standing committee on arbitration, and the settlement of all differences without stoppage of work in the manner advocated by the National Association of Builders. The Masons' and Builders' Association is striving to compel the brick manufacturers to concede an advantage in prices to its members. The masons and builders agree to buy materials only of those who will sell them at 10 per cent. lower prices than those quoted to non-members. They claim that, on account of their numbers, their responsibility and the time spent in learning the business of a master mason, they should be given an advantage over the builder who has no knowledge of the business, but who, nevertheless, is able to buy for a single building at as low prices as association members who are constantly engaged in the building line.

All of those firms who agree to the new regulations will have their names posted conspicuously in the rooms of the association, and all others are to be boycotted. The association recently fined one of its members $100 for violating the contract recently made with the Bricklayers' Union. It was proven that he had attempted to pay one of his workmen at the rate of 40 cents an hour instead of 50 cents, as agreed upon.

Alderman Kahler has introduced an ordinance providing that all persons engaging in constructing or repairing roofs of buildings must obtain a license therefor, the license to be $25 in amount. A bond of $500 must be filed before the roofing business can be begun, and failure to comply with the provisions of the ordinance is to be punished with a fine of not less than $50 nor more than $100.

The Building Trades' Club held its house-warming at its new home at 118 and 120 Monroe street on April 23, and it proved to be a most enjoyable affair. In addition to the members and their friends there were a large number of visitors present from outside the city including Wm. H. Sayward, secretary of the National Association of Builders, a delegation from the original Building Trades' Club of New York City, and many others of note.

Cleveland, Ohio.

It is reported that the building trades unions will make a demand for the eight-hour day in Cleveland this spring. They include the carpenters, plasterers, stonemasons, bricklayers, and, in fact, all trades identified with the construction of buildings. Their strength, as computed by labor agitators, number in the neighborhood of 5000 men. Both the Amalgamated Association and the Brotherhood of Carpenters are a unit on the matter. The brotherhood has five local unions, aggregating 700 men, and the strength of the Amalgamated Association is estimated at 200. The plasterers, lathers, stonemasons and bricklayers have a numerical strength of fully 2000. Then there are several other branches of the building trades which will be included.

The outlook for building during the comnig season is considered fair, and contractors generally are not apprehensive of any serious or protracted trouble with the workmen.

Lynn, Mass.

The outlook for building in Lynn during the present season is not very good, there being less than the usual amount of work in sight at this time of the year.

The carpenter's union has been trying to secure an increase of 25 cents per day for some time, together with a rearrangement of working hours. The demands of the workmen were to have been enforced on April 1, but action was postponed in order to obtain if possible a peaceful consent by all the employers. On April 1 about half the contracting carpenters had conceded the demand, and since that date the workmen have been trying to bring the others into line. Several conferences have been held and it is expected that the workmen will gain their end without the need of striking.

Everything is quiet at present in the other trades.

Minneapolis, Minn.

The contractor having the building of a new armory and drill hall at Minneapolis in charge has antagonized the masons and bricklayers by employing non-union men at 10 cents per hour less than the union scale. The workmen had been looking forward to the building of the armory for work, there being little else of importance being built at present, and the employment of non-union men has created considerable bitterness.

The prospect for the building season is not favorable as compared with the more prosperous years of the past, although there is a considerable number of dwellings and several buildings for manufacturing purposes projected. It is thought that later developments may bring about greater activity.

New York City.

Some little time ago an effort was made to pass a law which would compel architects practicing in the State to take out a license, but the attempt failed and another one has recently been made. A few weeks ago a bill was introduced into the State Assembly by Mr. Waldo, the various sections providing for the examining and licensing of architects practicing in the State. Materially from that introduced last year, but differing especially in its treatment of architects now in practice. Any person who at the time of the passage of the act is engaged in the practice of architecture can, on presenting to the State Board of Architects an affidavit to that effect, or a license from a similar constituted board in another State, receive a license without fee or examination. Each person licensed is obliged to have the fact recorded in the clerk's office of the county of his residence, or if a non-resident of the State in the county in New York State in which he has an office. The State Board of Architects are to keep a corrected list of licensed architects and any license may be revoked by them for gross ignorance, recklessness or dishonest practices of the holder.

The most important feature at present, in the total that makes the sum of the volume of building operations in New York City, is the reconstruction of the old office and business buildings in the mercantile districts. While the enormous amount invested in flats and tenement houses during the past few years is still an important item in the total the largest amounts during 1896 will probably be invested in the business parts of the city.

An analysis of the work planned so far this year shows a continuation of the movement developed in 1895. Plans have been filed this year, between January 1 and March 20, for 27 new office and mercantile buildings, costing over $10,000,000; for nearly 200 flats, costing over $4,700,000, and for 25 churches, stables, factories, &c., costing over $1,500,000. These are exclusive of all private houses and of the city above the Harlem River.

The past year was the best, in point of money invested in building, in the history of the city, the total amount being estimated at above $83,000,000. The next best year was 1890, which represented an investment of about $9,000,000 less.

There have been several small strikes during the past month, but none that have become sufficiently general to affect more than individual employers. Conferences between employers and workmen over differences are steadily becoming more frequent, as both are being more carefully organized. The Building Trades' Club has become the recognized place of such meetings and its offices have been most beneficial to all concerned. A certain amount of agitating is being done by the workmen on the universal eight-hour day question, and there is some talk of strikes on May 1, but it is thought by some of the most conservative builders that no serious complications will ensue.

The Mason Builders' Association held their usual monthly meeting on April 9, the principal business being the consideration of the report of the Board of Arbitration on the subject of the agreement with the men for the coming year.

A curious instance of the arbitrariness of trades unions was mentioned in the New York papers a few days ago. A member of the Architectural Iron Workers' Union in this city, who wanted to provide some extra comforts for his family, started a small foundry at his home, where he did work at night for his employer. The union found this out and decided that it was against the rules, so fined the industrious workman the sum of $25.

Providence, R. I.

Providence builders are looking forward to the continuation of the activity that prevailed throughout 1895. A large amount of work is already in sight and more is promised. The new station for the N. Y., N. H. & H. R. R. is an unusually large job and will supply a large amount of work, and there will be considerable in the residence parts of the city and in the suburbs.

There has been some talk of a strike for eight hours on May 1 by the carpenters whose unions belong to the American Federation of Labor, but there seems to be so much difference of opinion among the men as to the wisdom of striking, that the situation is not considered serious.

Pittsburgh, Pa.

The union plasterers of Pittsburgh and Allegheny have determined to strike for $3 per day of nine hours. Before the strike three years ago, when the plasterers were defeated, they were getting $3.50 a day of nine hours, and eight hours on Saturday. A lot of new men were imported and the union men decided to go to work for anything they could get. The panic came on, and many strayed into other trades; but during all these trials about 100 men were carried on the rolls in the union. Recently No. 57 of the South Side joined No. 31 in a body. Many new members have been added to the roll, until now only about 60 plasterers are on the outside.

The workmen do not think the master plasterers will fight the demand, as it has been talked of for several months' and it is understood that a demand will be made. Six firms have practically agreed to pay the advance. The bosses have an organization known as the Master Plasterers' Association, and a meeting may be called to confer with the men. There are about 50 bosses in the two cities and vicinity. The wages paid are $2.50 per day, and the men claim they cannot average $1.50 a day during the year, taking lost time into consideration.

About 500 men will be affected and much work may be retarded if the fight is stubborn. Coming at an especially busy season, a strike would seriously interfere with building operations.

The action of the plasterers, following closely upon the successful demands of the plumbers and painters for an increase, is quite likely to be initiated in other trades. It is predicted that the carpenters will be the next to ask higher wages and to strike if they do not get them.

The coming season is looked forward to very hopefully by the builders of the city, and the amount of work already projected promises a busy season. Among some of the larger operations are an armory to cost about $250,000, and a building for the West Pennsylvania Hospital to cost about $1,000,000. The latter is as yet on paper only. At least one new public school building will be put up during the season, as well as a large number of apartment houses and tenements.

Pittsfield, Mass.

The contracting builders of Pittsfield, Mass., have for some time been considering the advisability of forming a builders' exchange, and the action of the masons' union in asking for shorter hours has forced the matter to an issue. The employers have formed themselves into an association and their principal intention, so far as yet expressed, is to maintain a uniform working day of nine hours. Secretary D. W. Devanny has given out the following action of the new association: "The Pittsfield Builders' Association is composed of contractors in the various branches of building construction and dealers in building supplies. It already includes as members most of the contractors in the city. At a recent meeting this vote was passed, 'That nine hours constitutes a day's work in each of the trades represented in the association.'"

Concerning the terms of employment the opinion of the members is expressed in the following resolution, which was adopted unanimously, as the sense of the association and agreed to, as outlining the course of action to be observed:

Resolved. That while we are not opposed to the employment of any man because of his membership in any union, yet we are of the opinion that our interests as employers will not permit us to let any but ourselves decide whom we shall employ and what work we shall personally do in carring on our contracts.

There is a large amount of talk about the building to be done during the coming season, but the builders say that very few contracts are being signed.

San Francisco, Cal.

Present indications in the building interests of San Francisco point to serious trouble between employers and workmen over the demand of the former for the acceptance of the "card system" as a means for preventing the employment of non-union workmen. The trouble originated with the painters who first made the demand, but other trades are likely to be involved before the matter is adjusted. On March 17 the Master Painters' Association of the Pacific Coast met in the rooms of the Builders' Exchange and voted to refuse to adopt the "card system" advocated by the union. Since that time the relations between the two have been growing more strained, and the strike which resulted is extending to other branches of the trade. The action of the Building Trades' Council has virtually committed the workmen in all branches of building to the support of the painters, and a general strike is likely to occur before the matter is settled.

The difference between the carpenter contractors and the contractors in other branches of the business over the custom of making the carpenter the general contractor for a whole job has been practically settled, so far as the Builders' Exchange is concerned, by the election of a Board of Directors favorable to separate bids for all parts of the work.

The prospect for building this year is still unfavorable, and there is little at present to warrant a very hopeful view. A considerable amount of work is being done, but the comparative amount is small.

St. Louis.

At no time during the history of the office of its Building Commission has the prospect for building been so good in St. Louis at this time of the year as it is at present. From the beginning of the year each month has shown an increase in permits issued over any other corresponding month in the history of the department, and builders generally are feeling elated over the prospect. It is estimated on the average established by the permits already issued that the total frontage of buildings to be built will be equal to 300 city blocks. An inspection of the records of the Building Commissioner's office shows that the larger percentage of permits issued have been for dwellings and flats of an average cost of $3000 each. There have been a number of permits issued for large buildings, but the number is about the same as in former years, and the general average is not affected thereby.

There is little likelihood of trouble with the workmen, unless new developments occur, as everything seems to point to an ordinarily quiet season in this particular.

Notes.

The journeymen masons of Salem, Mass., have asked the bosses to pay 42 cents an hour for work this season. The men are now paid $3.50 a day, which is equivalent to 39 cents an hour, on the basis of a nine hour day. The price asked for would be a raise of about 25 cents a day.

The master painters of Springfield, Ill., recently effected an organization by electing the following officers: P. F. Kimble, president; G. W. Harnett, vice-president; John M. Kimble, secretary; Geo. E. Day, treasurer. It will be known as the Masters' House Painters and Decorative Association of Springfield, Ill. The demand made by the painters' union is for a rate of $2.50 per day for journeymen painters, and provides that not less than $2.25 shall be paid to any painter who is not an apprentice.

Union painters and paperhangers of Elmira, N. Y., are striking against the employment of non-union workmen.

The prospect for building in 1896 in Colorado Springs, Col., is considered very hopeful. An unusual number of buildings are projected for immediate erection.

Richmond, Ind., builders are looking forward to a busy season, the amount of work now in sight being much greater than that in hand at this time last year. The new work will be principally dwellings, many of which will be built in West Richmond.

The Central Labor Union of Louisville, Ky., is talking of the establishment of an eight-hour day throughout the building trades of the city on May 1. Employers are not counting upon any serious interference with work.

Syracuse architects and builders expect a dull season in that city unless matters take an active turn for the better in the near future. The spring thus far has been one of the dullest on record.

Contractors and dealers in building materials of Anderson, Ind., are at work forming a builders' exchange. A meeting was held on April 6, and another for permanent organization and election of officers will be held in the near future.

The plasterers of Green Bay, Wis., who have recently organized a union, have decided to advance prices from 8 cents per yard to 12 cents, and the action has raised a protest from the contractors, who claim they will not pay the figure.

The building trades of Denver do not report a more than usually good prospect for the summer, though as spring advances there is evidence of more and more building. The bricklayers have served notice on the bosses that wages will be advanced on May 1 from \$3 to \$4 per day. No trouble is anticipated, as nearly all the bosses have agreed to the raise. The notification of the bricklayers was given early enough so that all contracts for the year have been made on the higher rating.

A report of the Kansas City Builders and Traders' Exchange shows more contracts let at the present time this year than at the first of May last year. Most of the members have contracts and are only waiting for good weather to commence their work. The indications are that this will be one of the best springs, in the way of building, that Kansas City has seen for some time.

Toledo builders, as represented by the Exchange, are trying to compel the architects to present full drawings and specifications for estimating at the time bids are invited, neither of which are provided at present.

There is every prospect of a building boom in no less than fifteen Kentucky towns this summer.

After several preliminary meetings representatives of every building trade in Los Angeles, Cal., met at Painters' Hall and organized a Building Trades' Council. A prosperous summer is looked for and the different trades unions of the city deem it for their interest as well as for the interests of their employers that some such action should be taken. The fact that there are a large number of irresponsible contractors now doing business in this city has induced the different trades unions to take this action for the purpose of assisting the legitimate contractors.

Decatur, Ill., plasterers ask an increase in wages from 35 to 50 cents per hour.

The agreement between Indianapolis stone contractors and their workmen for 1896 is the same as regards wages as it was in 1895, viz., 45 cents per hour best men and 40 cents for others.

The Builders and Traders' Exchange of Columbus, Ohio, on March 6, presented R. D. Conger, the retiring secretary, with an elegant gold headed cane in recognition of his untiring services the past two years. J. G. Drayer, the first vice-president, made the presentation speech.

The Cleveland Master Painters' Association and the painters' unions are trying to establish a uniform day of eight hours on all painting work in the city.

An adjourned regular monthly meeting of the Worcester Builders' Exchange was held at 11 o'clock, March 6. Four new members were elected, making the total membership 96. The new members are Martin Wilson, contractor in stone; B. D. Metcalf, painter and glazier; Ward & Blaudin, contractors and builders; W. E. Putnam, contractor and builder. It was voted to express approval of the measure for 1 cent letter postage, and a record of this vote will be sent direct to the Congressional Committee.

A commission composed of builders, architects and journeymen has been formed in Utica, N. Y., to urge the creation of a department for the inspection of buildings, by the city, and the appointment of an inspector.

Union painters in Galveston, Texas, are trying to establish an eight-hour day in their trade. Conferences are being held with the Master Painters' Association.

Mr. Lacroix, city building inspector of Montreal, speaking of the prospects of the building trade this season, said: "It is a good many years since I have seen so few new buildings going up, and from all I can learn the probabilities are that there will be very few new buildings erected in the city this year."

The San Jose, Cal., Hodcarriers' Union decided at its last meeting to raise the scale of wages from \$2.50 to \$3 per day after May 1. The Bricklayers' Union will likely take similar action at their next meeting. The former scale of \$5.50 and \$6 per day has not been obtained for some months, the ruling wages being \$5 per day. Contractors are said to not oppose the contemplated raise.

At its recent annual meeting the Builders' Exchange of Fitchburg, Mass., elected the following officers for the ensuing year: W. C. Carter, president; H. E. Jennison, vice-president; J. S. Starr, secretary and treasurer; A. Wellington, H. B. Dyer, F. A. McCauliff, G. M. Parks, Geo. Buckley and J. D. Littlehale, trustees.

Building interests in Atlanta are reported active, with an excellent prospect for 1896.

At the annual meeting, the Appleton (Wis.) Builders' Exchange elected the following officers for the ensuing year: President, W. Wilson; vice-president, W. S. Patterson; secretary, S. B. Belding; treasurer, August Knuppel. Directors: H. Schneider, C. L. Marston, A. H. Weickert, Wm. Duvall, Chas. Lang. The exchange has had the best of success since incorporated, less than one year ago and starts in the new year with the special aim in view to give reasonable assurance to the public of the skill, integrity and responsibility of its members.

The various labor unions of Kansas City are seeking the establishment of a central organization which shall control the whole.

The Builders' Exchange of Toronto, Ont., has elected the following officers for 1896: President, John Aldridge; first vice-president, T. Cannon, Jr.; second vice-president, John Vick; treasurer, David Williams. The following directors were also elected: Wm. Booth, John Wickett, Jas. Crang, Jno. M. Gander and George Henry. Auditors: Messrs. Fred. Holmes and Geo. Clay.

Binghamton, N. Y., is looking forward to an unusually active year in the building trades.

Architects and builders of Chattanooga, Tenn., predict a more active year in 1896 than has existed since the "boom" day of the past.

The Builders' Exchange of Bridgeport, Conn., has elected the following officers: President, C. H. Botsford; vice-presidents, Zalmon Goodsell, Chas. Bottomly; secretary, W. S. Dowling; treasurer, Jos. Sanger. Trustees, C. L. Chamberlain, L. H. Mills, H. M. Purdy, D. C. Mills.

Pittsfield, Mass., masons are asking for an increase in wages and changes in the working rules to prevent the employment of non-union men.

LAW IN THE BUILDING TRADES.

WHEN CONTRACTOR IS NOT LIABLE FOR INJURIES TO WORKMAN.

A contractor for the erection of a brick building employed a party as a laborer in attendance upon the masons, who were also in the employ of the contractor. This helper, while engaged in his work, was injured by the fall of a scaffold constructed by the masons, and the falling of it was due to their neglect in putting it up. The Supreme Court of New Jersey held that the contractor was not liable, as the injuries arose from the negligence of fellow servants, which is a risk assumed by all employees.—Maher *vs.* McGrath, Supreme Court N. I., 33 Atlantic Reporter, 945.

MECHANIC'S LIEN FOR FIXTURES; HEATER AND RANGE.

A heater and range, although but slightly attached to the building, are fixtures, if put in by the owner of the premises with the intention of making them such, and the one who puts them in, under such circumstances, is entitled to a lien, and has priority over a mortgage made subsequent to the execution of the contract.—Erdman *vs.* Moore, Supreme Court N. J., 33 Atlantic Reporter, 958.

SURETY ON BOND OF CONTRACTOR.

Where a building contract provides as a condition precedent to the final payment that there shall be no legal claims against the contractor for work or materials furnished, a surety on the bond of the contractor cannot enforce a lien for work or materials. He cannot be permitted to recover without violating his contract of suretyship, and he must therefore be held to have waived the right to file any lien in the face of his contract.—Gannon's Ex'rs. *vs.* Cent. Presb. Church, Supreme Court Penn., 33 Atlantic Reporter, 1043.

CONTRACT PRICE IS BINDING.

Where a complaint in an action to recover for work and materials alleges that they were furnished under a contract, which fact is not denied, the only issue being made in the pleadings being the contract price, evidence of the reasonable value cannot be introduced.—Fladung *vs.* Dawson, Supreme Court Cal., 43 Pacific Reporter, 1107.

FRAUD OF CONTRACTOR AND OWNER WILL NOT PREVENT LIEN.

In an action to enforce a mechanic's lien in favor of a sub-contractor, notwithstanding the contractor had covenanted that no liens should be filed, on the ground that though the title stood in the name of the sister of the contractor, the latter was whole or part owner of the property, and the whole scheme of having it put in her name and his making the contract and covenant was a mere device, participated in by both of them for the purpose of misleading and defrauding strangers to the title who should furnish labor and material, the Supreme Court of Pennsylvania held such evidence sufficient, though it would not be to create a resulting trust adverse to the holder of the legal title.—Ballman *vs.* Heron, 32 Atlantic Reporter, 249.

HINTS ON WOOD CARVING.*

BY CHAS. J. WOODSEND.

IN the last article bearing on the subject of wood carving there was given a rather simple design of a crocket, together with various sections indicating its method of construction. In the present instance the subject is a crocket of more elaborate design than the one previously given, and allows considerable play for the exercise of the student's ability in handling his tools. In this design it will be observed that there is considerable downward and under cutting—features which involve the exercise of a great deal of care in order to prevent chipping out pieces while the work is in process of execution. In cutting the crocket shown in Fig. 95 of the illustrations the entire work may be done with gouges, each member being worked down gradually. The first step to be taken is to fit the blocks after the manner indicated in connection with the previous design and then saw to the outlines. If the situation will permit, fasten them securely in the places where they are to remain, and then proceed to work the bands of leaves between the swelled parts. The leaves marked XX are repeated until connecting with the next swelled portion, thus making the design continuous. The shapes of the leaves are given upon the sections A B, C D, E F, G H and T U, shown in Fig. 96 of the engravings. If the student will carefully examine the sections, keeping in mind the general outline of the design, he will have no trouble in finding the correct curves. After the leaves are worked commence to rough out the swell, and while doing this make it a point to carefully study the various sections. Note the projecting parts and how they run, also observe the manner in which the curves run into and out of each other. If so desired, templets or calipers may be used according to convenience, but a gauge of some kind is absolutely necessary in the beginning. While doing this work it will be noticed that the leaves marked Z project beyond and partially cover the band of leaves marked X. Their relative positions are shown in the sections G H, J K and T U of Fig. 96, and are marked in the positions it is intended they shall occupy. There are no veinings shown to the leaves and none are required, all that is requisite being bold outlines and curves to create shadows. A certain amount of roughness of execution is preferable to very fine or minute work in these situations, retaining, of course, the general outline as given Crippled work is objectionable in all cases, but the work may be rough and still remain symmetrical in all its parts.

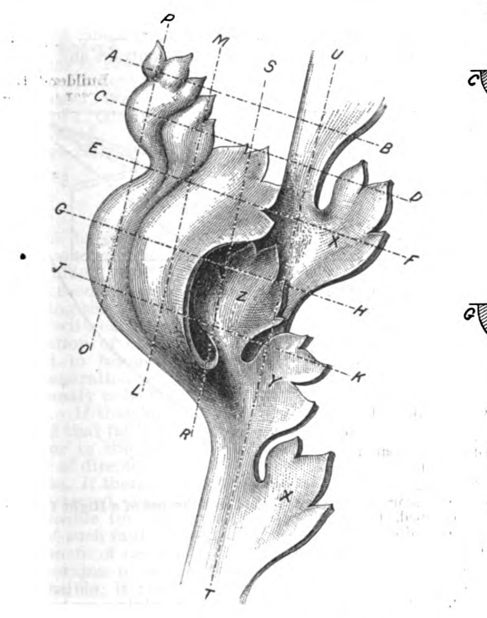


Fig. 95.—Crocket of Rather Elaborate Design.

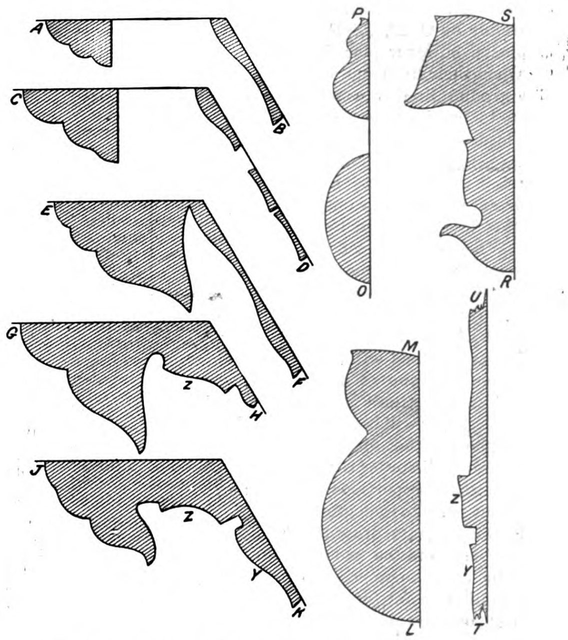


Fig. 96.—Vertical and Horizontal Sections taken on the Various Lines Indicated.

Hints on Wood Carving.—Design of a Crocket with Various Details.

* Copyrighted 1894, by David Williams.

The Williamson Trade School.

The third annual commencement of the Williamson Free School of Mechanical Trades, at Media, Pa., took place at the school building on Saturday, April 4. Prior to the commencement exercises, an inspection was made of the workshops and the other departments of the institute. Graduating diplomas were awarded to 15 students in machine work, 16 in bricklaying, 8 in carpentry and 4 in pattern making. Cash prizes to the amount of $378.50 were also distributed among the classes for excellence in conduct and for superior work in the school and shops. The course and trade training given in the Williamson School is said to be thorough and complete enough to equip the boys graduating from the institution with a sufficient knowledge to start them in a trade under the best kind of auspices. According to the will of the founder of the school, instruction is entirely gratuitous. The success of the youths who have been turned out into the world from this institution has been most gratifying to the trustees and friends of the schools. Considering the comparatively short time in which the school has been in existence, it has succeeded in accomplishing an amount of good work for the friendless boys of Philadelphia and its vicinity which does the greatest credit to the authorities of the institution. The display of the work of the classes for the session just closed showed an appreciable advance as regards skill over the exhibit of last year.

THE trustees of Princeton University report the gift of a new library building, which will be constructed of stone and cost not less than $300,000. The plan contemplates a structure 166 feet square.

Architectural Drawing for Mechanics.*

BY I. P. HICKS.

A STRIKING illustration of the effect of placing an object in various perspective positions and the use of hight lines or vertical scales is presented in Fig. 56. In the design A and B represent the geometrical size of a frame, as, for example, a transom, A showing it standing on end and B resting on its side. C, D, E, F and G are of the same size as A and B, but represent the object in different perspective positions. C and D represent perspective views of the object standing on the narrow end. C and D are both the same size, but C being more distant than D appears smaller. E and F show different perspectives of the frame as it would appear lying flat on the picture plane, which is the surface on which the drawing is made. G is a perspective of the frame standing on the long side in an upright position. It is of the same size as the other perspectives, but its appearance, as influenced by position and distance from the eye, is greatly changed from the other figures, as may be seen from an inspection of the drawing. The effect of different positions is shown very forcibly by C, D, E, F and G. It is also obvious that objects, however placed, have the same vanishing points when their lines and planes are parallel.

The ground line is usually assumed to be the lower edge of the picture plane, all horizontal scales being measured in this line, and it is simpler to have the nearest edge of the object touch this line as, shown by D and E. When objects touch this line they are in the extreme foreground. When objects do not touch this line, but instead are drawn back of it, as C, F and G, the scales are still set off on the ground line or plane of measures, as it is sometimes called, and transferred, as will be shown by reference to the diagram. This is necessary in order to preserve the actual proportions of the different parts to each other. To make the diagram draw the H L, the P L V and the ground line in the usual manner, also fix the station point and the measuring points as shown. Now it will be observed that C is set back a considerable distance from the ground line. This distance is assumed when it is not definitely known. In this case the distance is assumed to be V H, and a line drawn from H to M P I will, in crossing the retreating ground line, determine the perspective distance from the ground line from which to start the outline of C. In order to determine the hight it is necessary to have a vertical scale, which is represented by V S. On this line set off the actual hight of the object as taken from A, and draw the line from S to the V P, which will determine the perspective hight of C. The perspective width is determined by setting off on the ground line the actual scale width of A, as H I, and drawing the line from I to M P I, as shown. The outline of D is drawn in exactly the same manner, the only difference being the position, which is such that its nearest line touches the ground line. E and F are drawn in like manner, but the object lying flat on the picture plane without any hight being represented no vertical scale is needed. G, which is a perspective of B in an upright position, requires a vertical scale, as represented by V^2 S^2. We have now illustrated the use of the hight line or vertical scale and shown that all distances, however remote or small, may be kept proportional and determined by the horizontal and vertical scales.

(To be continued.)

* Copyrighted, 1894, by I. P. Hicks.

Protection of Sub-Contractors.

The Select and Common Councils of the city of Philadelphia have passed an ordinance, which was signed by the Mayor on March 31, for the protection of sub-contractors as well as for persons furnishing materials and labor for the construction of public buildings. The ordinance states that "hereafter any person or persons entering into a contract with the city of Philadelphia for the erection or construction of any public building, or the prosecution or completion of any public work, or for repairs upon any public building or public work, either in the capacity of sub-contractor or material and supply man, or for labor furnished upon said buildings or work, shall be required before commencing such work to execute a penal bond in such sum as may be required by ordinance or by the head of a department or bureau, together with such sureties as may be required by ordinance or said head of department or bureau, with the additional obligations that such contractor or contractors shall and will promptly make payment to all persons supplying him or them with labor or materials, whether as a sub-contractor or otherwise, in the prosecution of the work provided for in such contract; and any person or persons making application therefor and furnishing affidavit to the department or bureau under the direction of which said work is being, or has been prosecuted, that labor or materials for the prosecution of such work has been supplied by him or them and payment for which has not been made, shall be furnished with a certified copy of such contract and bond, upon which said person or persons supplying such labor and materials, either as a sub-contractor or otherwise, shall have a right of action and shall be authorized to bring suit in the name of the city of Philadelphia for his or their use and benefit against said contractor and sureties and prosecute same to final judgment and execution; provided, that such action and its prosecution shall involve the city of Philadelphia in no expense, and that the person or persons authorized to bring suit shall first furnish such indemnity to the city of Philadelphia against costs as shall be approved by the city solicitor; provided, also, that said bond shall contain a condition that no suit shall be brought upon the same after the expiration of two years from its date.

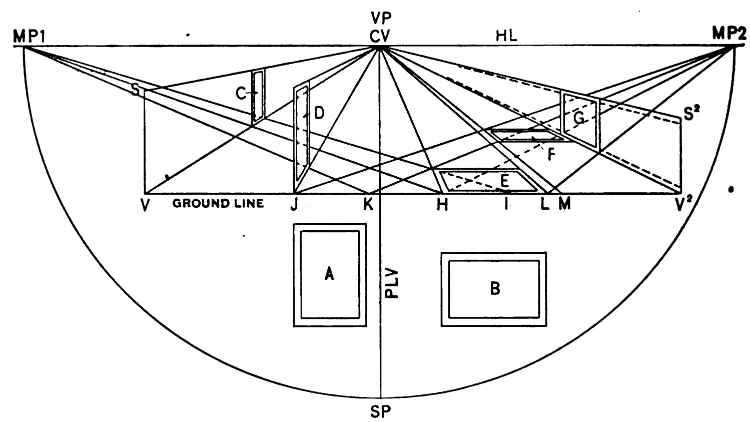


Fig. 56.—Diagram Showing Effect of Different Perspective Positions and the use of a Hight Line or Vertical Scale.—Scale, 3-16 Inch to the Foot.

Architectural Drawing for Mechanics.

FOR some time past the idea of providing suitable dwellings for the wage earners of New York has been developing, and within the past few weeks it has been determined by the Committee on Model Apartment Houses of the Improved Housing Council to commence practical operations. With this end in view, the committee has invited architects to submit plans for a block of dwellings which in design and construction shall conform to certain principles and specifications contained in a pamphlet issued by the secretary of the Council, William H. Tolman of 105 East Twenty second street, New York City. The plans must be submitted on or before May 11 of the present year, and while the committee is not in a position to offer prizes to competitors, it is stated that the architect whose plans may be accepted will be appointed the architect by the committee, providing in its judgment it is warranted in so doing.

The Builders' Exchange

Directory and Official Announcements of the National Association of Builders.

Officers for 1896.

President,
Charles A. Rupp of Buffalo.
First Vice-President,
H. J. Sullivan of Milwaukee.
Secretary,
William H. Sayward of Boston.
Treasurer,
George Tapper of Chicago.

Directors.

Noble H. Creager	Baltimore.
E. Noyes Whitcomb	Boston.
John Feist	Buffalo.
William Grace	Chicago.
Frank L. Weaver	Lowell.
Louis A. Clas	Milwaukee.
Stephen M. Wright	New York.
Stacy Reeves	Philadelphia.
Thomas B. Ross	Providence.
Justus Herbert Grant	Rochester.
Thomas J. Ward	St. Louis.
George J. Grant	St. Paul.
A. S. Reed	Wilmington.
George H. Cutting	Worcester.

Unofficial Criticism.

The habit of unofficial criticism and private "kicking" among members of a builder's exchange is one that does much more harm than is realized by those who indulge themselves in this particular. Members in the habit of doing this sort of thing get off by themselves and find fault with existing conditions, the action of their officers, the action of other members, &c., and become so accustomed to being dissatisfied with the exchange and its administration that they lose sight of the fact that they are mostly to be blamed for the things which they condemn. If they have any fault to find, the time and place to find that fault is in the open meetings of the organization, or in the form of official written complaint to the board of directors or other governing body, whatever it may be. If there are faults in administration, they should be corrected, and those who recognize those faults are responsible for their continued existence as the recognition of such faults implies the duty of their correction for the benefit of the whole. The member who sees no fault has nothing of which to complain, and is therefore not responsible; it is the duty of the member who sees the fault to report the matter to such in authority as will insure action looking to correction. Purposeless kicking, off in a corner, is worse than useless, as it breeds dissatisfaction without effort to wipe out the cause of complaint.

The following circular was recently issued by one of the filial bodies of the National Association of Builders to its members, and is given as a sample of a good means to elicit criticism in the proper way:

> The Board of Directors desire to receive suggestions looking toward the definition and establishment of methods and practices that will be conducive to the best conditions within the association, either in regard to the conduct of the business of the association or in regard to the attitude and relation of members toward each other.
>
> Every individual and firm in any way connected with the association is requested and urged to present suggestions in writing to the board covering any points wherein improvements may seem to be possible and desirable.
>
> The board asks that these suggestions be presented to them on or before the first day of May next, in order that they may be properly prepared for consideration at the May meeting of the corporation, and printed for distribution.
>
> As this opportunity for expression of opinion is open to all, the board will conclude that those who do not formulate and present recommendations for changes and improvements are satisfied with the conduct of the affairs of the association and see no way open to improve methods and practices of members in their relations with each other, beyond codes and principles already adopted by the association in addition to the operation of the by-laws of the body.
>
> In this connection the board calls attention to the "Code of Practice" adopted in August, 1894, a copy of which accompanies this circular.
>
> The board sincerely hopes that those members who believe that improvements are possible and desirable will not fail to take advantage of this opportunity to formulate them, so that everything possible may be done and be done comprehensively, rather than by piecemeal, in producing the best possible conditions for the welfare of all concerned.

Architect and Contractor.

Certain details of a recent competition, in one of the principal cities of the East, offer an excellent example of the attitude frequently assumed by architects and the position which should be taken by the contractor in such cases. The competition, which was for a very large building, was conducted under what is known in the East as the "general contracting" system, whereby one contractor, either the mason or carpenter, is asked to assume the whole contract, all other parts of the work being sub-contracts. In the case in point, the general contractor was a mason builder, and prior to asking sub-bids he was given the names of such concerns as would be acceptable sub-bidders for the several parts of the work, more than one concern in each branch being named to insure competition.

After the bids for the entire work were opened by the architect, and the contract virtually awarded in due form to the lowest bidder, the architect requested an interview with the contractor who had secured the work. He desired to know whose figure the contractor had used for a certain portion of the work, and upon being informed that A's estimate had been the lowest and was therefore used, stated that the owner desired B to do the work. The architect proposed to the contractor that he throw out A's bid and use B's, adding the difference to the total of the contract for the whole work. The contractor stated that A, having been the lowest bidder in a legitimate competition, was entitled to the work, and asked what compensation would be allowed A for resigning his rights in favor of B, in case he was willing to so resign. The architect declined to concede that A was entitled to any compensation whatever, and proposed that his bid be thrown out unconditionally and the work given to B. He attempted to sway the general contractor by intimating that he might be thrown out and lose the general contract if he did not accede to the proposition to deprive A of his rights. The general contractor maintained the injustice to A of such a proceeding and declined without qualification to become party to any such unfair discrimination, and stated that the principle involved was much more far reaching than the performance of one contract, however large, and that nothing, not even the loss of his own profit, would induce him to consent to A being robbed of his rightful portion of the work. The architect refused to recede from his position, and the contractor next sought the owner and explained the situation to him, pointing out that both A and B had been indicated as being acceptable sub-contractors and that in legitimate competition A's bid had been the lowest and had therefore been used. The owner at once saw the justice of the general contractor's position, and notwithstanding his desire to have B perform the work, admitted that A alone was entitled to the contract, and informed the architect that no change should be made unless A received satisfactory compensation for withdrawal.

A Worthy Example.

The example set by the general contractor in this case is worthy of the highest commendation and is one that should be followed by every general contractor in the country. It is the absence of such fidelity to the moral obligations of a general to a sub-contractor, coupled with the unscrupulousness of the architect or owner, that brings the business of contracting into such ill repute. Every case such as this, where a contractor stands firmly for his rights and for the rights of those committed to his keeping, proves unquestionably that it is possible to conduct the building business upon an honorable and profitable basis. The position of the architect in this case is one that occurs with too great frequency, and is one that should be rigidly opposed and relentlessly shown up. The utterly unwarrantable position of the architect in this case is manifested most plainly in the fact that the nature of his relationship to the contractor and the owner is such that he is the one person to interpret the duties of each to the other and to protect the interests of both. The architect in this instance, instead of standing for justice and pointing out to the owner the inalienable obligations of competition, sought by the most despicable means to rob one contractor through an appeal to the cupidity of another, utterly disregarding equity and honor; and all for the purpose of currying favor with the owner, his client.

Not an Isolated Case.

This is, unfortunately, not an isolated case, but is a fair sample of the methods frequently brought into operation in the building business. The contractors themselves are largely to be blamed for this state of affairs, as their attitude, in too many cases, is one of willingness to sub mit to anything, or to do anything, honorable or otherwise, for the sake of securing a contract. This laxity among the builders gives the architect the assurance to hold over the contractor the threat, "If you won't submit, there are plenty of others who will." The perpetuation of such conditions is destructive alike to profitable business and honorable dealings, and it is the duty of every honest contractor to "show up" every architect whose methods are dishonorable, as in the case cited; and it is the duty of every architect to brand every contractor who seeks to obtain, by dishonest methods, a contract belonging to his competitor.

This case is an excellent example in demonstrating the evils in the building business against which the National Association of Builders has directed its attack. The main function of the association is to define to builders generally the principles of honorable dealing and to make plain the inherent benefit to all concerned of fair and legitimate business practices. Ever since the organization was founded it has steadily kept before builders everywhere with unremitting insistance, the protective value of fair and open methods, and has spared no pains to point out practical examples of the operation and effect of both right and wrong business practices. The constant and widespread dissemination of information as to what constitutes honorable dealing has resulted in the adoption of "codes of practice" by local organizations of builders, and has gradually brought about a clearer understanding of the moral obligation of business relationships. Out of the experience of the many, builders have had defined for them the limits of the legitimate operation of lack method customs which years of letalone policy have permitted to prevail, and have had pointed out the exact and particular habits that are wrong, and wherein the wrong exists.

The beneficial effect upon the whole fraternity of its gradual permeation by the principles made public by the National Association cannot be overestimated; and every application of these principles, as in the foregoing case, strengthens the power of the fraternity to resist the injurious action of customs which permit dishonorable dealings to exist in the building business.

Fire Proofing Steel Skeleton Construction.

Much attention is now paid to methods of fire proofing the steel skeletons of buildings erected at the present time, especially in the case of structures intended for public purposes. A notable illustration of this feature, says the *Brickbuilder*, is presented in the treatment of the great girders of the new Tremont Temple in Boston. The steel girders are first placed in terra-cotta blocks, on all sides and below, these blocks being then strapped with iron all around the girders, and upon this is stretched expanded metal lathing covered with a heavy coat of Windsor cement; over this comes iron furring, which receives a second layer of expanded metal lath, the latter, in turn, receiving the finished plaster. There is, consequently, in this arrangement for fire protection, first a dead air space, then a layer of terra cotta, a Windsor cement covering, another dead air space, and finally the external Windsor cement. These great girders are characterized as the vital parts of the whole steel structure, the necessity of their absolute protection being explained by the fact that a rise in temperature of 300 degrees would throw the columns out of place about 1½ inches on each side, and a rise of about 500 degrees would ruin the steel. Another feature to be noted in this work relates to the partitions of the outside corridors about the auditorium, these being built of terra-cotta blocks, held securely in place by means of angle irons, and bound together by expanded metal lathing on each side, upon which is placed the plaster.

New Publications.

HOME CARPENTRY FOR HANDY MEN. By Francis Chilton-Young. Size, 6¼ x 9¼ inches; 772 pages, with upward of 550 illustrations; bound in ornamental board covers; published by Ward, Locke & Bowden, Limited. Price, $3.

This volume is by the same author as of that interesting work entitled "Every Man His Own Mechanic," in which the amateur carpenter is told what woods and tools are requisite, and how to use them for all building purposes, especially for operations in carpentry and joinery. The work under discussion is a book of practical instruction in all kinds of constructive and decorative work in wood that can be done by the amateur about the home. Its pages tell the amateur what to do in order to beautify and adorn the house, to add to the attractions of the garden and to render the farm thoroughly useful and well fitted for his purpose. The author states that there is nothing described in the volume but those things which he has done himself, or in some few cases have been done by others, so that the book is peculiarly valuable to the amateur. The text requiring it is illustrated and elucidated by working drawings to scale, diagrams or sketches, most of which are from the pen and pencil of the author, and have been put on paper in a manner which, it is hoped, will be clear and intelligible even to the dullest comprehension. The work is divided into three parts, the first relating to carpentry and joinery for the house, the second to carpentry and joinery for the garden, and the third to carpentry and joinery for the farmstead, the matter being comprised in 28 chapters.

CONTENTS.

Carpentry and Building

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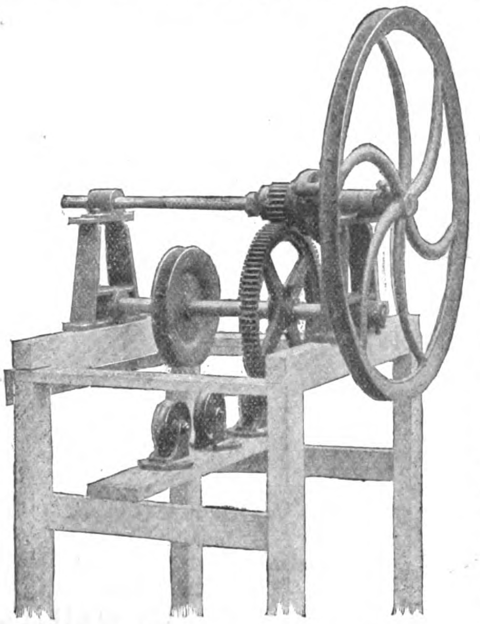
Dealer: "Yes, sir. Complexion, sir?"

—*Detroit Tribune.*

NOVELTIES.

Paragon Dumb Waiter No. 8.

F. S. Hutchinson Company, 32 Warren street, New York City, have brought out a dumb waiter of improved construction, as shown in Fig. 1. The principal feature is its adaptability to various sizes of well holes, so that it may be carried in stock, obviating the necessity of having the waiters made especially to order. The adjustability is secured by the bearing to the left of the machine, which can be placed nearer to or further from the wheels, to adapt the waiter to the size of the well hole. The waiter shown is geared for a capacity of 500 pounds for use as dumb waiter, invalid or trunk lifts and light store and factory elevators, where it is desired to carry loads up to 500 pounds easily and quickly, and is designed to be put in position by any good mechanic. The locking device, it is explained, holds the load at any point automatically, without the aid cf any check rope, clamp, catch or other auxiliary part ; also that the machine is always locked, excepting when a pull is made on the hand rope, to raise or lower, when the lock is released and the car ascends or descends at pleasure, so long as the hand rope is operated. The releasing mechanism is connected directly to the shaft on which the hand wheel is fastened, and, it is remarked, no matter what the load on the car may be the hoisting wheel or sheave which engages the lifting rope will not revolve until a pull is made on the hand wheel. The lock is so constructed that the wearing of the parts will not affect its efficiency. The shaft of the machine runs in roller bearings to reduce the friction to a minimum. A catalogue showing different styles, together with description and price-lists, will be mailed upon application to the manuacturers.



Novelties —Fig. 1 —Paragon Dumb Waiter No. 8.

THE STEEL BATH MFG. COMPANY, Detroit, Mich., announce that they have secured the services of S. Davison to take charge of their business in the East and South, with headquarters at 203 Broadway, New York City. Mr. Davison also issues a notice to the trade stating that the agreement between him and the Day-Ward Company of Warren, Ohio, has been canceled by mutual consent and h has resumed his relations with the Steel Bath Mfg. Company.

Sash Mortiser with Relishing Attachment.

A machine intended for making the mortises for the bars in the meeting top and bottom rails of sash is illustrated in Fig. 2 of the accompanying cuts. The work is performed by means of a stationary hollow chisel with an auger bit revolving inside. This chisel and bit mortise a square hole, leaving the mortise clear of chips. The sash rails are placed on the table with the tenons against the stops, which are adjustable to any length of rail. The table is then moved toward the chisel by a foot treadle, the stop governing the depth of mortise. Suitable springs force the table back after the mortise is made. The table is adjustable up and down for different thicknesses of sash, and different sizes of chisels can be employed as circumstances require. The sash relishing attachment consists of a table and rip saw on the opposite end of the arbor from the mortiser, also a boring arbor and hip. The table has an adjustable guide for regulating the width of relish, also an adjustable stop for the shoulder of the tenon. The tight and loose pulleys are 6 x 3 inches and should run 900 revolutions per minute. This machine is made by the Rowley & Hermance Company, Williamsport, Pa.

Cronk's Roller Bearing Barn Door Hanger.

Cronk Hanger Company, Elmira, N. Y., have brought out the ball bearing hanger for barn doors shown in Fig. 3 of the engravings. The hanger is referred to as being made heavy, as carrying a door any distance, and as guaranteed to last a lifetime. The company state that they have tested the rollers for a year with a weight of 3000 pounds, running ten hours a day at 60 revolutions a minute, without showing any wear. The hangers are made in two numbers, for 5 to 10 foot doors and for 10 to 20 foot doors.

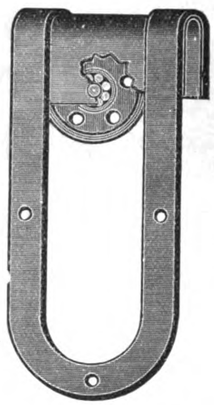


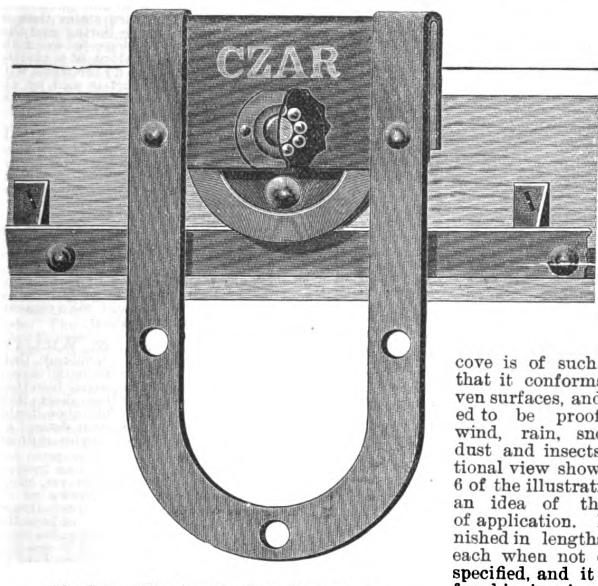
Fig. 3.—Cronk's Roller Bearing Barn Door Hanger.

WE ARE INDEBTED TO THE Knowles Steam Pump Works, 93 Liberty street, New York City, for a copy of a special catalogue which they have issued relating to electrically operated pumps. Unlike many machinery catalogues, the one issued by this concern is not compiled from designs and data of types as yet largely on the drafting board, but from knowledge of apparatus already built in their own shops and thoroughly proven in actual service by their customers throughout the world. In choosing illustrations, they have endeavored to select such types as would probably meet the needs of the largest classes of their customers, intentionally omitting many designs not really absolete, but adapted less for general than for special uses, and also many patterns not yet standardized or sufficiently tested under working conditions. In fact, the idea in preparing the catalogue was to make it largely suggestive in character and with a view to rendering the subjects considered of the greatest good to the largest number. The pumps presented are of various types and intended for different purposes. The descriptive matter is ample and the information contained within the covers of the catalogue cannot fail to prove valuable to all having to do with pumps generally.

Fig. 2.—Sash Mortiser with Relishing Attachment.

The Czar Door Hanger.

The Coleman Hardware Company, 59 Dearborn street, Chicago, Ill, are offering a ball bearing door hanger, as shown in Fig. 4. The wheel is of steel, with tempered steel axle and rider bar. The makers state that



Novelties.—Fig. 4.—The Czar Door Hanger.

the hanger has stood the test of running 61,000 feet (more than 11 miles) on a door weighing over 400 pounds, cutting the axle less than 1-100 inch, and the rider bar less than 1-64 inch.

Steel Mill Door Latch.

The Victor Mfg. Company of Newburyport, Mass., are offering the mill door latch shown in Fig. 5 of the cuts. The handle bolt is adjustable for doors to 2½ inches in thickness, or thicker if so ordered. Four bolts for the latch and one for the catch are required for putting it on a door, but the bolts, owing to the varying thicknesses of doors, are not packed with the latch, but are obtained from local dealers by the purchaser. The latch is

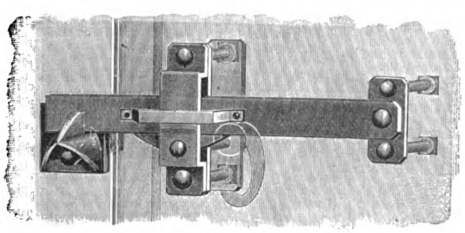


Fig. 5.—Steel Mill Door Latch

designed for hard usage and is especially adapted to heavy doors. It is used by the company on their swinging fire doors, where full fittings are furnished, and with the approval, it is remarked, of leading insurance authorities.

MONCRIEFF, DOWMAN & CO., Atlanta, Ga., are getting the cornice ready for the Court House and City Hall at Columbus, Ga. This is said to be one of the largest contracts in sheet metal work that has been let in that section for a considerable time. The roof will be entirely of galvanized iron and the dome covered with sheet copper. Moncrieff, Dowman & Co. make a specialty of this kind of work, and are now extending their operations over the whole of the South.

White's Patent Lead Cove.

Howard White of 330 Bourse Building, Philadelphia, Pa., is manufacturing a lead cove designed for closing the open joints of a house both inside and out, thus rendering the building more comfortable and attractive. The cove is of such a nature that it conforms to uneven surfaces, and is claimed to be proof against wind, rain, snow, dirt, dust and insects. A sectional view shown in Fig. 6 of the illustrations gives an idea of the method of application. It is furnished in lengths of 4 feet each when not otherwise specified, and it is boxed for shipping in quantities of 100, 200 and 500 feet. It is referred to as being easily applied, economical in use and as not being affected by moisture or changes of temperature. In applying the lead cove it is first smoothed closely in the angle in which it is to be used, and then tacked in place as shown in the illustration. Another way is to bed the cove in fresh paint, shellac or other adhesive, simply tacking the ends. We understand that Mr. White will furnish samples and prices on application.

The Davis Heater.

We present in Fig. 7 of the engravings a broken view showing the internal construction of the Davis heater, made by the Davis Heater Company, Racine, Wis. It consists of a series of horizontal cast iron sections, the bottom section resting on an ash pit and above the grate, which is of a labor saving type. The lower section receives the return connection from the heating system, and is an annular water chamber exposed to the direct action of the fire. Water passes from this section to the sections ranged above it in such a manner as to cause the water passing through it to come in contact with a large heating surface. Centrally located in the heater, directly over the fire and exposed to its most intense heat, is a large funnel shaped water chamber. This chamber is supplied with water which has previously passed through all the other sections, and is heated before it enters and passes to the crown sheet over the fire, where it receives its final heating and passes up through the central column to the flow outlet. The following quotation is taken from a letter describing the heater from O. C. Davis of the Davis Heater Company: "To show the tremendous push of the direct radiation of the fire on the crown sheet over it and the rapid circulation down the side of the cone of the water on the inside, so as to pass under the canopy, there to come in contact with the intense heat and to be pushed by the heat up and out, thus making and keeping up a rapid circulation in the system, the following description of the phenomena of the boiler is given: In the top of the section, near the center,

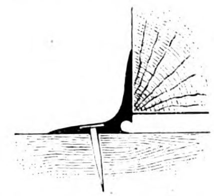


Fig. 6.—Sectional View, Showing Application of White's Patent Lead Cove.

suppose that a 2 or even a 3 inch plug is placed. The heater is then connected with radiators in a building of one, two or three stories, and all in operation with an open tank, so arranged as to be changed into a closed system when all has been heated up to 160 degrees. Now, make it a closed system, and draw off three or four pails of water, if so much will come out, the fire continuing the same as if it was to

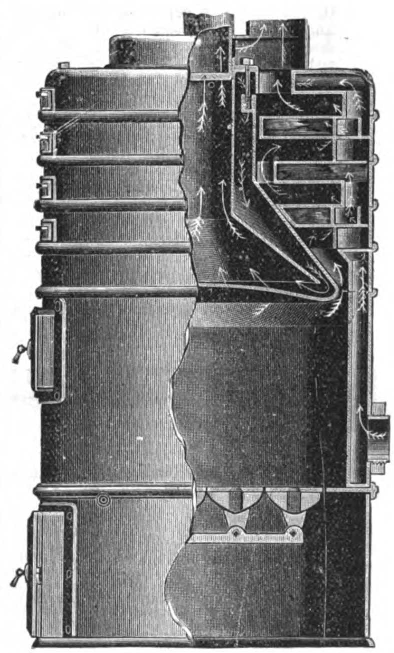
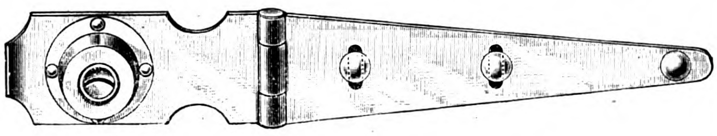


Fig. 7.—Broken View of the Davis Heater.

be used right along. After this has been done, the plug mentioned in the top section can be removed without water escaping. This plug can be left out for hours, and no water will escape if the fire is kept up. If dust or some light material is thrown into the opening, it will be drawn down into the water, moving in its downward passage to the crown sheet." These heaters are for both steam and hot water heating, and in nine different sizes, rated to carry from 500 to 3000 feet of direct hot water radiation. In addition to this heater the same principle of construction is also used for smaller water heaters and for an instantaneous water heater for domestic use.

The Novelty Hasp Lock.

The hasp lock represented in Fig. 8 of the cuts is being offered by the Shamokin Novelty Works, Shamokin, Pa. The lock is made of brass, the hasp of steel and the keeper of malleable iron. The lock has four tumblers, protected by a neat casing. The hasp and



Novelties.- Fig. 8 —The Novelty Hasp Lock.

keeper have slotted holes to allow them to adjust to the swelling, shrinking and sagging of the door. The point is made that as there are no holes to be bored the hasp is readily attached; also that the lock, being secured to the door, cannot be mislaid or carried away. The goods are furnished in either nickel plate or japan.

The Lape Pneumatic Door Check and Spring.

The Pullman Sash Balance Company, Rochester, N. Y., and 14 Warren street, New York City, are offering the door check and spring shown in Fig. 9, which represents the appearance of the device when on a closed door. The air cylinder is of brass tubing and the spring is of best clock spring steel, to insure perfection and durability. The device can be applied to any right or left hand door, and is designed to take the place of spring hinges and to prevent door slamming. The point is made that the check and spring can be used between a screen door and the inside door. It is remarked that the device holds the door strongly closed, and that it can be easily adjusted to close the door slowly or quickly, as desired. The goods are furnished in japan and in polished brass finish, and are referred to as being neat in

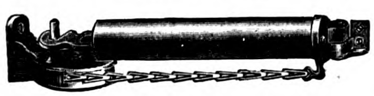


Fig. 9.—The Lape Pneumatic Door Check and Spring

design, simple in construction, handsome in finish, perfect in operation and low in price. They are packed with screws and directions, one in a box, one dozen in a slide cover wooden box.

The Empire Scroll Saw.

A machine which has been designed especially for the use of carpenters, builders, cabinet makers, and for general shop work is shown in Fig. 10 of the accompanying illustrations. It is intended for operation by either foot or steam power, is made strong and durable, and will cut up to 3 inches thick and swing 24 inches. It has wooden arms operating upon an entirely new principle, being pivoted in such a manner as to prevent any side motion, and in connection with the self-adjusting saw clamps, gives a straight up and down motion to the saw blade. It is fitted with an iron tilting table turned true and polished, which can be adjusted to any angle for sawing inlaid work. The driving wheel is 24 inches in diameter and the driving belt, being of the patent V shape, gives great power without slipping or lost motion. The foot power has a walking motion, the construction being such that the operator can run the machine with both feet sitting, or with one foot standing, as he may prefer. The machine is fitted with the upright drill attachment having an Empire drill chuck, which will hold twist drills from No. 60 to 3-16 inch, inclusive. The machine is also designed to use 8-inch saw blades, but can be adjusted to use 5-inch blades, if desired, for very light work. The hight from the floor to the top of the table is 40 inches and the average rate of speed when sawing is about 800 strokes per minute. The machine here

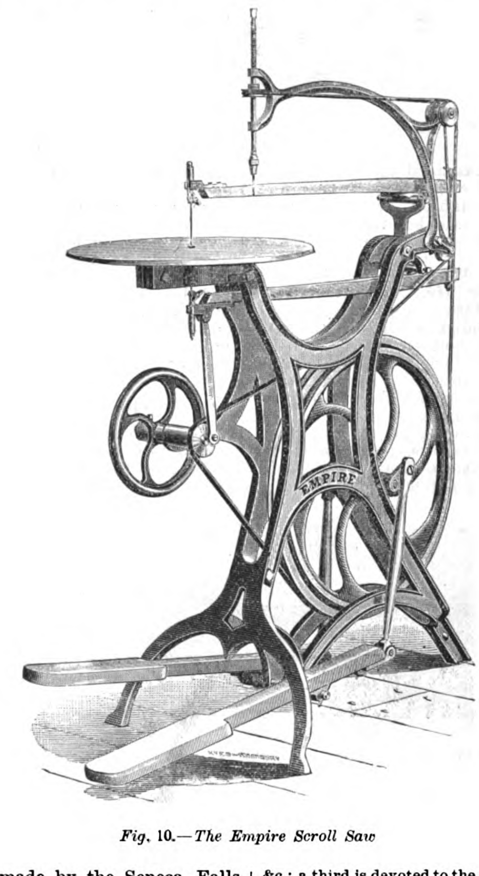


Fig. 10.—The Empire Scroll Saw

shown is made by the Seneca Falls Mfg. Company, 209 Water street, Seneca Falls, N. Y.

WE ARE INDEBTED to the American Roofing Company, Cincinnati, Ohio, for a very pretty calendar calling attention to their business as manufacturers of iron and steel roofing, corrugated siding, &c., sheet steel brick, metal weather boarding, steel ceilings, American metal laths, and dealers in tin and terne plate and galvanized iron. The calendar is of convenient size for office use and is prettily decorated by an engraving of St. Bernard dogs.

TRADE NOTES.

THE Fox lock mortising tool is the subject of an announcement presented in another part of this issue by P. L. Fox & Co. of Bridgeport Conn. This tool is intended for mortising locks in doors, and as may be seen from an inspection of the illustration of the tool, the latter is particularly suited by reason of its peculiar shape to the purpose intended. The manufacturers claim that its use will save one third the boring and that it will cut away the sections between the holes and clean out the bottom of a mortise in half the time it takes to do the work with an ordinary chisel. The tool is sold by the trade or it can be obtained direct from the manufacturers by forwarding the price, $1.

MERCHANT & CO., Incorporated, 517 Arch street, Philadelphia, Pa., refer in their advertisement this month to Merchant's Gothic shingle, which is designed especially to meet the requirements of architects and others who desire bold and ornamental effect in roof coverings. An important feature of the new Gothic shingle, aside from the storm proof lock, is that the sheets are first crimped, giving the shingle strength and rigidity as well as an ornamental appearance. Two sizes are manufactured of copper and tin of various grades, also of galvanized steel. Merchant & Co. will take pleasure in naming prices on application.

THE VAN WAGONER & WILLIAMS HARDWARE COMPANY of Cleveland, Ohio, and New York City, favor us with several loose sheets intended to be pasted into their October, 1894, catalogue. One sheet illustrates and describes the Columbia double acting spring hinge for screen doors; another gives the prices, sizes, styles of finish, &c.; a third is devoted to the sizes and prices of Oxford spring hinges and blanks, while a fourth relates to the Gem stove pipe damper.

THE MONTROSS METAL SHINGLE COMPANY of Camden, N. J., will forward to any one who may send his name and address a copy of Catalogue G, in which reference is made to their leading specialties. The company manufacture Eastlake and Octagon shingles, as well as Gothic and Diamond tile, from tin, steel, galvanized iron and copper. They state that the best method of applying metal to a roof is in the form of shingles, and that the best of these cost no more than inferior makes. The construction of the shingles is such that they can be readily laid by carpenters. The Eastern manufacturers of these goods are E. Van Noorden & Co., Boston, Mass.

THE STEPHENSON MFG. COMPANY of South Bend, Ind., make a specialty of dowels, turned moldings, table pins, &c., and in a well arranged catalogue recently issued from the press they show a large line of these goods. The volume is oblong in shape, bound in colored paper covers, and has on the front the name of the company, the letters being formed in such a way as to represent the various specialties manufactured. The illustrations are outline engravings made full size, and each is designated by a number to facilitate convenience in ordering. The company state that most patterns can be changed as may be desired, and they request those ordering dowels, pins or turnings with tenons to mail a hardwood block with holes and a pin or tenon, to show whether a tight or loose fit is wanted. A feature of the catalogue is a carefully prepared index which is arranged in tabular form. The fourth page of the cover is devoted to a bird's eye view of the company's works.

HENRY A. GOETZ, president and manager of the Goetz Box Anchor Company, New Albany, Ind., announces a competition in building construction, and offers to donate $200 to any architectural league or club, should he be unable to prove that any "architect who does not use the Goetz method of building is overlooking his client's interests." The terms of the competition are first, that the club is to make a plan of a warehouse four stories high on the slow burning principle, in which durability, the arrangement of material, strength and fire safety shall be the features rather than ornamental design; second, that Mr. Goetz shall make a plan of the same kind, using his patented improvements as he intends they should be; and third, all plans be referred to a committee composed of an architect, an insurance expert and some person who owns or has built several large warehouses, the money to be awarded the best plan. The entire membership of the club competing will be allowed to incorporate their ideas into the plan submitted, but shall not be allowed to use any of the ideas advanced by Mr. Goetz in his printed literature. In order for Mr. Goetz to secure the premium he must prove that his method of building will secure the lower rate of insurance; that his method is stronger and more durable than any competing plan; that his plan of building will suffer less loss from partial destruction by fire or wind than any competing plan, and finally, that his improvements used as a whole will actually cost less money to build, or at least not more than the competing plan next in merit.

MORSTATT & SON, with office and factory at 227-229 West Twenty-ninth street, New York City, have been meeting with a very gratifying demand for the Morstatt inside blind which they manufacture. They have furnished all the inside blinds in the new Manhattan Hotel at the corner of Forty-second street and Madison avenue, the contract calling for over 600 sets. These blinds, of the Morstatt pattern, are of extra fine workmanship, and made of mahogany, birch, oak and cherry. The makers have also placed all the inside blinds in the new residence of John Jacob Astor at Fifth avenue and Sixty-fifth street, as well as in the new residences of Charles T. Yerkes and Isaac Stern on the same avenue. Morstatt & Son also secured the contract for all the inside blinds required for the addition to the Hotel Waldorf, and other important contracts are under negotiation. The Morstatt blind possesses merits which have given it a wide reputation, and it is to be found in many of the finest residences, hotels and club houses in the United States and Canada.

THE POWHATAN CLAY MFG. COMPANY of Richmond, Va., have opened an office in the Mohawk Building, 160 Fifth avenue, New York City, with F. H. S. Morrison as general sales manager. The company manufacture a cream white brick of fine quality, possessing the advantage of holding its color, as well as being free from any of the discolorations common to light colored brick. These brick have been used in the large department store of the Siegel-Cooper Company on Sixth avenue, and in the structure located at 704-706 Broadway, New York City, as well as in many other buildings. The company also manufacture red, buff, gray speckled, repressed brick, fire proof building materials, drain tile and fire brick.

THE trade will be interested in a catalogue distributed by Cribben, Sexton & Co., Chicago, Ill., in the interest of enameled cast iron of their manufacture. The goods referred to in the pamphlet, which is of large size and oblong in shape, include Roman wide roll rim enameled baths, Imperial wide under roll rim enameled baths, French pattern baths in different styles, the Apollo, the Universal and the narrow rim enameled baths. The other goods noted are the Universal laundry tubs, two views of which are shown, and enameled sinks in various styles. The goods are illustrated by fine engravings, and descriptive particulars as well as full price-lists are given.

THE GILBERT & BENNETT MFG. COMPANY, New York and Chicago, are distributing samples of their Pearl wire cloth, intended specially for use in door and window screens. This wire cloth is protected from rust by a metallic finish, at first lustrous as silver but turning an almost invisible gray after short exposure to the atmosphere. This gives it a neutral appearance which is never out of harmony with the prevailing colors in a building. The manufacturers allude to numerous points for which superiority is claimed over painted cloth.

W. J. BURTON & CO., 164 Larned street, West, Detroit, Mich., report that many dealers who have for several years handled Eastlake metallic shingles and other roofing are so well pleased with the Eastlake that they are now using them on their own buildings. The company claim to have furnished several roofs this spring for the residences of dealers who are thoroughly familiar with the merits of the Eastlake through past experience. The manufacturers are now figuring on supplying a large metallic ceiling for a new store building which has been erected by one of their agents.

THE F. A. REQUARTH COMPANY of Dayton, Ohio, state that they have been operating their new and enlarged plant the entire winter on full time, and that the outlook is very fair. They have just completed a contract at Huntington, W. Va., to furnish all the stair work and interior finish, this being secured in competition with New York and Chicago houses. Their trade in roped balusters and special work seems to be appreciated by the leading contractors and builders throughout the country, judging by the demand for these goods.

WILLIAM CONNORS, 677-679 River street, Troy, N. Y., is sending to those who may be sufficiently interested to apply for it, a little volume entitled "Hints on House Painting." It is issued with a view to setting forth in a concise and comprehensive manner the results of his experience as a practical paint maker, and the opinions expressed in the pamphlet are said to be indorsed by the best painters in the country. Among the headings under which the subject is treated may be mentioned the following: What Constitutes Paint, Harmony of Colors, Choice of Colors, Covering Capacity and Priming Coat. The evils to be avoided are enumerated, and one of the closing pages is devoted to the reasons why the best paint is the cheapest in the end.

E. C. STEARNS & CO., Syracuse, N. Y., have issued an illustrated catalogue of door hangers, sheaves, sliding barn door lock, Vanderbilt sash balance, wire cloth, adjustable window screens, window screen frames, screen door frames, spring hinges, lawn mowers, jack screws, hammock hoops, Star register, store truck casters, pulleys, sinks, faucets, mallets, saw vises, bench vises, bench drill, screw clamps, spoke shaves, hollow augers, bicycle stands, stable fixtures.

THE STANDARD PAINT COMPANY, formerly at 2 Liberty street, New York, have been compelled by the growth of their business to occupy more space. They have leased the street floor and floor above at 81-83 John street, using the first floor for warerooms and the second floor for office purposes.

THE STANLEY WORKS of New Britain, Conn., are sending out to architects an exceedingly neat little pamphlet bearing upon the front cover the picture of an armor clad warrior and a shield carrying the inscription "Strength and Silence." Turning the early pages of the volume, we find a number of illustrations, accompanied by quotations from Milton, Menander and Shakespeare, all of which relate to strength and silence. The quotations, however, do not continue for many pages before the reader has his thoughts turned to another channel by an illustration of Stanley ball bearing steel butts, in the interest of which the pamphlet is issued. There are illustrations of the new Union Railroad Station, at St. Louis, and the Milwaukee Public Library and Museum, in connection with which the ball bearing butts have been specified and used. The special features of these goods are set forth in a way to interest the trade, and while the pamphlet gives but a hint of the extensive variety of butts and hinges manufactured by the company, it is of such a character that it cannot fail to interest architects, builders and contractors. A copy of the company's complete catalogue will, we understand, be sent to any address on application.

EDGAR C. SEEBOHM, the representative sent to South Africa by J. A. Fay & Egan Company, Cincinnati, Ohio, had a close call recently at Johannesburg, where he went to install some machinery for his company, and as a consequence writes to suggest that a change be made in the pattern of the column of his company's band mill, as he had difficulty in getting it through the Custom House, the Boers taking it for a large cannon or some sort of a machine gun and wanting to confiscate it. Mr. Seebohm says it took any amount of talking to convince them that it was a part of a band mill, and they are even now a little skeptical as to its being what he claims, and ride past every hour so as to watch the progress made in its erection. He is afraid they may yet make up their mind it is some kind of a weapon of war and take it, and him with it, as they wanted to run him in for blowing his bicycle whistle, and did in fact run in the whistle. He experiences great difficulty in procuring the necessary labor to erect the mill, as the Kaffirs have all left for their homes in expectancy of war, the indication being that the whole of South Africa will form a combination against the English.

THE TWENTIETH CENTURY SAW FILING MACHINE COMPANY, 208 Superior street, Cleveland, Ohio, send us a leaflet illustrating the saw filing machine to which they are directing the attention of the trade. The machine is referred to as providing a means for holding the saw firmly in place and filing each tooth exactly the same depth and bevel as all other teeth of the saw, so as to make them uniform in hight and shape. At the same time provision is made for moving the saw along a regular distance according to the size of the teeth which are being filed. The machine can be adjusted for saws having teeth of any hook or bevel, and is so constructed that all wear can be taken up.

THE SAFETY RAFTER COMPANY of Box 294, Lancaster, Pa., call the attention of architects and builders to the merits of their safety rafter support, designed for use in connection with verandas, balconies or other structures required to be built against a brick, stone or frame building. The timbers are supported by an iron strap, which serves as an anchor, and which is built into the wall against which the timbers abut. The device is made in two styles, one intended for brick and the other for wood construction. Circulars explaining the device will be mailed by the company to any one sufficiently interested to make application.

RUSSELL & ERWIN MFG. COMPANY, New Britian, Conn., and New York City, have issued supplement No. 2 to their 1894 catalogue. It is bound in black cloth with back title and contains 183 pages, each 11¾ x 9¼ inches. It illustrates and describes goods of new design and pattern brought out since the issue of former catalogues, and is accompanied by discount sheet A. The arrangement is such that the following designs in the order mentioned are shown complete, each by itself, beginning with locks, escutcheons, push buttons and plates, butts and all the various articles of inside trim, which are designated as Arabian, Bavarian, Bavarian bronze, Normandie and Verocchio and are handsome in appearance. The balance of the catalogue is devoted to a large assortment of locks, latches, knobs, escutcheons, push plates, butts, door handles, sheaves, sash fasts and lifts, catches, bolts, pulls, handles, locks, brackets, &c., in great variety, making quite a complete catalogue of builders' hardware in itself.

"SOME HOUSES NEAR BOSTON STAINED WITH DEXTER BROTHERS' ENGLISH SHINGLE STAINS," is the title of a little book which reaches us with the compliments of Dexter Brothers, 55-57 Broad street, Boston, Mass. The houses shown are illustrated by means of half-tone engravings made direct from photographs, and constitute a few which have been chosen to show the effects produced by the use of Dexter Brothers' English shingle stain. In connection with each illustration is given the location of the house, the name of the architect and the number or color of the stain used in its treatment. Accompanying the *brochure*, as it may be called, is a folder containing reprints from various architectural papers relative to the stains and also suggestions for their use. The firm also favor us with a number of illustrations of cottages at Kennebunkport, Maine, which have been treated with their English shingle stains. The firm have agents in New York City, Chicago, Pittsburgh, San Francisco, Cleveland, Seattle and Baltimore.

ALEX. MCCUNE, 10 and 12 North Thirteenth street, Philadelphia, Pa., is calling the attention of architects, builders and decorators to his line of architectural composition ornaments. These ornaments are pliable, and are for use on exteriors as well as interiors of buildings. Mr. McCune has issued an illustrated catalogue showing over 300 designs, including frieze, pilaster and capital ornaments, ornaments for mantel pieces, furniture, chairs, tables, cabinets and pedestals, and designs for wall and ceiling decorations. The ornaments being pliable are, it is stated, easily bent to fit any irregular form, and when dry become perfectly hard. Mr. McCune states that he is at all times prepared to submit estimates on special work, or to make special patterns when designs are furnished.

FOLLANSBEE BROTHERS COMPANY, formerly James B. Scott & Co. of 328-332 Second avenue, Pittsburgh, Pa., issue an attractive card calling attention to the various specialties which they manufacture. The upper portion of the card contains the name and address of the company and the statement that they are sole owners and manufacturers of Scott's Extra Coated guaranteed roofing tin. The remaining portion of the card is finished in imitation of a sheet of tin stamped with the company's trade-mark. A convenient feature of the card is a calendar for the year.

— A GENEROUS BEQUEST.—A husband, feeling his end approach, sent for a solicitor to make his will.

"I leave my wife a life interest in a hundred thousand francs."

"Very good; but if she marries again?"

"In that case I'll make it two hundred thousand. It is not for her, however—I leave it to her husband. Poor fellow; it will be hard-earned money."—*Illustrazione Popolare.*

CARPENTRY AND BUILDING

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
96-102 READE STREET, NEW YORK.

JUNE, 1896.

Improving Labor Relations.

The first of May has come to be a portentous date with both those who employ and who are employed. In Europe it has been selected for socialistic demonstrations by agitators and dissatisfied workmen who desire to overturn the existing order of things regardless of what might follow. In this country it is favored by workmen who consider it the most suitable time at which to make general demands for advances in wages or reductions in the length of the working day. So threatening had the attitude of the socialists become in Europe that extensive preparations were made by the authorities in numerous cities this year to thwart the designs of the labor leaders, but they were not sufficient to completely prevent demonstrations which led to rioting and the usual bloodshed. In this country, however, the day passed off more quietly than usual. A few strikes were inaugurated in the building trades of scattered cities, but they were not regarded as significant or as likely to lead to very serious results. One of the most conspicuous storm centers in labor disputes is Chicago, and almost invariably on May 1 that city is the seat of a serious disturbance in the building trades or some other equally important interest. It is remarked, however, that this year finds more amicable relations existing between employers and employed in Chicago than any year since 1880. Great battles have been fought in the past, and both sides have claimed victory at times, but this year no great dispute is pending as of yore involving thousands of men. The better conditions prevailing in labor circles in Chicago this year are attributed mainly to the permanent arbitration committees which have been formed in nearly every branch in which labor is organized. These arbitration committees meet with similar committees appointed by employers and often settle grievances or misunderstandings which would in the old days have caused a flame of discord to burst forth, followed by weeks or months of business prostration. That such an improvement in labor relations could be effected in Chicago is a very strong reason why it should be expected elsewhere. The millennium may not be at hand, but the reign of reason may at last be dawning both for those who employ labor and those who seek to lead it. Let Europeans continue to foment trouble on May 1 if they will, but let us in the United States endeavor to divest it of its ominous association with strikes and lockouts.

Greater New York.

The approval by Governor Morton, on May 11, of the legislative measure commonly known as the Greater New York bill gives to the United States the second largest city of the world. Heretofore, London with her 4,400,000 of population, and Paris, with 2,425,000 have both outranked any American city. New York, with 1,800,000 inhabitants, came third on the list of the world's great cities. On January 1, 1898, the date on which the new law will go into effect, the city will claim a population of considerably over 3,000,000, thus yielding rank to the great British metropolis alone, which, however, it will surpass in territorial area. The Greater New York will moreover be far ahead of any other city in the United States, and will contain as many citizens as Chicago, Philadelphia and Boston combined. The immense city thus created is composed of New York, Brooklyn, Long Island City, Flushing, Newtown, Jamaica, and Staten Island consolidated in one municipality. It has an area of 359 square miles, and includes, according to a statistician, 1100 churches, 90 post offices, 37,000 business houses, 130,000 dwellings, 6000 acres of parks, 900 miles of paved streets, 900 miles of sewers, 1800 miles of gas mains, 1100 hotels and 350 public schools. The aggregate debt of Greater New York will be $170,000,000 and the taxable property no less than $2,583,324,329. These figures furnish food for interesting reflection. One hundred years ago the whole population of the United States was less than double that of the Greater New York of to-day, while the wealth of the entire country was considerably below the aggregated resources of the new Empire City.

Hotels for Working People.

The " housing of the poor " in great cities is one of the vital problems to which the close and earnest attention of philanthropists and social economists is being devoted to a very large extent at the present time. A tenement house commission, appointed by the State, have lately concluded an exhaustive investigation of the subject in New York City, and have made a number of valuable suggestions for bettering the conditions under which the herded masses of the very poor live. Some of these suggestions are now being carried out, and much good work has been accomplished or is in progress in this field. Now comes a man of wealth and benevolence with a plan which promises to be of great benefit to another class of citizens—namely, the respectable hard working people, without special family ties, who have a steady though limited income. These persons live largely in cheap boarding houses, where, as a rule, they find few home comforts. In the interests of this class, D. O. Mills, a New York City banker, is to build two large and well appointed hotels, one on the east side and one on the west side of the city, at a cost of $700,000 each. These hotels are designed to be run on an economical basis, and their advantages are intended to fall within the means of working people who cannot afford to pay the price demanded at other hotels. Baths, free reading rooms and other hotel comforts are to be provided, as well as restaurants which will supply the guests with good food at moderate prices. That an institution of this character will be greatly appreciated by the class for which it is intended goes without saying. The idea is an excellent one, and deserves to achieve a full meed of success.

Guaranteeing a Heating System.

The heating contractor is called upon to make some kind of a guarantee in connection with all the contracts which he secures; but the custom which prevails at the present time is unreasonable in the demands made upon him, and should be replaced by some fairer method of insuring the efficiency of the system. The conditions of the contract should provide for a settlement as soon as the goods are delivered or the work is completed. This subject is brought to the attention of the trade at this time by the position taken by the members of a school board in a Western city who held that the bill for a heating apparatus was not payable until the plant had been tested in weather 20 degrees below zero. In a New England city, the chairman of a board of inspectors stated that a heating system could not be accepted until next winter, when the proper tests could be applied. In one case the heating contractor had made application for a settlement of the contract. In the second case a desire to collect the account does not appear, but it is quite probable that the test to be applied will be a source of delay to a complete settlement of the heating contract. The custom prevailing between the contractors and their clients at present is that the contractor makes a guarantee, backed by his business reputation and financial standing. This, apparently, is a sufficient guarantee when the contract is awarded; but on the completion of the work the contractor is confronted with the demand on the part of his customer for a further insurance of the guarantee in the withholding of a portion of the contract price until the efficiency of the heating system has been demonstrated. In many cases the heating contractor is compelled to work according to specifications and an arrangement of the heating plant which is at variance with what his judgment and experience would determine to be proper. He, nevertheless, is compelled to guarantee the efficiency of the system. In some cases contractors have only given a guarantee that they will install the heating system in strict accordance with the plans and specifications, and whoever has designed the heating system must guarantee its efficiency. This problem has been widely discussed among heating contractors, but the solution has not yet been presented. At this season of the year, when heating contractors are not well occupied, it is possible that a disposition to secure contracts will prevent a close examination of the terms, and may lead to disagreeable complications when the pay day is reached. It is well for those who are engaged in this line of trade to look into this matter with a view of protecting themselves. A bill is due and should be collectible when the work is completed. If anything is then found to need rearrangement or to be added to render the work efficient, the contractor of good standing will hardly need to be reminded of his guarantee to make good the deficiency.

A Summer Manual Training School.

A new departure is to be made this year in connection with the Rochester Athenæum and Mechanics' Institute, Rochester, N. Y., in the shape of a summer school of manual training. This school is designed for the benefit of pupils who find it difficult or impossible to attend such classes except during the summer vacation. The course will open on Monday, July 6, and will close on Tuesday, September 1. It will consist of 24 lessons, given from 9 to 11.30 a.m., on three days of each week. It is intended to carry the pupils through a course of carefully graded exercises which will involve the use of tools and materials commonly used in wood working, enabling them to make working drawings and to construct models from drawings. No charge will be made for the use of tools and materials, but a fee of $6 will be charged for the course of instruction. Instruction in drawing will be given with every lesson, and all work will be made from drawings, the necessary drawing materials and implements being furnished by the institute. An excellent manual training workshop is attached to the institute, and is is intended, when the funds will permit, to devote an entire building to manual training purposes.

The trade school work of the institute, which includes courses in joinery, carving, pattern making, forging, machine work, molding and plumbing, is carried on during the winter and spring months. That of the season just closed is stated to have been very gratifying in its results. The annual exhibition of the work of the students will be held in the Institute Building, 38 South Washington street, Rochester, on June 1 to 6 next.

EARLY in May ground was broken for a new city hall in Worcester, Mass., which is expected to cost in the neighborhood of $700,000, and be ready for occupancy early in the spring of 1898. The plans, which have been prepared by Peabody & Stearns of Boston, Mass., call for a structure of Milford pink granite in the general style of the Italian renaissance. The building will occupy the most conspicuous site in the city, on the old common, fronting Main street and midway between Front and Park streets. It will be 218 feet long and 86 feet deep, with a tower rising to 192 feet above the level of the sidewalk. The top of the cornice will be 72 feet from the ground. The main cornice is modeled after one at the Palazzo del Diavolo in Sienna; the details of the large windows resemble those of the Palazzo Tava, at Bologna; the second story tower window is much like a doorway at Trevi, and the tower in general form bears a resemblance to those at Sienna and Florence, although the details are treated in the modern spirit of the renaissance. The floors of the corridors in the basement and the second story will be laid in mosaic marble, with a wainscoting of the finest Georgia marble, while the corridors in the two upper stories and all the offices will be floored and wainscoted in oak. The general interior finish will be of Indiana quartered oak. The stairways will be constructed of iron and marble, and the building throughout will be made as nearly fire proof as possible. Norcross Brothers of Worcester have been awarded the contract for putting up the building.

Architectural Terms Explained.

A recent issue of our esteemed contemporary, the *Brickbuilder*, contains the following explanation of the various phrases used by architects, and not generally fully understood by the mechanic, which may prove beneficial to many. The front, or facade, made after the ancient models, or any portion of it, may represent three parts, occupying different hights; the pedestal is the lower part, usually supporting a column, and its place supplied by a stylobate; the stylobate is either a platform with steps or a continuous pedestal supporting a row of columns. The lower part of a finished pedestal is called a plinth, the middle part is the die, the upper part the cornice of the pedestal or surbase. The column is the middle part, situated upon the pedestal or stylobate. It is generally detached from the wall, but is sometimes buried in it for half its diameter, and is then said to be engaged. Pilasters are square or flat columns attached to walls. The lower part of the column when detached is called the base; the middle or longest part is the shaft, and the upper or ornamental part is the capital. The swell of the column is called the entasis. The hight of columns is measured in diameters of the column itself, taken always at the base. The entablature is the horizontal continuous portion which rests upon the top of a row of columns. The lower part of the entablature is called the architrave, the middle part is the frieze, while the upper or projecting part is the cornice. The pediment is the triangular face produced by the extremity of the roof. The middle or flat portion inclosed by the cornice of the pediment is called the tympanum. Pedestals for statues erected on the summit and extremities of the pediment are called acrosteria. An attic is an upper part of a building, terminated at the top by a horizontal line, instead of a pediment.

The different moldings in architecture are described from their sections or from the profile which they present when cut across. Of these the torus is a convex, but its outline is only a quarter of a circle; the scotia is a deep concave molding; the cavetto is also a concave and occupying but quarter of a circle; the cymatium is an undulating molding, of which the upper part is concave and the lower convex; the ogee, or talon, is an inverted cymatium; the fillet is a small square or flat molding. In architectural measurement a diameter means the width of a column at its base. A module is half a diameter, and a minute is a sixtieth part of a diameter.

A CLASS in bricklaying has been established in San Francisco, Cal., by a resident bricklayer who has been engaged in business for many years. The class is composed of boys from ten years of age upward, who take a lesson every day after school hours, and also on Saturday. An hour is spent in drawing to scale that which they build during the week. The pupils are the sons of the leading contractors of the city, and instruction is given in laying Roman, common and press brick, as well as how to do all kinds of work pertaining to the trade.

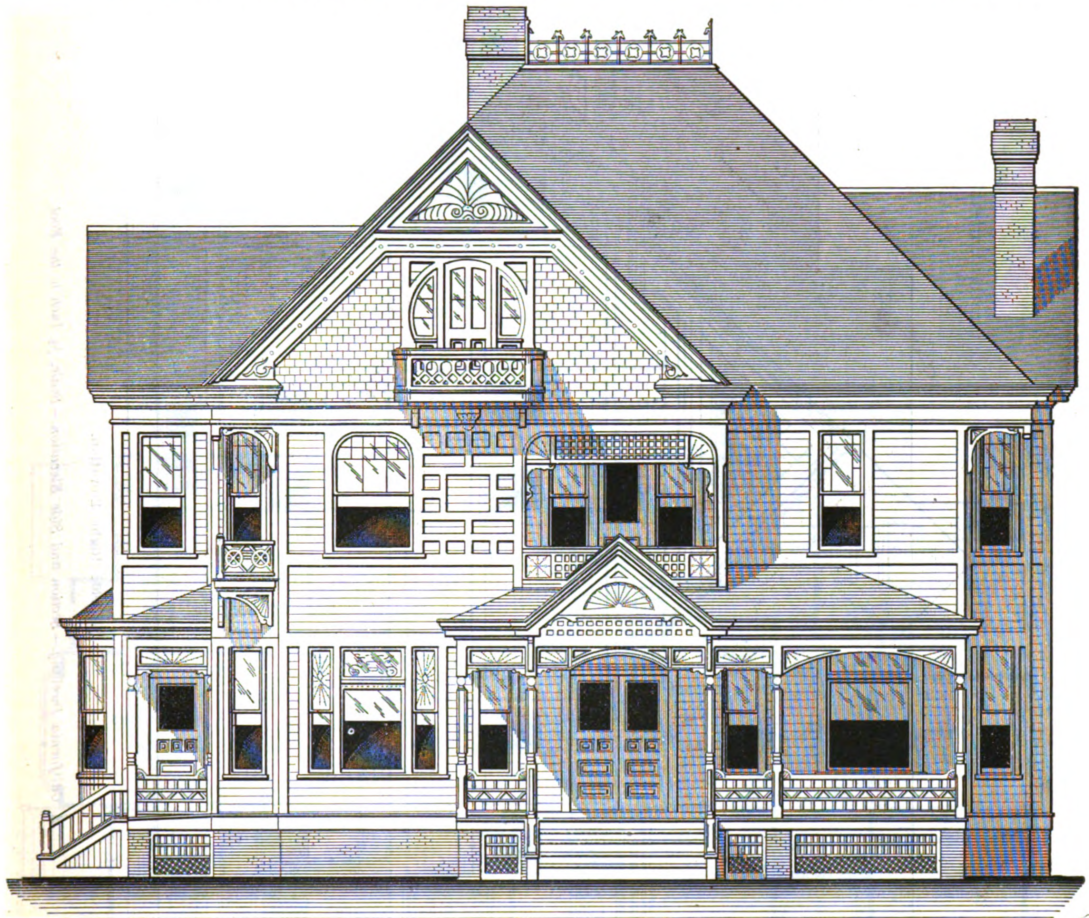
RESIDENCE OF MR. LANNES McLAREN, AT CRESCENT CITY, CALIFORNIA.

GEORGE W. PAYNE & SON, ARCHITECTS.

A CALIFORNIA DWELLING.

IN an endeavor to give our readers as great a variety as possible in the way of designs of attractive houses, and at the same time show the general style and character of modern dwellings in different sections of the country, we this month present illustrations of the beautiful mansion of Mr. Lannes McLaren, erected last summer in Crescent City, Cal., a thriving place of a little more than 1000 people, located on the ocean in the extreme northwestern part of the State. The treatment of the exterior is bold and effective, as may be gathered from an inspection of the half-tone supplemental plate, which is a direct reproduction of a photograph of the building taken especially for our purpose. A study of the floor plans shows a more than usual regard for the comfort and convenience of those who preside over the kitchen and dining room, while the arrangement of the principal rooms is thoroughly in keeping with the requirements of a first-class home. A feature that may be commented on by many is the placing of a sleeping room and bathroom on the main floor, but this will be found to be a very common arrangement in many sections of the country, especially in the West On the second floor are five sleeping rooms, bathroom and what is called a "den," this being located in the front of the house between two sleeping rooms. Each room has opening from it a commodious closet and in two of the rooms are stationary wash bowls. The location of the stairs is such as to give a commodious hall on both floors, while the seat on the landing midway of the rear flight forms a comfortable resting place, as well as affords a fine view from the three small windows located at that point.

The actual size of the house is 47½ x 57½ feet, not including the projection of the front porch. A cellar extends under the building and contains furnace and fuel rooms, vegetable room, laundry and servants' water closets. The first story is 11 feet in hight, the second story 9½ feet in the main building and 9 feet in the first and second stories of the rear wing. The foundations are of stone. The timbers throughout are of well seasoned fir, but if erected in other sections of the country, the architects suggest that pine be used of sizes given on the drawings. The outside walls are sheeted, papered and weather boarded with ½-inch studding. The painting is three-coat work and the plastering is of cement plaster. The first floor is laid double.

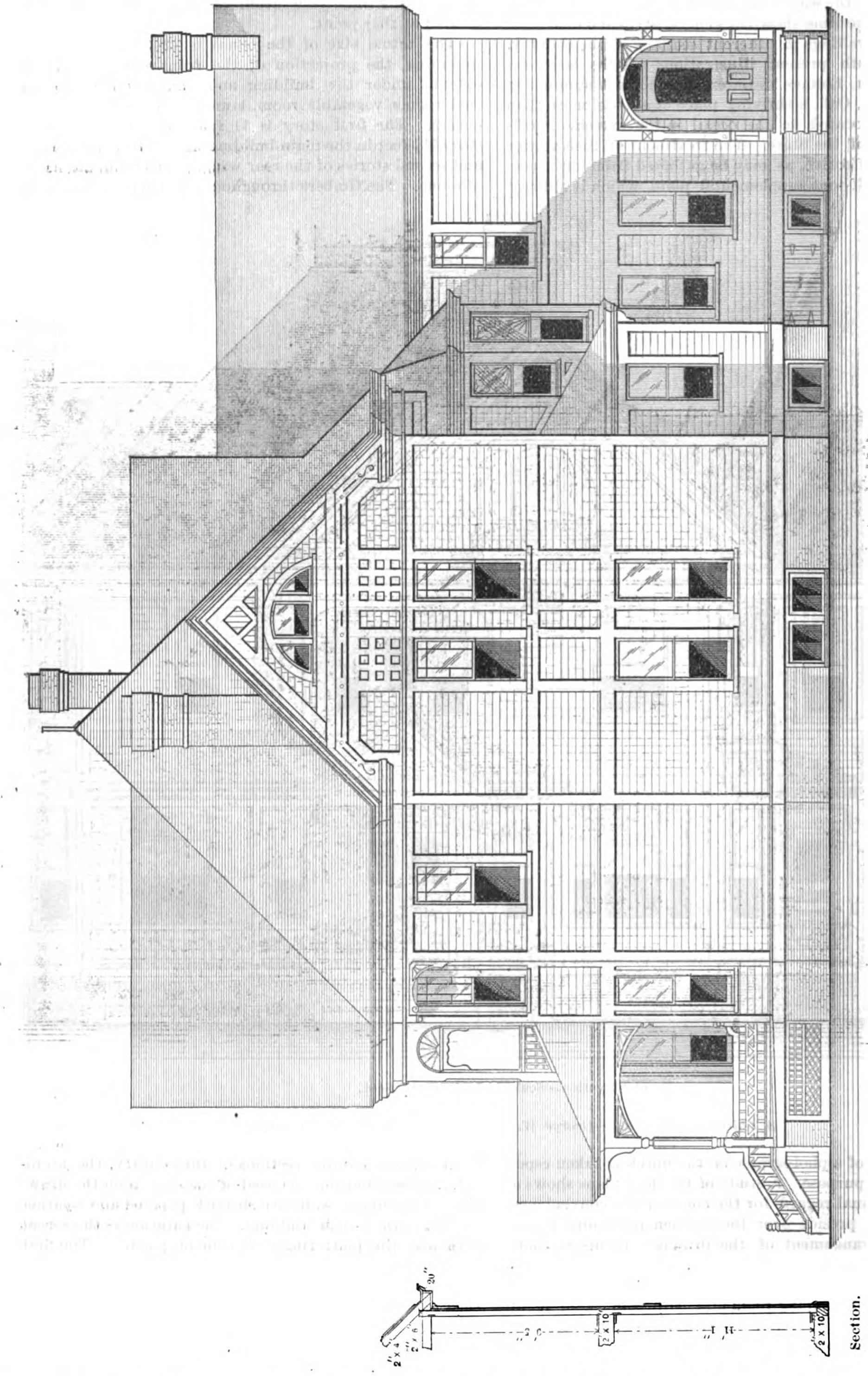


Front Elevation.—Scale, ⅛ Inch to the Foot.

A California Dwelling.—George W. Payne & Son, Architects, Carthage, Ill.

The interior trim throughout the house is natural finished red wood, but for other sections of the country the architects suggest butternut for the parlor, hall, sitting room, dining room and bedroom, with yellow pine for the balance of the first story and white pine for the second story, finished natural throughout. The dining room, kitchen and pantries are wainscoted, the pantries being fitted with all the conveniences necessary to a complete equipment.

The principal windows of the first story are fitted with plate glass and the transoms outside have art stained glass. The plumbing is of the first order, the two bathrooms being thoroughly fitted with modern fixtures. There is a supply tank in the attic and hot and cold water connections through the house. The cost of the building was $5000, including heating and plumbing. The plans were prepared by George W. Payne & Son, architects of Carthage, Ill.



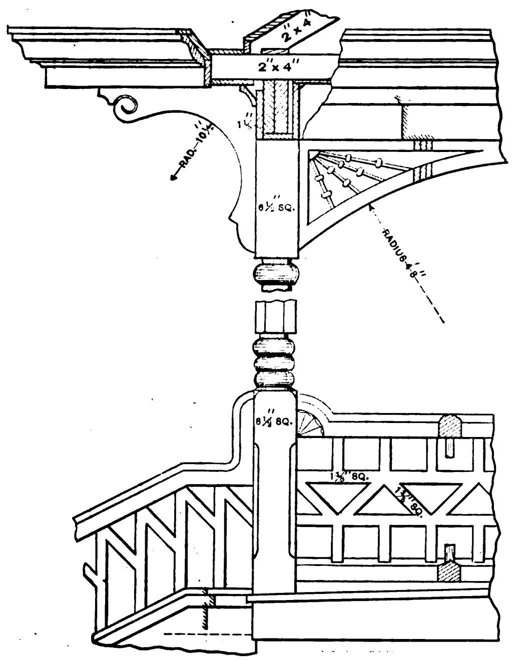
Side (Right) Elevation.

Section.

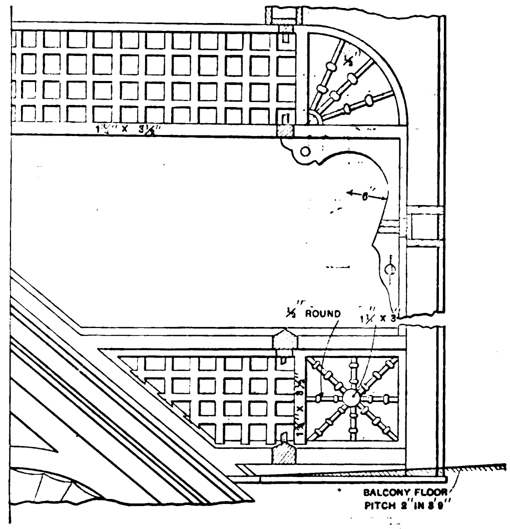
A California Dwelling.—Section and Side Elevation.—Scale, 1/8 Inch to the Foot.

THE Public Art League of the United States is the name of a new association, the object of which is to promote the passage of a law or laws by Congress requiring that before the purchase or adoption by the Government of any work of art, the design or model of the same shall be submitted to a commission of experts for an expression of opinion as to its artistic merit, and that the approval of such a committee shall be a prerequisite to its adoption. Many of those prominent in the architectural and other professions are interested in the matter, the president being Richard Watson Gilder, editor of *The Century*

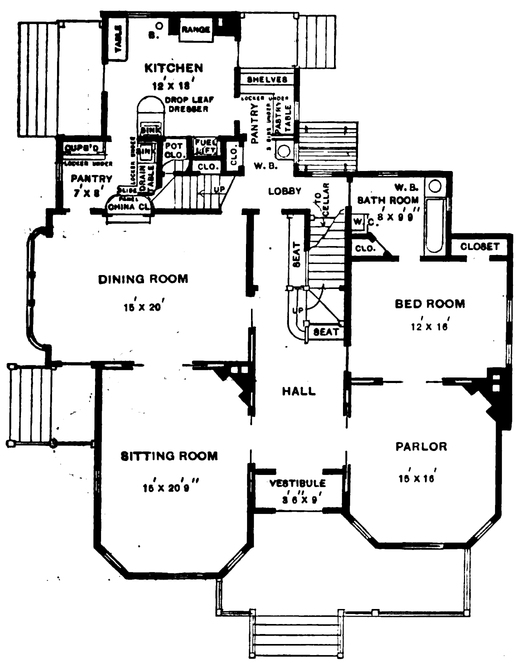
Magazine, New York; the recording secretary, T. M. Clark, architect, of Boston, Mass., and the acting corresponding secretary, Glen Brown, architect, of Washington, D. C.



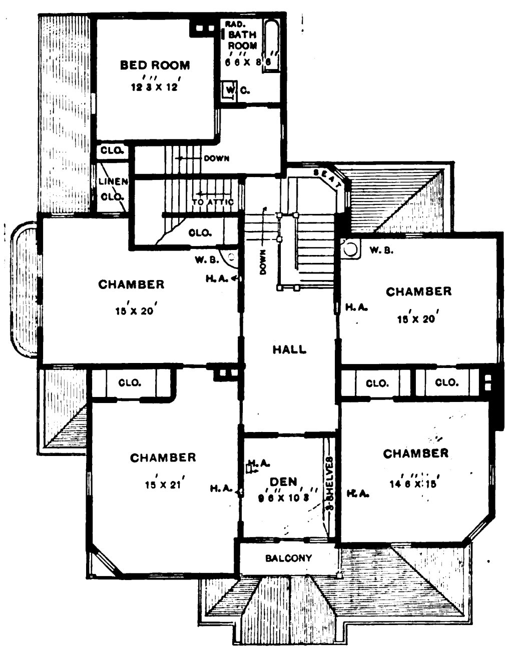
Detail of Front Porch.



Detail of Front Balcony.



First Floor.

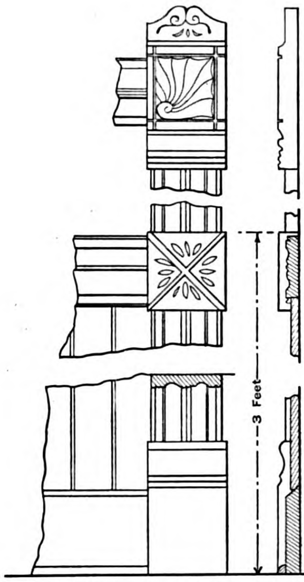


Second Floor.

A California Dwelling.—Floor Plans.—Scale, 1-16 Inch to the Foot.—Details.—Scale, ¾ Inch to the Foot.

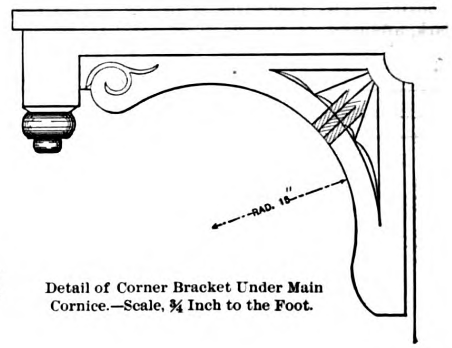
Fixing Paper on Drawing Boards.

One of the methods suggested for fixing paper on a drawing board is to first take the sheet of paper and dampen it on the back by means of a wet sponge and clean water. While the paper is expanding, take a spoonful of wheat flour, and mix with a little cold water, making of it a moderately thick paste, which, with a feather, spread round the edge of the drawing paper 1 inch wide. Then turn the drawing paper over and press the edges down on the board. After this take four straight pieces of deal wood ¾ inch by 2¼ inches wide; place them on the edge of the drawing paper, and put a large book or heavy weight on each corner to make the paper adhere firmly to the board. In about an hour's time the paper will be straight and even, and quite ready for executing a drawing. When the drawing is finished, take a sharp knife and raise one corner of the paper, then take a scale, run it round the edges, and the paper will come off easily. Turn it over and take the dry paste off with a knife, and all will be perfectly clean and no paper will be wasted.

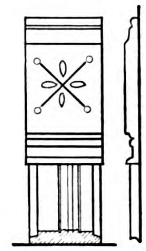


Detail of Dining Room Finish.—Scale, 1 Inch to the Foot.

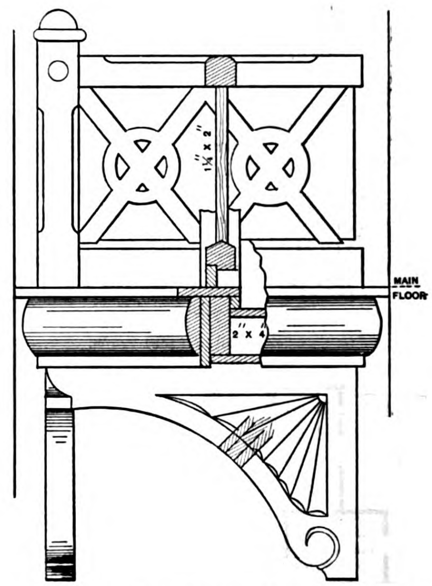
Detail of Finish in Second Story Hall and Chambers.—Scale, 1 Inch to the Foot.



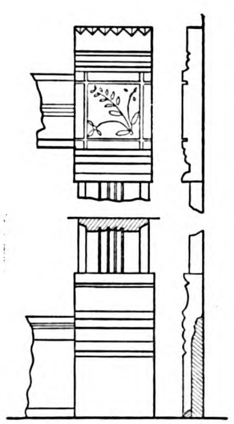
Detail of Corner Bracket Under Main Cornice.—Scale, ¾ Inch to the Foot.



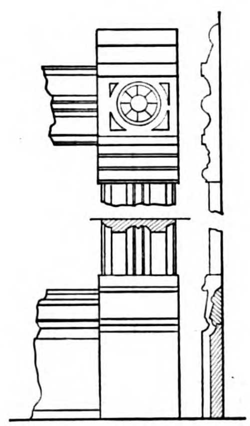
Detail of Finish in "Den."—Scale, 1 Inch to the Foot.



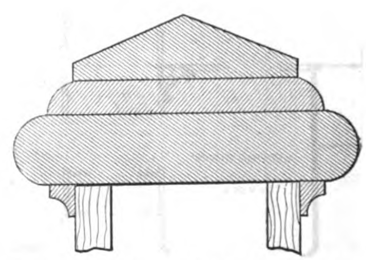
Detail of Front Corner Flower Balcony.—Scale, ¾ Inch to the Foot.



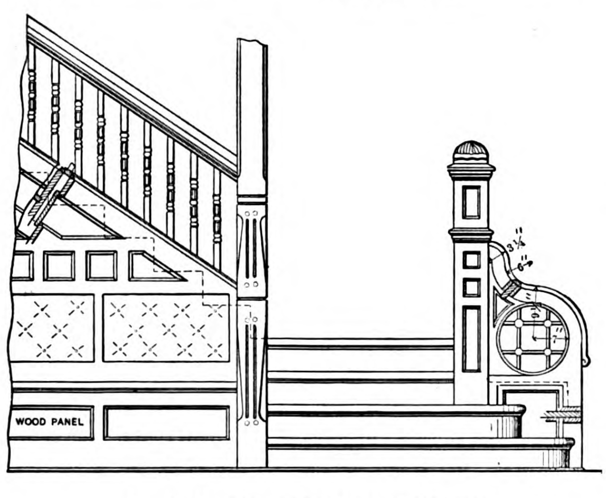
Detail of Trim in Main Hall and Vestibule.—Scale, 1 Inch to the Foot.



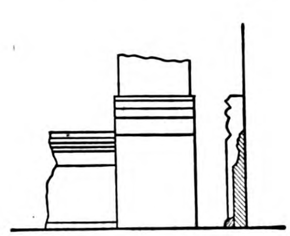
Detail of Trim in Parlor, Sitting Room and Bedroom.—Scale, 1 Inch to the Foot.



Detail of Newel Cap.—Scale, 3 Inches to the Foot.



Detail of Main Stairs.—Scale, ⅜ Inch to the Foot.



Detail of Second-Story Trim.—Scale, 1 Inch to the Foot.

Miscellaneous Details of a California Cottage.

HINTS ON WOOD CARVING.*

BY CHAS. J. WOODSEND.

THE subject for discussion in the present article is a Gothic finial, Fig. 97, which will be found suitable for use in connection with the crockets illustrated in the immediately preceding issues of the paper. The crockets are not shown in the present figure, but may extend up to and stop at the cap between the principal and the finial, this being marked V. The cap shows an astragal upon its edges and may be round or octagon, as preferred. If octagon it should be a little larger than is here shown, as this is round and sufficiently large to receive the crockets. In designing a finial of this description the student must exercise his judgment as regards size, for the reason that a great deal depends upon the hight and size of the spire or the finial, there being no set rules for his guidance in this particular. The general cross section of the finial, with the exception of the bottom, is an oval, and if desired may be turned up in a lathe to somewhat near the proper size. If it should be decided to do the work by turning the parts between the letters G K and H L must not be curved in as shown on the elevation where the section I K is given, but should be straight across from the letters G K and H L. If it is intended to saw out the block the foregoing suggestions are unnecessary.

In preparing the design, the student should constantly bear in mind the fact that the elevation for one side will be the elevation for the other, and instead of the letters given on the elevation and sections being fixtures, they are revolved around a center, so that from whichever side the finial may be viewed the letters P B D S F, &c., are toward the right hand, and the letters A C U E, &c., are toward the left, so that, whichever side is toward the observer, the sections and elevation are the same, and not, as a carpenter would express it, "in pairs." After the block is turned or sawed out secure it flat by the bottom in some position so that all parts may be worked without the necessity of turning the block around. This will render it easy for the student to follow the different cuts as far as practicable. By taking off a small quantity of the material at a time a more symmetrical piece of work may be obtained than would otherwise be the case. In cutting to a finish preference should be given to the upper part, the small portion which bears some resemblance to an unopened bud being finished first. By examining the vertical and cross sections given for this portion, Figs. 98 and 99, it will be noticed that the two outer edges, where the center lines cut them to quite a sharp edge, make a ridge with a hollow on either side. This ridge is continued all the way from the bottom to the top, being not quite so prominent at the bottom as in the center, which is the most prominent, and then the top slightly less pronounced, with the bottom the least of all. It is also to be observed that where the leaves overlap, as well as where the ground work is shown between the leaves, heavy drawing paper templates may be made, care being taken to apply them to the exact positions given; then ease off the parts between. Wherever possible it is well to make a drawing or a sliding cut with the tools rather than a direct thrust cut, as in cutting this figure the tools have to be placed and used in all sorts of positions so as to cut the grain without tearing some portion and thus crippling the work. The whole of the finial shown in Fig. 97 may be cut with four gouges of requisite size and shape, depending, of course, upon the size of the work undertaken. If the work is of a large size all the roughing out may be done with a small adze, which to many may not seem to be much of a carving tool; but upon large work that is placed a considerable distance from the eye the adze plays a more important *rôle* than is dreamed of by the uninitiated.

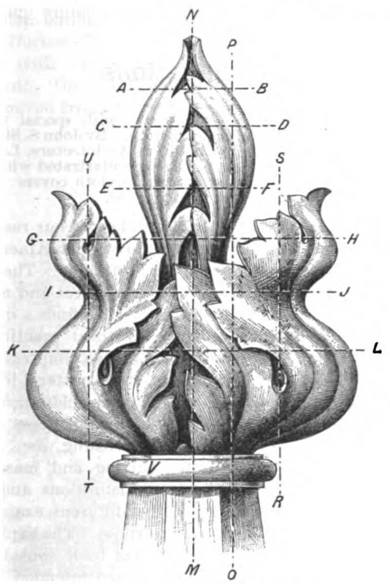


Fig. 97.—Gothic Finial.

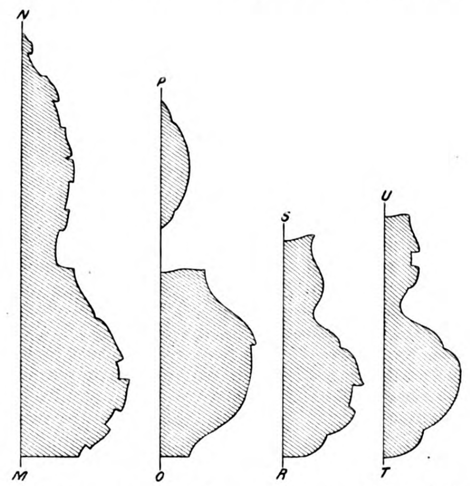


Fig. 98.—Vertical Sections Taken on the Various Lines Indicated.

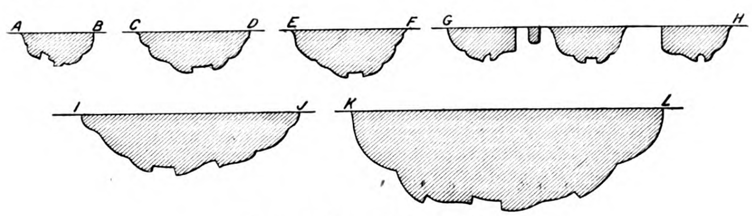


Fig. 99.—Horizontal Cross Sections.

Hints on Wood Carving.—Design and Details of Gothic Finial.

* Copyrighted 1894, by David Williams.

Greenhouse Construction and Management.*

The cases where it is desirable to use stone walls are so rare that they were merely touched upon. As a usual thing they would prove expensive, rough and cumbersome.

Grout walls are of course solid. Any solid wall is to a certain extent a good coductor of heat. While objectionable for this reason, on the other hand, a grout wall is impervious to moisture and air and if well built will resist the action of frost.

To make a wall of this kind, dig the trench deep enough that when laid the base of the wall will be beyond the action of frost. Lay the foundation course 18 to 20 inches thick, and carry this course up to a level with the floor of the house. Above this the wall need not exceed 12 inches in thickness.

That part of the wall below the ground may be built up the full width of the trench. Above the ground a mold or box is, of course, necessary. This may be made of two 16-foot planks 1 foot wide for each side, and made into a box of the proper width for the desired thickness of the wall. When placed in position it will be necessary to brace the sides so as to avoid spreading.

The materials for the grout, or concrete, are small cobble stones or stone chips, good clean gravel, and a good brand of water lime, or better still Newark cement.

Make a mixture of 1 part water lime or cement to 3 of gravel, after which add water sufficient to make a good stiff mortar.

Now lay a layer of cobble stones in the bottom of the mold or trench, leaving about 1 inch clear space next the sides of the plank, then over this spread a layer 2 or 3 inches thick of mortar, and tamp it well, so as to crowd it among the stones. Repeat the operation until the box is filled. Five or six hours is required for the concrete to set, after which the mold may be changed and the wall carried further. It is recommended that one have two or three sections of wall in process of construction at the same time; this allows time for each to set while the other is being carried up.

After the wall is completed in the above way, a coating of Portland cement to finish will add both to its appearance and durability.

Experiments With Walls.

In 1889 Professor Green of the Minnesota Experiment Station and Professor Maynard of the Massachusetts Hatch Experiment Station made some tests of the value of different kinds of walls. Professor Green's results were published in Bulletin 7, Minnesota Experiment Station, April, 1889; and Professor Maynard's in Bulletin 4, Massachusetts Hatch Experiment Station, April, 1889.

Professor Maynard experimented with four kinds of walls, as follows:

No. 1. Concrete made of Rosendale cement, 1 part; sand, 3 parts.

No. 2. Hollow brick wall, double; 9 inches thick, with 1 inch air space.

No. 3. Studding, with lining, consisting of boards, paper, and sheathing outside, and the same without paper inside.

No. 4. Same as No. 3, but having the hollow space filled with dry pine shavings.

The conclusions were: 1. The lined board wall filled with shavings gave the best results, that with hollow space being but little less valuable. 2. Hollow brick and concrete walls are about equally valuable in protecting from cold, but neither is equal to the framed board walls.

Professor Green included seven kinds of walls in his experiments, as follows:

No. 1. A 4-inch brick wall on each side of a wall of 3-inch hollow tile, with 1-inch air space on each side of the tile, the whole wall being 13 inches thick.

No. 2. Solid brick wall 13 inches thick.

No. 3. Two 4-inch brick walls with 5-inch dead air space.

No. 4. A hollow wooden wall 3 inches thick, with a 4-inch brick wall on outside and inside.

No. 5. Four-inch studs with building paper, matched boards, and clapboards outside.

No. 6. Same as No. 5, but boarded up inside.

No. 7. Same as No. 6, but filled with sawdust.

The results of Professor Green's tests were:

1. Of brick walls No. 1, as described, was the warmest.
2. Wall No. 4 was warmer than No 3.
3. Wall No. 3 was nearly, but not quite as warm as No. 2.
4. Of wooden walls, No. 7 was warmer than Nos. 5 or 6.

The lined board wall with sawdust filling was found as warm as the brick wall with one dead air space, but a wall made like that given as No. 1 is much warmer than the wooden, sawdust filled wall; and both experimenters argee that the filled wall is warmer than a hollow one.

*Concluded from May issue.

New Publications.

MODERN STONE CUTTING AND MASONRY, with special reference to the making of working drawings. By John S. Siebert and Frederic C. Biggin, Instructor in Architecture, Lehigh University; size 6 x 9¼ inches; 50 pages, illustrated with numerous diagrams and plates; bound in cloth covers; published by John Wiley & Sons. Price, $1.50.

This is a work in which a large class of our readers will be interested, as it covers a field in which American literature of an up-to-date character is meager. The aim of the authors of the volume has been to collect and make available for students only such material as finds a direct application in engineering and architectural practice in this country. The work is comprised in two chapters, the first of which describes masons' and stone cutters' tools; the shape and finish produced by them; the classification of masonry according to shape and finish, and closes with a few general remarks on bonding, dressing, &c. The second chapter deals with stone cutting and masonry proper, and after a few preliminary definitions and descriptions takes up the study of the different examples which have been selected for the purpose. The explanations are given in detail where it has been considered necessary, but some of the drawings are intended only as models, the idea being that the student shall make others like them. Among the topics discussed in the second chapter may be mentioned Gothic buttresses, arches, arch culverts, railroad bridge masonry, intersecting arches, canal lock masonry and architectural stone work. The volume is carefully arranged and neatly printed, while the plate diagrams are clearly defined in all particulars.

THE MODERN SIGN WRITER AND ART ORNAMENTER. Compiled by leading experts in their respective lines; oblong in form; illustrated with 30 plates; bound in paper covers; published by R. Henderson. Price, $2.50.

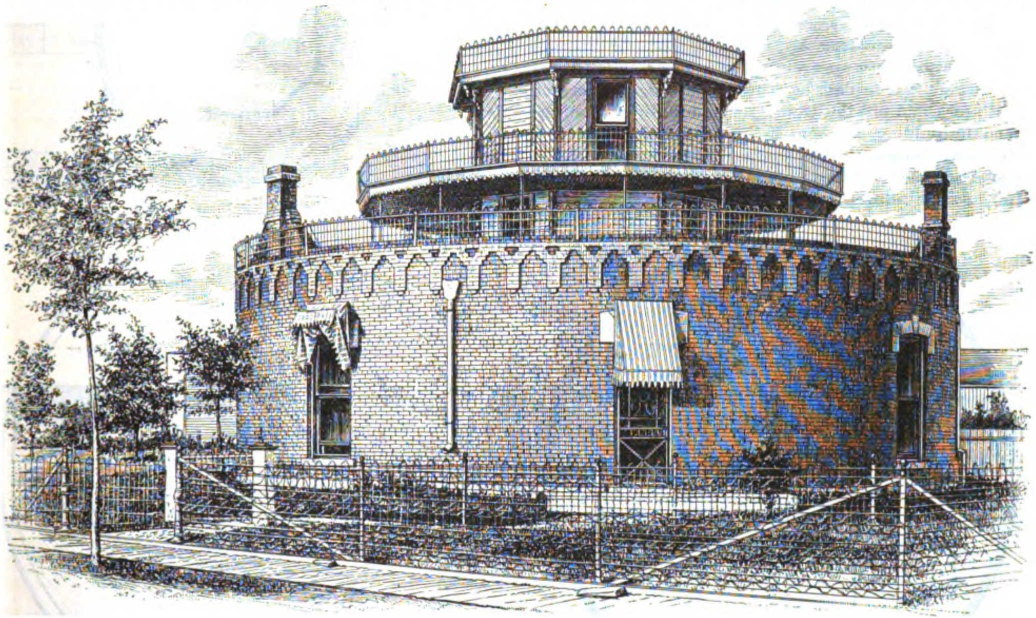
This publication, compiled by leading experts in their respective lines, cannot fail to prove a valuable addition to the literature of the subject indicated by the title. The ground covered includes modern and legitimate alphabets and designs, leaf scrolls and flat ornaments suitable for fresco painters and all others who are interested in ornamental painting. The work embraces artistic and beautiful sign layouts with rococo panels and tasteful designs, all of which were originated and prepared especially for this volume, together with all the standard styles. The printing throughout is in colors, showing upper and lower case alphabets, as well as figures. There are several full page designs of scroll work, beautifully printed by the chromo-photogravure process, and clearly showing the beautiful effects produced by work as actually executed.

The School Board of Homestead, Pa., have notified Superintendent C. M. Schwab of the Carnegie Steel Company of its acceptancee of Mr. Schwab's proposition to equip and maintain a mechanical training school for boys. The training school will be located in the four first-floor rooms of a building on Amity street. If this school succeeds it is said that Andrew Carnegie will erect a large building in Homestead specially for a training school, where boys can be taught any trade.

AN "ANTI-CYCLONE" DWELLING HOUSE.

THE recent cyclonic disturbances in the western and southwestern sections of the country, whereby a vast amount of property has been destroyed and scores of human lives sacrificed, render both interesting and timely a brief account of a rather unique dwelling house, designed and erected with the specific object of resisting the terrific force of such storms. The illustrations which are here presented give an idea of the general appearance of the completed structure and also of the interior arrangement. The first thing that will probably strike the eye of the critical builder is the shape of the house, which is round and constructed of brick. The designer, builder and occupant of this unique dwelling is J. T. Dorton of Orrick, Mo., who has had several experiences with cyclones, none of which was altogether pleasant. On two occasions the house in which he lived was moved from its foundations while he and his family were in the cellar, and on another occasion, while occupying a brick structure, it swayed in a way that was alarming and caused him to seriously consider the question of an anti-cyclone dwelling. He then and there decided to build a house which would be safe to inhabit during a "severe blow," and the structure here shown is the result. The building is 48 feet outside diameter, with brick walls 13 inches thick. Rising from the roof are two stories of wood of decreasing size, like the first deck and "Texas" of a steamboat. The building is anchored 8 feet in the ground with eight iron stanchions or posts, each one, Mr. Dorton states, having a strength to hold of 20 horsepower. In addition to these as a wind resisting factor is the weight of the building, which, being circular, makes every brick act as a brace, as in an arch. The bricks are also laid in cement instead of ordinary mortar. The partitions through the house are of heavy frame work thoroughly braced, and this frame work serves to brace the outer wall at every 16 feet, while in addition the wardrobes and closet fronts form braces on each side of the doors and windows. The joists, 300 in number, forming the floor and roof, run to the center like the spokes of a wheel, giving the builder good reason to believe that it is next to impossible for the structure to be blown down. There are three tiers of joists, the first being 2 x 8 inches, the next 2 x 6 inches and the other 2 x 4 inches. The last two sizes are used in forming the proper pitch of the roof, the first carrying the water from the center toward the wall and then from the wall back toward the center, forming a square valley in the roof, as shown on the roof plan. The main wall of the house is well calculated to shed cyclones, as it is only about 17 feet high, with no corners for the wind to act upon. In other words, "the round house," as Mr. Dorton puts it, "is a continued brace all around in every direction."

The inside diameter of the building is 45 feet 10 inches, divided into 11 rooms, there being nine on the first floor and one in each story of the tower. The five principal rooms on the main floor are of good size, the central one, used as a dining room, being 15 feet square. There are also hall, bedroom, bathroom and pantry, together with numerous wardrobes, cupboards, &c. It will be noticed from an inspection of the main floor plan that the rooms are nearly square, Mr. Dorton stating that the circle is of such large size that a person standing in the dining room would hardly know that the building was circular in shape. Opening from the dining room are library, parlor, sitting room and kitchen, and when all the connecting doors are open the interior looks very large. There are six windows in the lower story, giving ample light to the various rooms, that for the dining room coming through the open doors of the other apartments. The kitchen is fitted with hot water boiler, &c., while the bathroom has a porcelain lined tub, with hot and cold water connections and washbowl. The house is heated by a large base burning stove, which is placed in the dining room, and when necessary to heat any one room more than another it is accomplishead by closing all the doors except the one leading into that particular room. The rooms upstairs are heated through a register indicated on the plans. The stairs leading to the upper stories are accessible from both the dining room and the kitchen. The roof is covered with tar and gravel, floored with plank, and is very much like the upper deck of a steamboat. A balcony extends from the "Texas" above, and is supported by strong iron stanchions The house is said to be very cool in summer, as no matter which way the wind may be there is always a draft through the building,



General View.

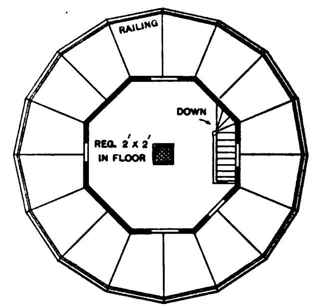
An "Anti-Cyclone" Dwelling House.—Designed and Erected by J. T Dorton, Orrick, Mo.

while in winter it is warm and comfortable, as the arrangement of the closets, &c., renders each living apartment almost wholly an inside room.

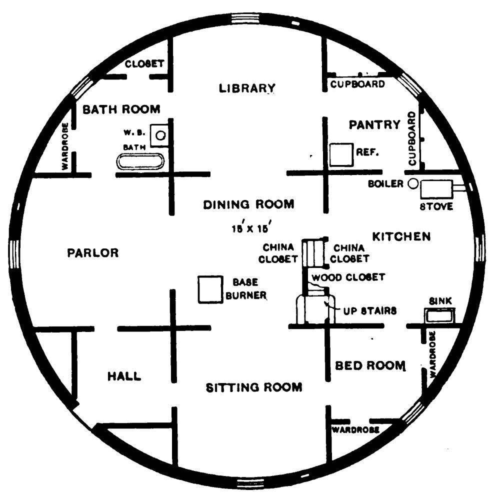
In writing of the house, Mr. Dorton states that his first reason for building a *round* house was to secure his family from cyclones, which he felt it as much his duty to do as to pull them from under a falling tree, and he could think of no other form of structure which would prove as strong. His next thought was to make it comfortable and convenient, and when he had drawn the plans he was so much better pleased with it than anything he had ever seen that he went immediately to work to build the house. He says one cannot realize the number of steps that its arrangement saves the housewife as compared with a square house. There is a complete system of water pipes running through and under the house, and they are so disposed that they never freeze.

Ownership of Architectural Plans.

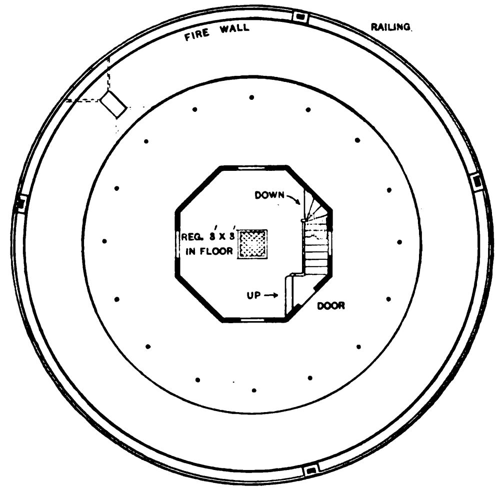
In a paper recently presented before the Ontario Association of Architects, a Mr. Gwynne, touching upon the legal relations between architect and owner, submitted the following: Where plans have been prepared, and the architect's fees paid, but the architect is not retained to superintend the building, to whom, in the absence of agreement, do the plans belong? This precise point has never been expressly decided. The architect says they are his, and relies upon an alleged custom among architects that in the absence of other agreement the plans remain the property of the architect. Where the building goes on and is completed under the same architect little if any difficulty is likely to occur in practice, as the architect gets his full remuneration. The trouble arises when the client, by claiming the plans without building, is in effect getting the benefit of the architect's work and knowledge for a much smaller fee than the latter would demand if he had anticipated the result. However, it seems, from a case decided in England some years ago, as if the architect's view is not likely to be taken when the question comes up for decision. In the case I refer to, the owner, after the completion of the plans, determined not to go on with the building, and asked the architect to send in his account and the plans. He refused, however, to give up the plans, setting up an alleged custom among architects that in the event of an employment of the architect being stopped he was entitled to be paid for the plans and to retain them. The learned judges, in discussing whether such a usage would be reasonable, even supposing it was properly proved, used some pretty strong language; one of them said that: "It appeared contrary to reason, good sense and justice that, in the event of a contract being put an end to, the architect should retain the plan for which he was entitled to be paid; it would require at least a clearly expressed stipulation in the contract to enable him to do so. The defendant was perfectly justified in refusing to pay until he had the plans. The execution of and the plans themselves formed the work and labor for which he charged the defendant, who was entitled to them if he had to pay for them."



Plan of "Texas" and Balcony.



Plan of Main Floor.



Roof Plan and Second Story.

An "Anti-Cyclone" Dwelling House.

Roofing Tiles of Wood Pulp.

One of the latest things in the way of roofing tile is made of wood pulp, the goods being turned out by an enterprising Norwegian firm doing business in Christiania. The roofing material is known as Norway tiles, the pulp under high pressure being formed into thin cakes of sizes similar to ordinary roofing slate. After a chemical treatment, which is the inventor's secret, the tiles become hard like brick and attain a deep black appearance, which lends itself admirably to give a soft tone to houses with prominent roofs and gables. It is claimed for the Norway tiles that they possess every advantage of the best slate in the market; their composition makes them light and durable, and they are not so liable to breakage as ordinary slate. They are not subject to any expansion or contraction, and when a roof is once covered with this material, it will stand for a good many years without any repairs whatever. Prominent architects in Norway who have had the opportunity to examine the tiles pronounce them superior as to quality, appearance and price, and the insurance companies seem to regard them as a very desirable and safe roofing material. The new mills at Embretsfos, Thursfos and Skien are covered with Norway tiles, and, from information gathered, the proprietors of the mills are much pleased with the new roofing.

MODERN MACHINE SHOP CONSTRUCTION.

SOME decidedly novel features of construction, which cannot fail to prove of interest to members of the trade, have been embodied in the new building recently completed in Providence, R. I., for the Brown & Sharpe Mfg. Company of that place. In external appearance, however, the new structure is in harmony with the other machine shops belonging to the company's plant. The new structure or extension, as it may be called, is four stories in hight and is connected on two of them, through wings, with the company's No. 1 building, and with this forms a hollow square. Parallel with the No. 1 building, the new structure is 163 feet by 51 feet, and the east and west wings are, respectively, 73 feet by 51 feet, and 50 feet by 43 feet, making, as each floor has the same dimensions, a total area of about 50,000 square feet. In addition, there are staircase and elevator towers. The first story is 16 feet 10 inches high, and the others are each 13 feet 1 inch in the clear.

The foundations, views of which are shown in Figs. 1, 2 and 3, rest upon piles, arranged to secure a uniform distribution of load of not more than 25,000 pounds per pile. The piles are cut off below the water level, but instead of being capped with timber in the usual manner, they are surrounded with a bed of cement concrete, 6 feet wide, brought flush with and entirely inclosing the heads. The footing stones are 6 feet by 4 feet by 1 foot 6 inches, dressed to a true bearing on the heads of the piles, and bedded in the cement concrete. On top of this footing, and up to the level of the brick walls, there is a wall of large building stone, 3 feet 6 inches thick. This wall is about 9 feet deep from top of piles.

In the center of the building the foundation is built in the same manner to a hight of 4 feet, when battered granite piers 12 feet long are constructed. On top of these piers are placed granite capstones, 5 feet by 3 feet 6 inches by 1 foot 6 inches thick ; upon these rest the cast iron column bases.

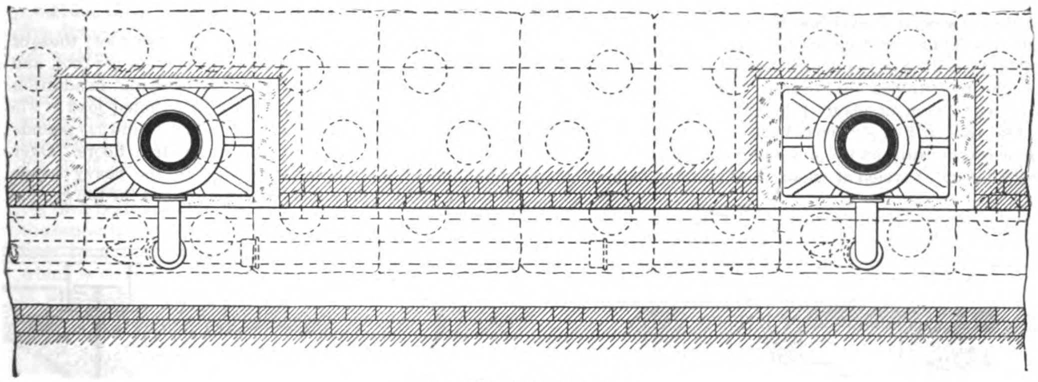


Fig. 1.—Plan of Foundations.

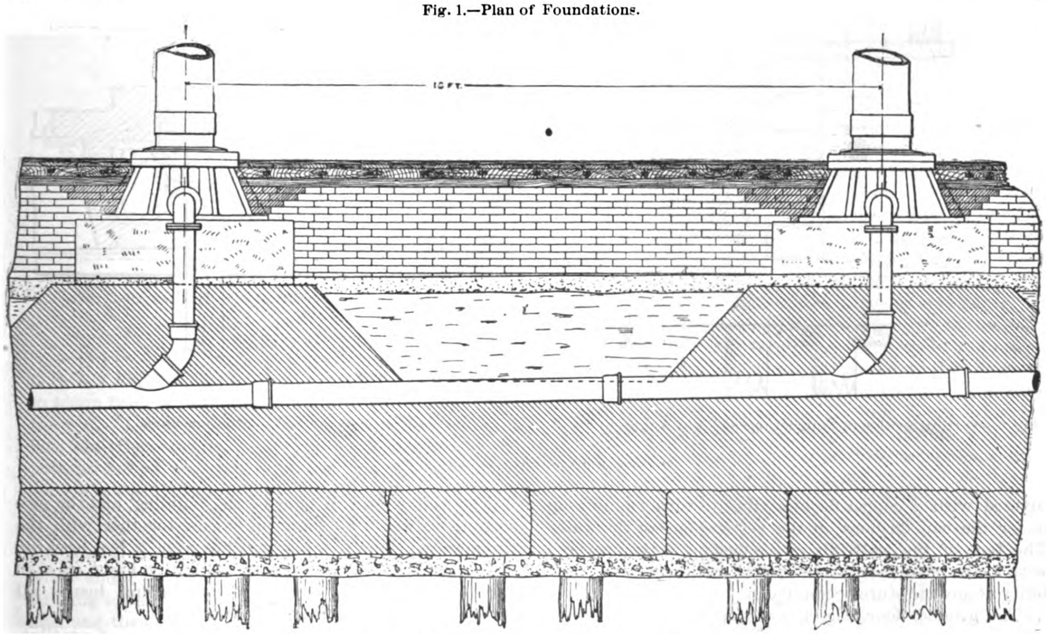


Fig. 2.—Vertical Section through Foundations.

Modern Machine Shop Construction.

Above the foundation the construction is of the well-known steel frame type. The columns are made up of steel Z sections riveted to the central plate—for the first floor, 10 inches by $\frac{7}{16}$ inch, weighing 75 pounds per foot; for the second and third stories, 10 inches by $\frac{5}{16}$ inch, 54 pounds per foot ; and for the fourth floor, 8 inches by ¼ inch, 38 pounds per foot.

The walls are 24 inches thick through the pilasters, including the Z-bar columns and ventilating flues. Only a few more bricks are required for this construction than would be necessary for a 12-inch solid wall, while the supporting power is equal to that of a solid 36-inch wall.

The walls are also provided with ventilating flues, Fig. 5, two to each pilaster (one on each side of the two Z-beam columns), made of special shaped fire-clay flue lining, and connecting with each room near the floors and ceilings by means of registers. These flues have a sectional area somewhat greater than an 8-inch circular flue, and are especially designed to assist in the proper distribution of the hot air supply, by means of the registers. The tops of the flues are offset to clear the granite coping, and are closed by a marble slab 2 inches thick, set at slight angle to drain the water from the coping on to the roof proper.

The floors, roof and coping also present some interesting features. The roof beams are 12-inch I-beams, placed 4 feet between centers, and correspond in position to the floor beams below. They support porous terra cotta arches formed of special shaped tiles to make the top surface flat and the under surface arched. Similar arches of brick form the ceiling of the floor below.

The roof arches are covered, true and smooth, with a coating of cement about 1 inch thick, and on top of this is laid regular five-ply tar and gravel roofing. The corners between the walls and roof are filled to a hight of 6 inches with cement, beveled at an angle of about 45 degrees, and covered with a copper flashing, this in turn running up under the cap flashing on the vertical face of the walls. The face of the walls above the flashing is then covered with a coat of asphaltum and pitch, to prevent the possibility of any moisture accumulating.

The ground floor, Fig. 3, rests upon a bed of cement concrete 12 inches thick. The concrete was mechanically mixed, and consists of one part Portland cement, four to four and one-half parts sharp sand, and eight parts crushed stone. This was put down as dry and stiff as possible, forming a continuous foundation which is sufficient for any of the machines, and very advantageous, as it will enable the location of any machine to be changed without requiring the building of new foundations or the sacrifice of old ones. Over this cement concrete is a coating of pitch, applied hot, and above this there is a ½-inch coat of tar concrete, so that the possibility of any moisture striking up into the floor planks is thoroughly prevented. In this foundation are bedded chestnut sleepers, to which are spiked the floor planks. The floor proper consists of 2¾-inch spruce planking, tongued and grooved; over this a diagonal course of matched spruce 1⅛ inches thick, and over all is laid 1⅛-inch hard pine; this is jointed square for convenience in making repairs.

The roof and other beams are supported at the outer ends upon steel Z-bar columns inclosed within the pilasters, Fig. 5, to which they are framed in a manner to support the frame work entirely independent of the brick wall. At the center of the building these beams are framed to a double line of 20-inch I-beams, which rest upon a single row of cast iron columns placed 16 feet between centers. These columns are 16 inches diameter at the bottom, tapered to 14 inches at the top, for the first floor, and of correspondingly suitable proportions for the other floors. The double row of beams are 20-inch I-beams for the second, third and fourth floors, and 15-inch I-beams for the roof. The roof beams are 12-inch I beams, and the other beams 15-inch steel I-beams, placed 4 feet between centers, with 4-inch brick arches resting upon the lower flanges.

The second-floor beams are 60 pounds per foot; those of the third and fourth floors are 41 pounds per foot, and the floors are thus capable of safely carrying, in addition to their own weight, a uniformly distributed load of 375 pounds per square foot for the second floor, and 225 pounds per square foot for the third and fourth floors. Over these beams and brick arches is laid the heavy 5-inch spruce and hard pine flooring, as described for the ground floor.

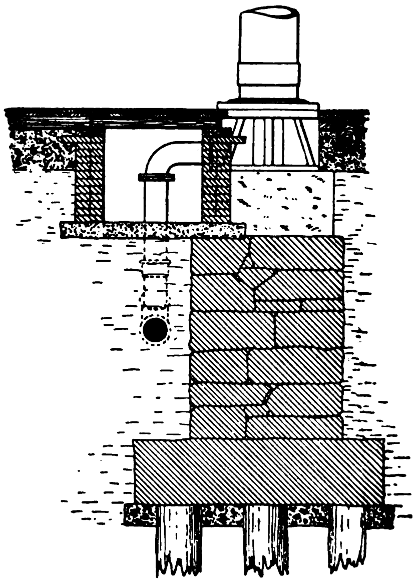


Fig. 3.—Vertical Section of Foundations at Right Angles to Fig. 2.

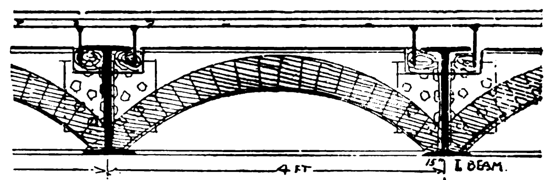


Fig. 4.—Detail of Floor Construction.

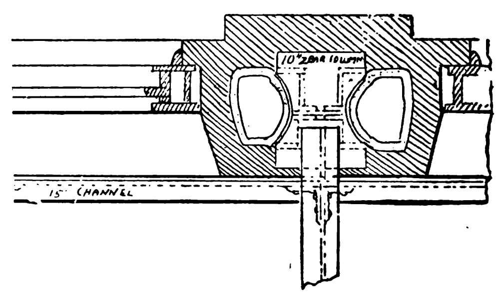


Fig. 5.—Detail of Ventilating Flues.

Modern Machine Shop Construction.

The hollow square plan of the building, and the proportion of width to hight of stories, together with the windows, which are 4 feet 2 inches wide, 8 feet between centers, and extend practically the entire hight on each floor, from the work benches to the ceiling, insure all that can be desired in the way of light.

The ventilation is accomplished by means of ventilating flues before described in connection with the walls.

The water is conducted from the roof through the iron columns before referred to as supporting the floor and roof beams at the center of the building, the roof beams grading toward these about ⅛ inch per foot. The columns are coated inside with tar to prevent rusting, and after passing down through these the water is carried off, through the cast iron column supporting bases, by special outlets connected with the drain, as shown in Figs. 2 and 3.

A convenient arrangement for running pipes, wires, &c., is obtained by having a drain conduit, or pipe trench, near the center of the building. It runs parallel with the main foundations, Fig. 3, these forming a part of one side, and varies from 2 to 3 feet in depth. The covering consists of removable sections of flooring of the same thickness as the regular flooring.

The building was designed and planned by the company's engineers, and was erected by Norcross Bros. of Worcester, Mass.

CORRESPONDENCE.

Trouble with Sweating Walls.

From A. E. L., *Marion, Ind.*—I have in my care two one-story houses of five rooms each, built side by side, both being erected at the same time and alike in general particulars. In one of the houses the water drips from the walls when the grate or gas is started. The houses are located in the natural gas region, and I desire to know from practical readers of the paper what to do to remedy the difficulty.

Wooden Skylight Construction.

From E. H., *Holyoke, Mass.*—I have been engaged in five different shops and in only one have I found a method of making wooden skylights like the sketch which I send. In the other four shops the work was done in such a way that it took three times longer. Thinking the subject is one in which the readers of the paper are interested, I will describe the method first referred to. In Fig. 1 of the sketches is represented the lower end of a skylight bar 1½ inches thick, the bar being made for a 1⅛ inch bottom rail. The latter has a ⅜-inch mortise in the center in which the bar fits. The stiles are mortised ⅜ inch from the face side with a ⅜-inch chisel. The cope, which is shown in Fig. 2, is ground as indicated, so that it will make the short tenon and shoulder indicated at

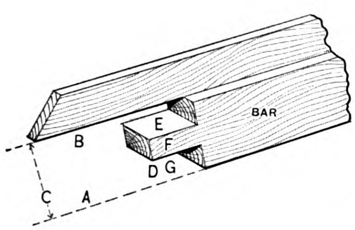


Fig. 1.—Lower End of a Skylight Bar.

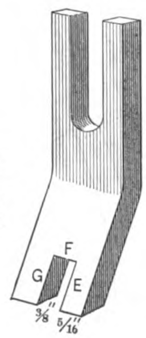


Fig. 2.—The Cope.

Wooden Skylight Construction.

E F G of Fig. 1. The tenoning machine must be set so as to tenon from A to B and from C to D and a cope will do the rest. The cope is used only on the bottom end of the bar, as all the other tenons are made without its use. The bottom end of the bar is the last thing tenoned and the cope is not put into the machine until then, for the reason that the machine has to be changed when the work on the end of the bar is done. I hope some of my brother mechanics will take up the subject of sash and door work and do all they can to help along those who are striving to learn. I will do what I can by sending letters now and then accompanied by sketches of work.

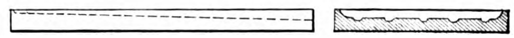
Insulation for Ice House Walls.

From A. V. H., *Bismarck, N. D.*—I would like to know the relative value of the following materials as non conductors when used as filling for insulation in ice house walls, the latter having an approximate thickness of 8 inches: Railroad cinders, anthracite coal ashes, bituminous coal ashes, sawdust and mineral wool.

Note.—In general terms it may be stated that the qualities of any non-conducting material depend upon the fineness into which they may divide the air spaces. Any substance which packs closely together is not as good a non-conductor as one of which the contrary may be said. Dry sawdust is a better non-conductor than when it is wet, as in the latter condition it becomes closely packed together and loses more or less of its non-conducting qualities. The same is also true of coal ashes. Mineral wool divides the air spaces very fine, and among those mentioned by our correspondent would probably rank first as a material for insulating the walls of an ice house. Sawdust would probably take the second place and coal ashes next. We should say that a very good plan for constructing the walls of an ice house would be to divide the thickness into three spaces, filling the outer and inner ones with ashes or sawdust and the middle one with mineral wool. Very much depends, however, upon the thoroughness with which the building is constructed, as whatever the material employed it is likely to become more or less dampened by the ice within.

Wood for Sink and Drip Board.

From A. E. P., *Sparta, Wis.*—In answer to "J. J. D.," Cornwall Station, Cal., relative to the kind of wood to be

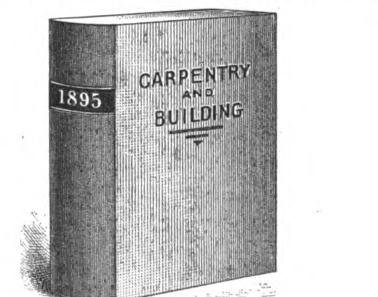


Side and End Views of Drip Board for Sink.—Contributed by "A. E. P."

used for a sink and drip board, I would say that I have found ash to give the best results, although I have used oak and cherry to a considerable extent. Quarter sawed lumber should be used, however, as it warps the least. It is best to make the drip board out of 1½ or 2 inch stuff and sink it as shown in the sketches, which represent side and end views.

What to Do With Back Numbers of "Carpentry and Building."

From YOUNG CHIP, *Montreal, Can.*—Referring to the inquiry which appeared in the March issue of the paper, perhaps the inclosed sketch may be of some assistance to "Wood Worker," Brattleboro, Vt. I use the same thing for keeping the current numbers of the papers together until I am ready to have them bound at the end of the year. The case illustrated is made of straw board glued together at the edges and the joints covered with a piece of tape. Then the whole is covered with cheap bookbinder's cloth. The front is left open and the case made large enough for all the numbers to slip in easily. "Wood Worker" could make as many of them as he required, cutting the date out of silver or gold paper, pasting it on the back and standing the cases on the shelves like ordinary books. If he does not care to go to the expense of bookbinders' cloth he can cover the whole with marble paper, or the back and edges with marble paper, and the sides with the two covers from the monthly numbers of the paper. If he keeps the various numbers in their proper order he has everything where he wants it,



View of Case Used by "Young Chip" for Keeping Back Numbers of "Carpentry and Building."

and although not as handy as a bound volume, it is 100 per cent. better than destroying them.

From P. G. M., *Windsor, Ill.*—In answer to "Wood Worker" of Brattleboro, Vt., I will describe what I do with my back numbers of the paper. I first remove all advertising matter and place the numbers in regular order for the full year with the index at the front. After getting the edges, and especially the back, as even as possible, I put them in a press—clamps will answer—and screw them down tight. While in the press I punch four holes about 3-16 inch from the rear edge and put in brass paper fasteners, clinching them before I unscrew the press. This makes a neat book about ¾ to 1 inch in thickness. Next, I take a strip of cheese cloth or thin muslin 2 inches wide and paste on the back, letting it turn over the edge on each side. When dry I paste on to the cloth any kind of heavy paper for a cover. This makes a very substantial book, and with ordinary care and handling will last many years. This style of binding does not cost more than a few cents for a year's numbers.

Trouble with Electric Bells.

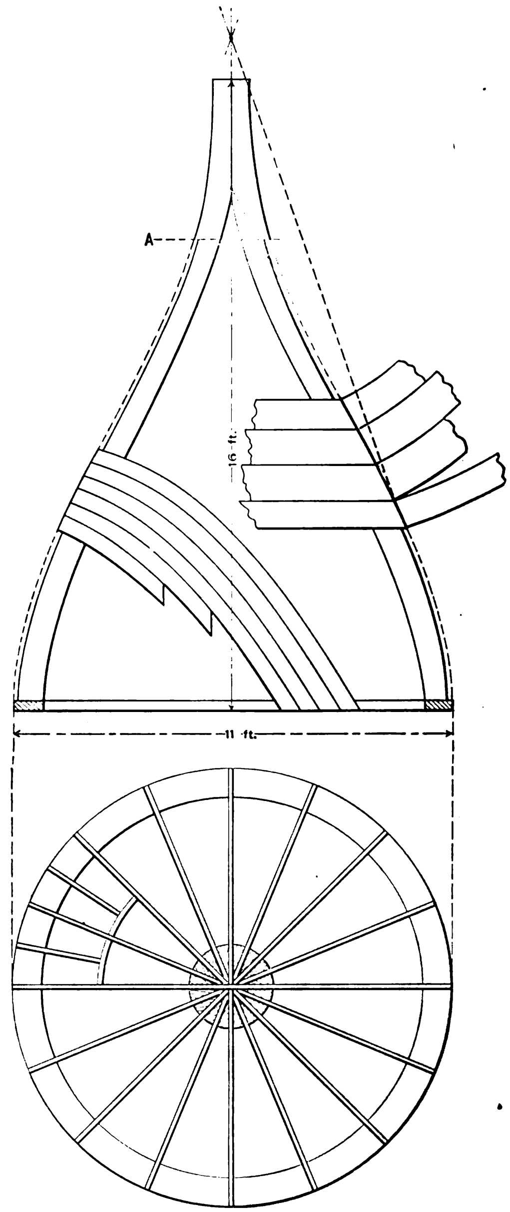
From A. B. C., *Scranton, Pa.*—Will some one please inform me through the columns of the paper how it is an electric bell is so apt to get out of working order. I have been called upon to fix a good many bells of late, and it seems to me that all the trouble lies in the small adjustment screw, yet I cannot account for it. I would also like to know how to renew a dry battery when it has become exhausted.

Note.--There are several things which might contribute to the difficulty mentioned by our correspondent, but without knowing more specifically just what are the conditions, we can only discuss the matter in a very general way. If the device employed is an electro magnet with a vibrating armature in front of it, the difficulty may be in the adjustment of the spring of the armature, or in the contact points against which the armature strikes when it is released by the magnet. These points should always be clean and bright, and if the contrary is the case, more or less trouble is found in the proper working of the bell. If the battery is very weak the armature must be close to the magnet, while if, on the other hand, it is a strong battery, the armature may be a little further away without seriously interfering with the operation. We should suppose that our correspondent could, with a little experimentation, determine the right adjustment, and if this fails to give relief then the trouble must be looked for elsewhere.

Our correspondent will probably find it much cheaper in the end to buy a new battery than to attempt to renew the old one, owing to the difficulty likely to be encountered. In many cases the manufacturers will allow a little something on the old case if returned, so that the expense of a new battery is reduced to that extent. The ingredients used in filling dry batteries are the following: Charcoal 3 parts, mineral carbon or graphite 1 part, peroxide of manganese 3 parts, lime hydrate 1 part, white arsenic (oxide) 1 part, and a mixture of glucose and dextrine or starch 1 part, all by weight. These are intimately mixed dry, and then worked into a paste of proper consistency with a fluid solution composed of equal parts of a saturated solution of chloride of ammonium and chloride of sodium in water, to which is added one-tenth volume of a solution of bi-chloride of mercury and an equal volume of hydrochloric acid. The fluid is added gradually and the mass well worked together.

Framing and Sheeting an Ogee Tower.

From H. W. N., *Salt Lake City, Utah*—In the January number "M. L.," of Warren, Ohio, asks for a plan showing the method of framing the rafters for the roof of a round tower and putting on the sheeting ready for a slate roof. I inclose a sketch showing plan and elevation which I hope will meet his requirements. The plan does not need much explanation, all the rafters being of equal size and pattern. The rafters at the foot are about 2 feet apart. Should this be too much I have shown the method of filling in by putting in a girt and short rafter. I have shown only two rafters in the elevation, which at the apex are 6 inches to the plumb cut. Set up two rafters at right angles to these with a thickness less by one-half than the first two. These four rafters well secured together will give the proper position and plumb to the center of the tower. The remainder of the rafters are to be filled in as shown on the plan, care being taken that each rafter radiates from the center at the apex to center of rafters, and that they stand at an equal distance of 6 inches from the center. For the sheeting I have shown two methods. One provides for laying the sheeting horizontally, which necessitates its being cut to the proper radius in order to lay level when bent to position. To obtain this it is necessary to construct a line tangent to the curve of the rafters, extending it until it cuts the center line of the

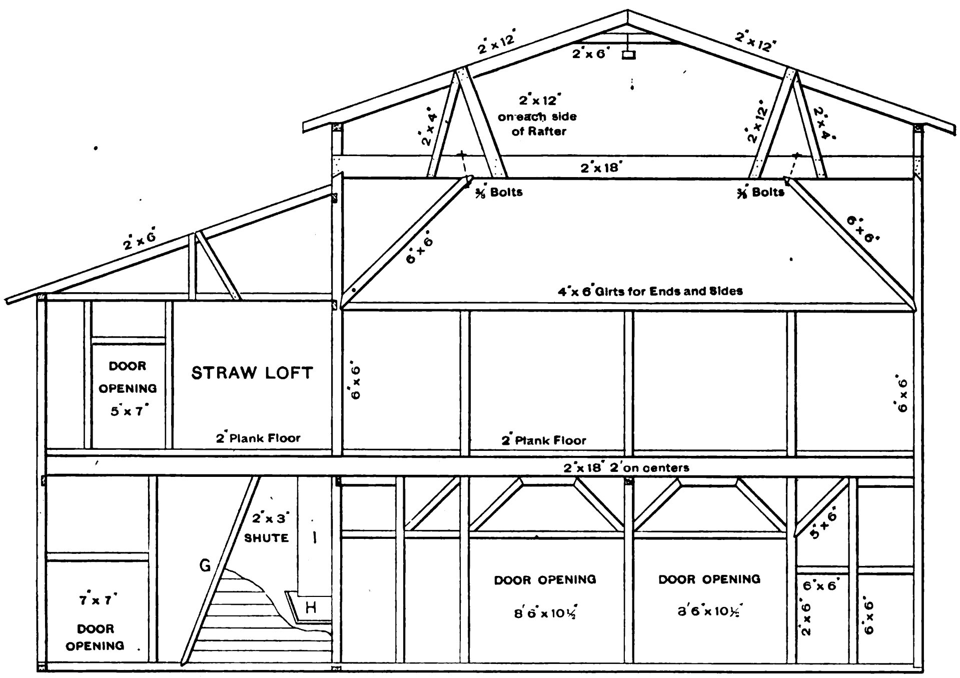


Plan and Elevation, Showing Method of Framing an Ogee Tower as Suggested by "H. W. N."

tower. This will give the radius as indicated in one of the examples in the elevation. Each tier of boards is to be treated in the same manner by their respective tangents. If the tower was a perfect cone they would all have to be struck from a common center being at the apex. I merely mention this fact, as I find a great number of mechanics are not acquainted with the problem. I have shown on the elevation that below A the rafters are sunk the thickness of the sheeting. The reason for this is obvious, as above A it becomes difficult to bend the sheeting even with kerfing, and as the rafters become so close and compact it will only be required to trim off ⅛ inch from the corners in order to make a perfect circle; and by a little filling in, as shown on the plan, this part will require no sheeting. The other method is the one generally adopted in this part of the country, and consists of two thicknesses of ½-inch narrow battens laid down diagonally, as shown on the elevation. I find this is the quicker way, but in either case it is necessary to have the apex as described. If the latter method is adopted it would be better to put the second layer of sheeting on the reverse way, as it gives better results.

Method of Framing a Barn.

From J. J. D., *Cornwall, Cal.*—I send herewith a drawing which shows the front end bent of a barn which may prove of interest to some of the readers of the paper. The main building is 40 x 70 feet, with a hight of 37 feet. It has a hay loft at the top and a 12-foot story underneath for storage of wagons, plows, &c. There is also a track for a hay carrier at the peak of the barn over the tie beam.



Method of Framing a Barn as Suggested by "J. J. D"

The stable portion of the building is 20 x 70 feet, and has a hight of 24 feet. Over the horse stalls is a straw loft as indicated. The stalls can be arranged for one or two horses as may be preferred, G representing the partition between the horses; H, the manger and I, the shute down which the hay is thrown to the horses The drawing shows the way in which the roof is braced; also the studding, door openings, &c. The side studding is 6 x 6 inches placed 2 feet on centers. I submit this form of framing to the readers of the paper, and should like to have their opinions as to its merits and demerits.

Problem in Board Measure

From L. W. H , *Jermyn, Pa.*—I would like to submit the following solution to the problem in board measure presented by "A. P. McL." in the November issue of *Carpentry and Building*. In the board we have a figure whose area is equal to

$$\frac{6'' + 8''}{2} \times 12' = 7'$$

$$\frac{6^2 + 8^2}{2} = \sqrt{50} = 7.071 \text{ inches.}$$

which is the width of the board at the point of dividing it into two equal parts. By this we find we have a board 7.071 inches at one end and 6 inches on the other, the average width being 6.535 inches. Now, as the area is 3½ feet we find the length of the board by multiplying 3½ by 12 and dividing by 6.535, which equals 6.426, or to reduce the decimal to inches, we find we have 6.5112 inches, the distance from the narrow end of the board to which to cut. I cannot give any authority for this method of solving the problem, but I find it will work every time, and it may possibly help those who do not understand geometry.

Suggestions Regarding Builders' Hardware.

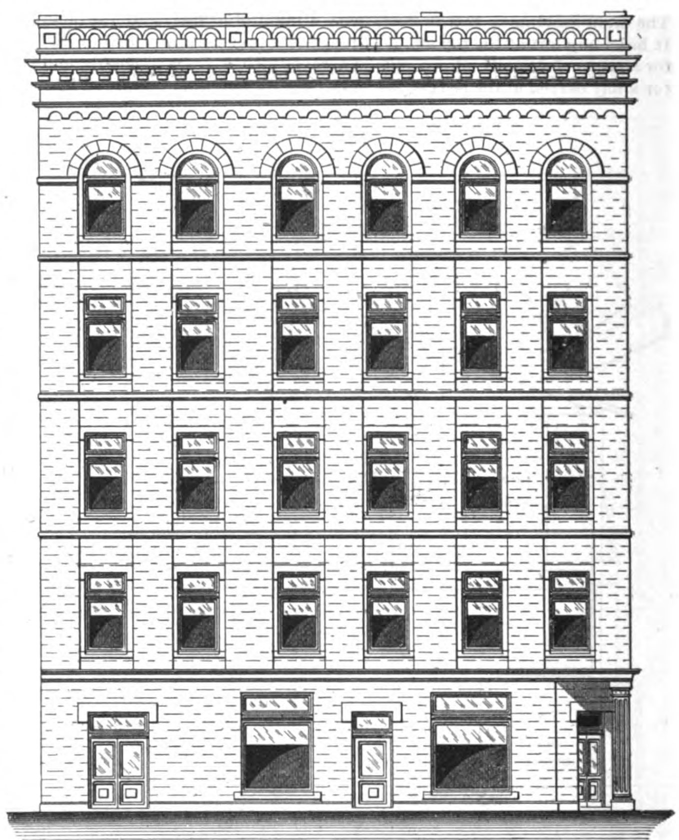
From G. P. S., *Leavenworth, Kan.*—If not taking up too much valuable space, I would like to make a few suggestions to the manufacturers of hardware, and ask my brother builders to do the same whenever they see fit. In the manufacture of locks the strike plate is generally made with little or no play for the bolts, especially in the length, and when doors are a trifle out of shape, usually caused by uneven settling in buildings, the latch and bolt will not catch. When the carpenter is called in he finds that the only remedy is to lower the strike plate and leave an unsightly hole in the jamb, or else glue in a piece, which seldom remains very long. Now, I would ask, Why not save the trouble and expense of this by making the opening in the strike plate ⅛ inch longer each way? Then there are some strikes lately made where the opening for the latch is a trifle wider than the opening for the bolt, so that unless the door is locked it will rattle on windy days. There may be some advantages in such a strike, but so far it has proven very unsatisfactory, especially for outside doors.

Another point that also affects the sale of a lock to some extent is the simplicity of reversing it. Some of the manufacturers have noticed this and devised clever arrangements for reversing a lock without taking off the cover. Most builders prefer to pay a trifle more for such a lock instead of having their carpenters fumbling away time with locks that fly apart as soon as the cover is lifted and causing the men to hunt in the shavings and dust for the different pieces.

There is also much room for improvement in blind hinges and catches. A catch that would hold the top as well as the bottom of a blind shut, the upper catch being connected with the lower by means of a rod so as to open both at the same time, would be a boon to many warped blinds that are sometimes open as much as 1 inch at the top, admitting snow, rain and dust. The carpenter, builder and architect are the first to notice these wants, and it is their place to suggest improvements. I trust, therefore, that others will express their opinions and that manufacturers will make an effort to give the suggestions their attention.

Design for a Society Building.

From B. J. C., *Washington, D. C*—I herewith submit plans for a society building in answer to the inquiry of "Birdseye," Reading, Pa., which appeared in the issue of the paper for July last year. Although nearly a year has elapsed since the inquiry was made, and while "Birdseye" may have no use for the plans now, I trust that other readers of the paper may be interested in them. The building is 60 feet wide by 130 feet deep and five stories high. I have followed "Birdseye's" directions as to the arrangements of the various floors and will try and give a brief description of them. The first floor is given up to two large stores and an entrance hall to the upper stories. The main entrances to the stores are on the side and are arched over. The arches as well as the trimmings for the whole building are intended to be of white stone, Indiana limestone preferred. Steel columns are placed at regular intervals in the stores, on which rest the girders and beams to support the floors above. Flat arches of porous terra cotta tiles are to be sprung between the beams, as these give a good flat surface for the ceiling and strips can be nailed direct to them on which the flooring of the story above can be laid. They are also fire and water proof and make a very strong arch. The entrance hall contains an elevator and a stairway leading to the upper floors of the building. The stairway should be made of cast iron stringers, protected on the under side with porous terra cotta, slate treads and risers, backed up with tile set in on boards between the stringers, the newels to be cast iron with wrought iron railing and a polished brass hand rail, this construction to be followed throughout. Under the stores are two cellars, a boiler room and a coal room. Steel columns are placed in the cellars, and the construction of the floor for the first story should be similar to that described above, with the exception that instead of having flat arches springing from the beams, segmental arches should be used, the upper surface of which should be filled in with concrete having strips embedded therein to which flooring can be nailed. Segmental instead of straight arches are used here for the reason that they are stronger, and as the floor immediately above would in all probability constantly have a heavy "dead" load owing to the goods in the stores besides a decided "live" load, they would always be subjected to a heavy strain. It will be noticed that the chimney runs up in the light shaft, which is rather an unusual place for it, I believe, but it is convenient to the boiler room at that point and it will not obstruct the light to any appreciable extent. Should it do so the trouble can be remedied by giving it a coat of white paint. The second floor contains 13 offices and toilet room, all of which open into the hall running through the center of the building. All the wood work on this floor should be of hard pine and the door and window frames have corner blocks with carved centers. The upper halves of the office doors should be frosted glass. The thrid floor is intended to be used for club purposes. The flooring should be of good hemlock boards 3 inches wide, blind nailed and polished. The washbowl stand in the toilet room should contain three or four cupboards with paneled doors. The hall, library, office, banquet hall and kitchen should have a wainscoting 4 feet high made of oak. The library should have large stationary bookcases built in the walls and fitted with glass doors. The wood work of these cases should be of black walnut. The fourth floor is fitted with session halls for the use of the society and should be finished in white pine. The fifth floor is intended for entertainments, private theatricals, &c. The partitions on this floor, as well as on the others, should be of hollow partition tile. The stage is of good size and provided with dressing rooms, scene docks, &c. The hall has a seating capacity of about 400 and should be finished in white pine, cherry stained. I suggest that the doors at the entrance of the hall be of "flexifold" construction, which wind around posts set in the partitions. The roof should be as thoroughly fire proof as possible and should be made of tile segmental arches covered with concrete, and all the girders should be covered with tile slabs. The entire building should be heated and lighted by electricity. I trust that the readers of the paper will freely criticise the design and arrangement, as I feel sure that they are susceptible of many improvements.

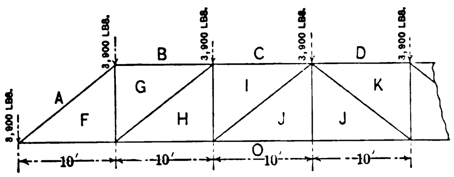


Front Elevation.—Scale, 1-16 Inch to the Foot.

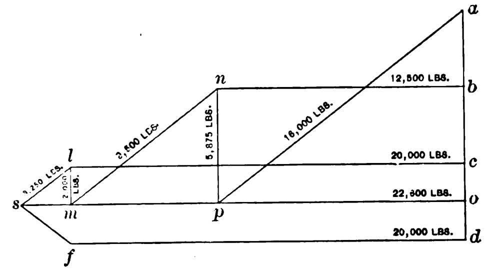
Design for a Society Building.—Contributed by "B. J. C.," Washington, D. C.

Shingling a Barn.

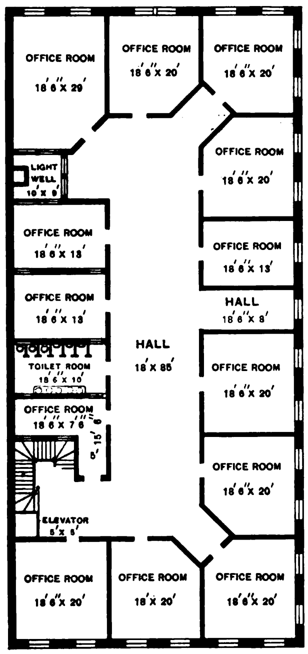
From J. T. C., *Laurium, Mich.*—I would like to ask the readers of the paper which they consider the better way to shingle a barn in order to secure the greatest warmth within—to lay the shingles 4½ inches to the weather, or use ship lap double, with paper between ?



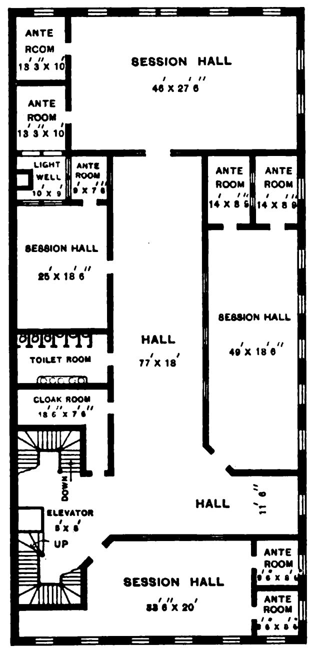
Skeleton of Half of Roof Truss.—Scale, 1-16 Inch to the Foot.



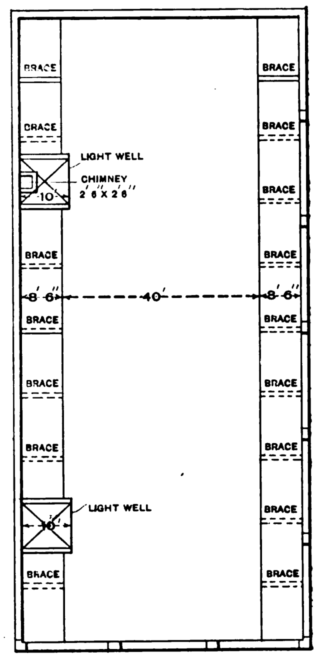
Stress Diagram.—Scale, ⅛ Inch Equals 1000 lbs.



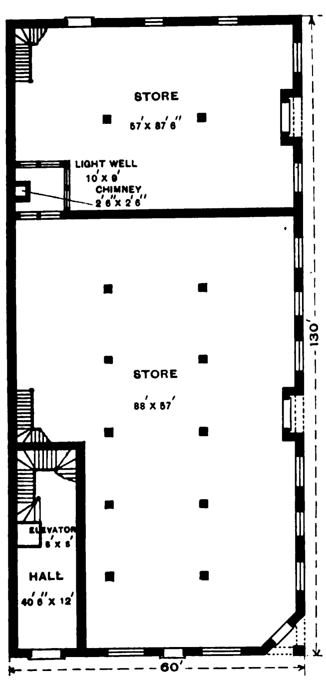
Second Floor.



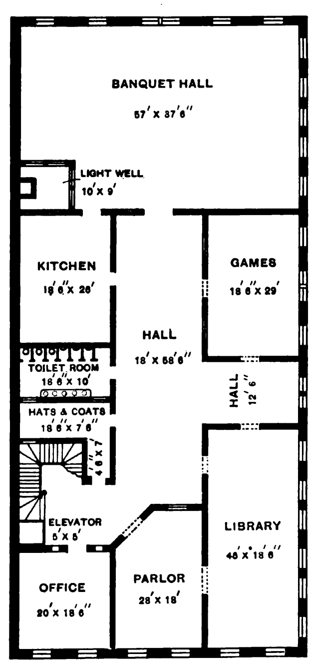
Fourth Floor.



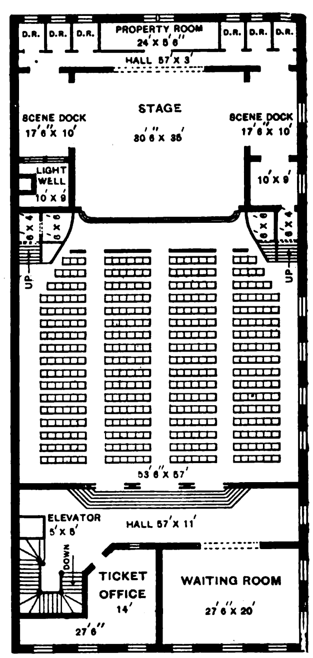
Roof Plan.



First Floor.



Third Floor.



Fifth Floor.

Design for a Society Building.—Floor Plans.—Scale, 1-32 Inch to the Foot.

WHAT BUILDERS ARE DOING.

AN attempt is being made in Atlanta, Ga., to bring the builders together for the transaction of business by offering special inducements in the shape of an office building for the occupancy of builders only. While the building is to be called the Builders' Exchange, the project is to be under the control of one man, C. Walter Smith, who has leased for a number of years the large storehouse at 62 Peachtree street, and which runs through to and faces Broad street. On the first floor the offices of the different builders, &c., and, in fact, all who are in any way connected with building will be situated. These offices or separate apartments are all divided off into equal spaces of about 6 x 10 feet, and are furnished with roll top desks, chairs and other necessities. These offices will be rented for $10 per month, but larger ones can be had on the floor above at more reasonable rates, for showrooms. The building is amply provided with water closets, lavatories and other conveniences, and will be kept clean and in first-class shape. Mr. Smith will give the occupants assistance, such as figuring or interpreting plans, and will furnish free information to parties outside the city or State who wish to inquire for first-class builders, mechanics and materials.

The exchange will open in the mornings at 6.30 o'clock and will remain open till 10 p.m. E. T. Horsey will be manager.

Baltimore, Md.

The new Building Inspector of Baltimore, by enforcing law in relation to the payment of fees for the erection of bay windows, sheds, porches, &c., has caused considerable disturbance among the builders doing business in that portion of the city recently annexed.

The annexation act expressly stated that the erection of buildings in the Twenty-first and Twenty-second Wards should be governed by building laws in force in the city proper, but not until so provided by ordinance. This ordinance did not become law until April, 1894, but City Solicitor Elliot holds that Building Inspector Owens has full power in the premises, and that the fees he is charging are legal.

Early in May there was some activity among the unions belonging to the American Federation of Labor, in regard to the advisibility of a general strike for a uniform day of eight hours. Contractors, however, have received no notification from the unions of any intention to strike, and it is thought that there will be no disturbance unless some new complication arises.

The amount of building in sight at the present time is less than that of 1895 at the same period; but there is enough to keep the majority of the builders busy. The exchange is in excellent condition, and the members expect that the season will be about up to the average.

Bloomington, Ill.

The Builders and Traders' Exchange of Bloomington has been experiencing a revival, many new members having been taken in within the last 30 days. Five new firms have entered the association, which now numbers over 80 members. Those already in are pleased with the outcome of the work undertaken a little more than a year ago and feel confident that still greater results will come from it. P. O. Munson and O. B. Housel, representing the builders and traders of Galesburg, were in the city a few days ago getting facts and items that will be of use in the organization of a similar exchange in that city.

Boston, Mass.

The building trades of Boston were very unexpectedly disturbed early in May by a strike of hoisting engineers. Just before the opening of the season the Hoisting and Portable Engineers' Association applied to the Mason Builders' Association for the establishment of a similar arbitration agreement to that existing between the Mason Builders' Association and the bricklayers', stone masons' and building laborers' unions. The Arbitration Committee of the Mason Builders' Association met a committee from the engineers' union and offered the form of arbitration mentioned, as having been demonstrated satisfactory. The delegation from the union reported back to their organization, which declined to enter into the agreement on account of the clause therein prohibiting strikes or lockouts pending the settlement of any matters in dispute. The engineers claimed the right to strike should they be ordered to do so by the Building Trades Council. No further action was taken until April 29, when the following notice was served on each builder employing hoisting engineers:

The Hoisting and Portable Engineers' Association of Boston and vicinity present the following schedule of time and wages, to take effect on and after May 4, 1896:

1. Eight hours shall constitute a day's work, at a minimum rate of wages of 42½ cents per hour.
2. All overtime shall be paid for at the rate of time and a half.
3. Work done on Sundays and holidays, except July 4, Labor Day and Christmas, shall be paid for at the rate of double time.
4. Work done on July 4, Labor Day and Christmas shall be paid for at the rate of three days for one.
5. When an engineer is required to get steam up before working hours he shall be paid 50 cents for same.
6. All engineers to be employed shall be members in good standing of the H. & P. Engineers' Association of Boston and vicinity.
7. The agent of this association shall have the right to canvass the engineers on all jobs during working hours.

After sending the foregoing to the individual employers no further action was taken by the workmen until the morning of Monday, May 4, on which date no hoisting engineers appeared for work. No further notice had been given the employers, and the strike was begun without warning.

The men had been granted eight hours without reduction of pay at the time the short day was established by the bricklayers, and the demand as presented is for an increase in pay of about $1 per day, and 50 cents additional if the men are required to get up steam before the hour of beginning work. This brings the total demand up to about $9 per week more than the men were receiving at the time of the strike. Under the laws of Massachusetts hoisting engineers are required to hold a license from the District Police Department, and all members of the union are compelled to hold a license before they can be admitted. Heretofore licenses have been granted freely, but since the strike the examination has progressed very slowly. It is intimated by many of the contractors that non-union men are being discriminated against by the department. Work has been seriously delayed on several jobs, but the contractors claim that new men are gradually taking the place of the strikers.

The 1500 painters and decorators of the city have practically succeeded in establishing the uniform rate of $2.50 per day of eight hours. Most of the master painters who employ any considerable number of men granted the advance in wages asked for by Painters' Union 11 without hesitation. A few of the smaller employers refused to accede to the request, and their workmen as a consequence struck.

Building interests generally are in an active condition, and a large amount of work is being done.

Buffalo, N. Y.

Several small strikes have occurred in the building trades of Buffalo during the past month, but none have thus far resulted in any serious interference with the work under way. On May 18 a struggle for an eight-hour day was begun by the carpenters' unions, but the result cannot be foretold at this writing. New work is slowly coming into the market, and builders are hoping for greater activity as the season advances. The majority of the new work now being let is for dwellings and general building in the residence and manufacturing parts of the city.

The Builders' Exchange Association, which is the stock company that owns the exchange building, has elected nine directors, as follows: Charles A. Rupp, H. C. Harrower, Alfred Lyth, George W. Carter, John Feist, Jacob Reimann, Henry Schaefer, A. A. Berrick, George W. Schmidt. The new board has elected the following officers and appointed a Building and Auditing Committee: President, Charles A. Rupp; vice-president, H. C. Harrower; treasurer, Alfred Lyth; secretary, John C. Almendinger; Building Committee, George W. Carter, John Feist, A. A. Berrick, Henry Schaefer, George W. Schmidt; Audit Committee, Jacob Reimann, John Feist.

The members of the association are busily engaged in perfecting the plans for entertaining the delegates and visitors to the tenth convention of the National Association of Builders, which will be held in Buffalo on the third Tuesday of September.

Chattanooga, Tenn.

The builders of Chattanooga are elated over the prospect of an unusually busy season. A *résumé* of the building which has been done or has been projected since January 1, 1896, shows figures that are gratifyingly surprising to all those who are interested in the progress of the city. Since the first of the year building permits have been issued to the amount of over $75,000! During the month of March alone permits were issued to the aggregate amount of $40,000. The building of dwellings, manufactories and other building enterprises which have been completed, begun or definitely projected since January 1, 1896, will entail a total expenditure of over $500,000.

With the increase in building comes the announcement that the number of vacant houses largely decreased and the number of inhabitants increased over last year.

Chicago, Ill.

May 1 passed very peacefully in Chicago among the labor unions, there being no strike of a general nature to disturb the progress of work.

The Bricklayers' Union, which is the most powerful union in the city, is working in aid of organization for the employers, it being believed that a much more far reaching harmony can be secured between employers and workmen if both sides are fully organized. The agreement between this union and the Mason and Builders' Association, by which all differences are arbitrated, has been working satisfactorily for a number of years and under its operation no strike or lockout can occur. The Bricklayers' Union has maintained its independence of all other labor organizations, and is now opposing the affiliation of the United Order of Bricklayers and Masons with the Building Trades Council.

A strike of iron workers has been settled by conceding the men a compromise wage of 41¼ cents per hour.

The scheme to amalgamate all the labor unions in the city into one organization is reported a failure. It was impossible to secure united action of the majority, and the plan has been temporarily abandoned

The Builders and Traders' Exchange has moved from the old quarters at Lake and Clarke streets to much more desirable rooms in the Chamber of Commerce Building, at the corner of La Salle and Washington streets. The exchange has 480 members at present and is in excellent financial condition. The officers are:

President, James A. Hogan.
First vice-president, William Crilly.
Second vice-president, W. L. Hoffman.
Secretary, Frank Conrick.
Treasurer, John Mountain.

The outlook for the season grows brighter as it advances, and builders are feeling more hopeful as time goes on.

Cleveland, Ohio.

As a result of a long period of agitation the union carpenters of Cleveland laid down their tools on Monday, May 4, and struck for an eight-hour day. The majority of the employers conceded the shorter day with little delay, there being only two of any prominence who declined to grant the demand of the workmen.

The progress of work was not seriously disturbed, and although the strike still has an official existence at this writing, both employers and workmen claim to be satisfied with the situation.

The amount of work now under way in Cleveland is less than during some of the more prosperous years of the past, and many of the contractors are complaining of the keenness of competition and the scarcity of contracts.

Columbus, Ohio.

The Builders and Traders' Exchange of Columbus is at work improving its constitution, so as to give the organization greater strength and better standing.

The builders have been much encouraged by the recent increase in the amount of building to be done, and if present indications are accepted as being trustworthy the season will prove much more profitable than seemed possible earlier in the season. Many new dwellings, a new hotel, a new school building and several manufacturing buildings are now in sight.

Detroit, Mich.

On May 11 the union carpenters of Detroit struck to the number of about 1200 for an eight-hour day without reduction of wages, which are now 25 cents per hour. The men claim that they will not return to work until all the contractors agree to their demands, although it is stated that many employers have signified their willingness to proceed upon the new basis. The heavier contractors claim that their work has not been seriously interfered with and that they have supplied the places vacated by the strikers with non-union men. Work is so slack that the situation does not seem to cause the employers generally much uneasiness.

The master plumbers have elected the following delegates to the national convention, which meets in Cleveland next month: James Partland, Benjamin Guiney, Samuel Dickson, Richard Walsh, John McKerchy, Samuel Graham and Thomas English. James Meathe is president and James H. Crumley, secretary.

Denver, Col.

It is reported that the amount of building now projected in Denver is greater than at any time during the past few years. An unusually large number of fine dwellings are being built, the cost of several ranging from $10,000 to $75,000; and more homes to cost between $5000 and $10,000 are under way than at any time since 1890. Builders are much gratified by the activity, and predict that renewed building throughout the business parts of the city will soon follow. Real estate dealers are of the opinion that the depression of the past few years is about to disappear, and that real estate is becoming gratifyingly active. No labor troubles have occurred recently, and owing to the number of workmen still idle none is anticipated.

Indianapolis, Ind.

The following from the Indianapolis *Journal* about May 1 indicates the condition of building in that city: Inquiry among the building contractors shows that but few, if any, are doing the business they did in April last year, or, in fact, in any April for some years past. The brickmakers say that not one-third as many brick have been sold thus far this spring as at the corresponding date in 1895. The stone workers are working about half as many men as at this time last year, and these largely on buildings which were commenced last year, there being little new work. The boss carpenters are hunting for work. Contractor Shover was asked how the carpenters were getting along with their eight hours a day plan. He answered that there were hundreds of them who would like to get a chance to work three hours a day. He placed a board in one of his windows at his shop for five carpenters, and the first day over 40 applied. Another boss carpenter said that in the Morton place last year there were eight houses building, now but one. In the northeastern part of the city in April last year, in four blocks of ground, 62 houses were in process of building; now not more than half a dozen. However, in the northern part of the city there are several fine houses going up, and on the South Side quite a number of cottages, but by no means is the amount of building up to that of last year.

Kansas City, Mo.

Early in May the Plumbers, Steam Fitters and Gas Fitters' Union presented the following as a proposition to the Master Plumbers' Association:

"We, the undersigned, hereby agree on and after May 4: 1. To work not more than eight hours a day and seven hours on Saturday, at the same rate of wages per day, senior plumbers to receive $3.20 per day; senior fitters, $2 80 per day, and juniors to receive no reduction in wages. 2. Members of the United Association of Plumbers, Gas Fitters and Steam Fitters will be given preference at all times over non-union men; shop stewards shall have the privilege to interview workmen in regard to their standing in the union."

The proposition was rejected by the Master Plumbers' Association and the workmen are now talking strike. The majority of the members of local union No. 4 of the Painters and Decorators' Association, about 125 in number, quit work on May 10. The painters have been working eight hours per day at 28½ cents per hour since August. February 14, 1896, notices were sent by local union No. 4 to the boss painters demanding that after May 4 painters be paid 30 cents per hour for an eight-hour day; that bosses recognize the union and use their influence to induce non-union men to become members of the union.

A committee of master painters, comprising J. A. Best, John Lippert and T. G. Johnson, acting for their association, met in the latter part of April and compromised with the journeymen, agreeing to pay their required scale of wages after July 1 and to follow their stipulations with regard to the union, if the journeymen would use their power to force all boss painters in the masters' association in return. Local union No. 4 has signed an agreement to this effect, and the boss painters met and all but three signed the agreement as an association and individually.

The Master Painters' Association, room 319 New York Life Building, has elected officers for 1896 as follows: President, W. H. Wormstead; vice-presidents, H. Ohaus, T. G. Johnson, G. V. Whelan; secretary, A. S. Rankin; treasurer, John Lippert.

Lowell, Mass.

The Builders' Exchange of Lowell recently celebrated its annual meeting and election of officers by a banquet. At the business part of the occasion President Frank L. Weaver was in the chair and the annual reports of the treasurer and secretary showed that the organization was never so prosperous as it is to-day. Since the first of last year there has been a steady increase in the membership, and altogether the outlook for the coming season is a most favorable one. The books of the treasurer show a substantial balance on hand.

The following officers were elected: President, Frank L. Weaver; vice-president, W. H. Kimball; secretary, Charles P. Conant; treasurer, George H. Watson; directors, Frank L. Weaver, Charles P. Conant, George H. Watson, W. H. Kimball, William H. Wiggin, Royal S. Ripley, C. H. Coburn, D. M. Prescott and F. O. White.

Newark, N. J.

During the past month the building trades of Newark have been much disturbed by a strike of carpenters for $2.75 per day and eight hours on Saturday. After the men had been out two weeks, during which time several conferences with the employers were held, the strike was settled by both signing an agreement that wages shall be $2.50 per day, and shall be paid by the hour. In other words, for the men to make $2.50 per day it will be necessary to work nine hours at 27 7-9 cents per hour. On Saturdays they will work eight hours.

The agreement goes on to state that either party becoming dissatisfied, three months' notice shall be given of any desire to change. That both parties shall meet on the first Monday in August, when the question of fixing the rate at $2.75 will be discussed. Also, that the Board of Master Carpenters shall allow the agents of the journeymen carpenters to enter their shops at any time and examine the men's cards.

In all there were nearly 1300 men out, and had the trouble not ended just when it did, the probabilities are that this number would have been greatly augmented. The men appear to be heartily glad that the whole affair is practically over, for the time being, at least. The fact that, according to the agreement both sides are required to meet again and discuss the advisability of raising the wages from $2.50 to $2.75 per day, does not seem to cause any apprehension as to the ultimate outcome of the movement.

New York City.

Building operations in the city continue to move along in about the same manner as heretofore, the greater portion of the work under way being in connection with office buildings and apartment houses. Some of the old buildings which are being torn down would seem almost large enough to serve their purpose for many years to come, but they are giving way to the progressive tendency of the times, and in some instances to conform in hight and general exterior with additions already completed. As a general thing, the material of the old structure about pays for the work of tearing down and carting away. In the case of the New York Life Insurance Company's building on Broadway, the sum of $5000 and the material is said to have been paid for the tearing down and removal of the old structure, while the Central National Bank Syndicate is said to have received $1 for the material of its old bank building, Broadway and Pearl street, the buyer taking it away free of cost.

The new structure to be put up by the Ivins Syndicate fronting on Park Row, Ann street and Theater alley is to be 26 stories above the curb and two stories below. The first six stories are to be of granite and the upper stories of light brick with granite and terra cotta trimmings. The building will be employed for offices, every one of which will open to the outer air. There will probably be a restaurant on the top story and perhaps a roof garden with two towers, which will render the structure the tallest building in this country, if not in the world, devoted exclusively to business purposes.

There have been a few minor labor disturbances during the past month, and outside of possible trouble between the housesmiths and the Iron League there is nothing worthy of mention.

Granite cutters have not been very busy for some time past and many men in the trade are idle, although the indications are for better times. Artificial stone masons and freestone cutters and setters are also having a dull season. Machine stone workers are busy.

Cement and asphalt layers report that work has been slack, but is picking up. Work is brisk at present in the iron molding trade, but bad weather has caused many outside housesmiths to remain idle. With plumbers, gas fitters and steam fitters business is fair.

Work is slack in the stairbuilding industry, and gilders are not busy. Painters have good prospects for the spring and summer. With varnishers and paper hangers things have been dull, but are getting better. There is some work for electrical and marble workers, wood carvers, tile layers, cornice and skylight makers, slate and metal roofers, machinists, hoisting engineers and elevator constructors.

The Mason Builders' Association and the Bricklayers' Unions have reached an agreement during the past month, which will govern the relations between the employers and employees during the year ending May 1, 1897. In several important particulars the agreement varies from that of previous years. The weekly pay day is substituted for the one heretofore established calling for payments every two weeks, and some new regulations have been inserted relating to fire proofing, none of which shall be lumped or sublet. There shall also be no lumping of rough or front brick work permitted in the future, nor shall any member of the Bricklayers' Unions work for any lumper or any one not complying with all the rules and regulations of the agreement. The hours between 7 and 8 a.m. are to be used for making up mortar and building scaffolds only.

Omaha, Neb.

Present indications point to an improvement in the building trades in Omaha, and builders feel that the prospect for work is better now than at any time during the past five years. It is expected that the Trans-Mississippi Exposition will be held in

Omaha, and its buildings, together with the new union station and a large office building at Fifteenth and Farnham streets, will give an immediate increase of work to both employers and workmen. The habit of beginning new work in the fall instead of in the spring, which exists in Omaha, makes it impossible to predict at this time the outcome of the season, but the first five months of 1896 have shown a marked increase in contracts let over the corresponding months of 1895. Last month's permits for new buildings are double those of the same month in 1895. A letter from W. S. Wedge, secretary of the Builders and Traders' Exchange, says: Among the most prominent contracts now let and approaching completion are the following: The Davidge Flats, corner Eighteenth and Farnham streets, to cost $25,000, and the Omaha & Grant Smelting Works, to cost $5000. The Franciscan Fathers have decided to build a monastery and church, the monastery, of brick and stone, to be 85 x 48 feet in plan, three stories in hight, and the church 137 x 66 feet in size. It is proposed to build a three-story monastery at an outlay of $18,000. The church will not be completed this summer, but will cost some $30,000. McCord, Brady & Co., one of our most enterprising wholesale grocery firms, are putting in an improved coffee roasting machine at a cost of near $3000. Booth Packing Company are adding a third story to their large brick building, also adding a cold storage plant costing near $5000. W. H. Green is building a $5000 residence and N. B. Rairdon a $4000 residence. There are 50 dwellings being built, costing from $2500 to $10,000 each. This, together with numerous repairs going on, shows a marked increase over last year, and we trust it is the beginning of better times.

The Builders and Traders' Exchange has held its own during the long depression, and the members are manifesting renewed interest in its purposes with the return of more prosperous business conditions. A number of new members have been recently admitted.

Pittsburgh, Pa.

The Pittsburgh plasterers' strike reported last month was finally settled by the concession of the $3 per day wage by the employers. It was estimated that about 1200 workmen were affected by the strike.

The painters did not have such excellent conditions as the plasterers during their dispute with the bosses, but a compromise to which the employers agreed was affected. Since then, however, some of the master painters have not been complying with the terms. It is claimed that only two members of the Master Painters' Association are conforming strictly to the agreement. A circular has been printed declaring a boycott on all the non-union paint shops and business houses that are having work done by men who are not receiving union rates.

A plan of arbitration between the Builders' Exchange and the unions, whereby differences shall be settled by local builders and their workmen, has been projected. The idea proposed is that each side shall have a committee of ten to act as arbitrators. In lieu of ten men, it has been suggested that the exchange appoint only six permanent members of the committee, leaving four to be appointed from masters of the trade in which controversy may arise, the four to drop out when the matter is adjusted.

Building is going on somewhat slowly thus far. A considerable amount is pending, but masters say that contracts will doubtless be held off to a larger extent than usual until the second half of the year.

Philadelphia, Pa.

What is no doubt the largest building operation ever undertaken in America by one man will be begun in the Twenty-eight Ward by James E. Dingee, the millionaire brick manufacturer. He will build, it is reported, 500 three-story houses on the site of his mammoth brick-making plant, putting the entire number under way at one time. The houses will be of the same general style and will be for one family each.

The past month has been almost entirely free from strikes or lockouts, and the present undisturbed condition of affairs between employers and workmen bids fair to continue throughout the season. The amount of work on hand is fairly satisfactory.

Over 100 members of the Philadelphia Master Builders' Exchange and their friends enjoyed a dinner of planked shad and all that properly goes with it, at Washington Park, May 9. W. S. P. Shields, chairman of the Entertainment Committee, was in charge of the affair, and was seconded by Secretary Wm. Harkness.

Providence, R. I.

The strike of Providence carpenters on May 1, of which there was some talk in April, was abandoned, and except for isolated cases the general relations between employers and workmen are amicable. A short strike of bricklayers occurred during the early part of May, but is now over. The men won their fight for 50 cents per hour and eight hours for a day. They were getting $4.50 and $5 per day for nine hours. All work contracted for prior to the bosses being notified of the change will be finished at the old schedule by the electricians and painters. The bricklayers will work on such contracts for 50 cents per day less wages in order to cover the hour's time lost. The Building and Trades Assembly was in secret session discussing the whole situation. The action of the painters may delay work, but those who are in a position to know claim that no serious disturbance of the labor situation is either contemplated or probable.

Pittsfield, Mass.

The masons, bricklayers and plasterers of Pittsfield struck May 1 for $3.50 per day of nine hours, an advance of 50 cents over last season's wages. The Builders' Association refused to grant the request. The contractor on the new High School Building put men at work on the terms asked for and this will probably lead other builders to pay the same wages. The carpenters and painters are asking for a nine-hour day and it is believed they will obtain it, as the nine-hour day is now almost universal. A considerable amount of building is under way, and it is stated that more new work will be undertaken in time for completion this season.

The new Builders' Exchange is in good condition, and is finding favor among the builders of the city.

San Francisco, Cal.

The present state of affairs among the labor unions in the building trades of San Francisco is very unsettled, the unions having united for the enforcement of the "working card" system upon all contractors. There is comparatively little work on the market and the number of idle workmen is so large that they present a formidable front to the employers. Notwithstanding the agitation by the workmen the contractors claim they have all the men they can use at their own terms. One or two strikes of short duration have occurred, but building generally is not seriously interrupted. The new officers of the Builders' Exchange are: President, Oscar Lewis; vice-president, T. W. Butcher; secretary, J. A. Wilson; treasurer, M. C. Lynch; attorney, W. H. Cobb; financial secretary, S. D. North; recording secretary, L. A Larsen; doorkeeper, J. F. Meadows.

St. Louis, Mo.

General building conditions in St. Louis are in excellent condition and a large amount of work is being done. Contractors are very well satisfied with the present state of affairs, and look forward to an unusually profitable season.

The Builders' Exchange at its last quarterly meeting appointed a Committee of Arrangements to prepare for the annual excursion, to be given on June 11. The committee consisted of the following: W. J. Baker, T. J. Ward, P. C. Ring, R. B. Miller, G. M. Blair, James Kearney and C. X. Sauthier. The exchange is reported as being in good financial condition.

On April 23 the new Master Builders' Association opened its quarters in the Turner Building with a banquet and reception. The rooms were very tastefully decorated with flowers and festoons of bunting, and there were many of the prominent business men of the city present as guests of the new organization. The affair was most enjoyable in every particular, and the after dinner speeches brilliant and entertaining.

The officers of the association are: Daniel Evans, president; F. J. Remmers, vice-president; H. L. Weber, secretary; C. E. Wells, assistant secretary; Adam Bauer, treasurer.

The St. Louis Chapter of the American Institute of Architects has established in rooms below the exchange floor a permanent exhibit of high class building material. It will be run under the auspices of the exchange. The entire second floor will be devoted to the exhibit, which will be one of the most complete in the United States.

St. Paul, Minn.

The St. Paul *Dispatch* of May 2 says:

For the past five years comparatively little building has been done in the business district of St. Paul, and for that reason the activity in that direction this season is significant of the approaching better times. Work has already been begun on three important business blocks on Sixth street, the Savings Bank of St. Paul, the Prendergast and Fitzpatrick buildings, and ground has been broken for a number of smaller structures in the business district. Plans for the large Berrisford Building, at the corner of Sixth and Minnesota, are almost completed, and work on this improvement will begin soon. The *Dispatch* has information of another very important improvement to be made in the business center this season, but details of the same cannot be published yet. The plans, which have been drawn by a prominent St. Paul architect, call for a large business block, five stories high, to be erected on one of the best down town retail streets. The plans are at present in Boston for the purpose of being examined by the parties who are to make the improvement. The fact that it is Boston money that is going into this building, and the further fact that Boston money is building the handsome structure on the southeast corner of Sixth and Cedar streets, ought to serve as a pointer for our local capitalists.

Worcester, Mass.

Prospects for builders in Worcester are growing brighter as the season advances and more work comes into the market. There has been no disturbance among the workmen this year, and everything seems to point to continued peace in this direction.

The Builders' Exchange has been amending its constitution for the better protection of its members, and is about to issue a handbook containing information in regard to the organization and upon general topics of interest to builders. Preparations are being made for the entertainment of the delegates to the semi-annual meeting of the Massachusetts State Association of Builders, which is to occur on June 9.

Notes.

Building Inspector Schuddemage of Harrisburg, Pa., issued in April permits for 18 new buildings and 28 alterations, reaching a total outlay of $103,638. Of this $98,081 is represented in new buildings and $5557 in alterations.

Building interests of Anaconda, Mont., are reported as being unusually active this season.

Stoneham, Mass., is enjoying a building boom, particularly in the east and south portions of the town.

Los Angeles, Cal., daily newspapers report an unusually large amount of new building in prospect. Plans are now under preparation by the architects for a number of costly and handsome business blocks, to be erected on Main, Spring and Broadway, and the crosswise streets in the business portion of the city.

Union carpenters of Hartford, Conn., are preparing to press a demand for an eight-hour day and for a fixed system of apprenticeship.

The St. Joseph, Mo., Building Inspector's annual report shows that permits were issued the past year for brick buildings amounting to $281,899, and for frame buildings, $354,134, making a total of $636,033. The permits issued the year before amounted to $420,000.

ARCHITECTURAL DRAWING FOR MECHANICS.*

By I. P. HICKS.

IT has been shown that perspective reduces and foreshortens objects, and it now remains to present another method of producing the same result in the reduction and foreshortening of objects placed in perspective positions in order that the student may have a choice of methods and be able to use that which will best serve the purpose. For example, take plan A of Fig. 56 and proceed to place it in a perspective position as if it were the floor plan of a frame or the outside sills. Referring to Fig. 57, draw the horizontal line and the P L V. Fix the station point and ground line by assuming some convenient distances, as shown. Next place the plan A at an angle of 45 degrees with the P L V and make the corner D the same distance above the horizontal line as it is from S on the ground line below.

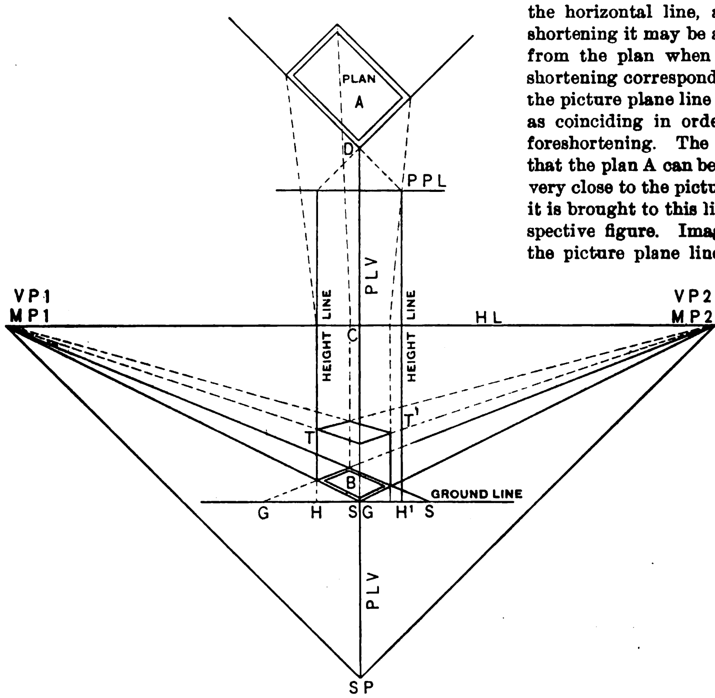


Fig. 57.—Diagram Showing Another Method of Foreshortening in Perspective and that the Same Result is Produced when the Principles are Accurately Observed.—Scale, 3-16 Inch to the Foot.

Architectural Drawing for Mechanics.

The vanishing points are found by running parallel with the sides of the plan A, starting from the S P and continuing until the horizontal line is intersected, as shown by V P 1 and V P 2. This method of finding the vanishing points for all horizontal lines is very simple, and is practically the same as the method given in connection with previous figures. To many, perhaps, this method will present some advantages, as it does not matter to what angle the plan A is placed with the P L V, for the vanishing points will be found in exactly the same way as already described. In this case the vanishing points are equally distant from C on the horizontal line, but if the plan A was turned at some other angle, then the vanishing points would not be equidistant from C. They would still be found somewhere in the horizontal line, but further removed toward and from the center, according to the angle at which the plan is placed. The measuring points and the geometric scale G S for the foreshortening of the retreating sides of the object have been thoroughly explained in the previous figures. They have been drawn in this figure to show that the two methods produce like results when closely followed. Draw the perspective B, using the geometric scales and measuring points to determine the foreshortening of the retreating sides, as shown by the first method.

We will now proceed to show the second method of foreshortening. Draw lines from the corners of the plan A toward the S P and from the points of intersection with the horizontal line drop lines perpendicularly to the ground line. The intersection of these lines with the retreating ground lines will determine the perspective widths of the retreating side of the object, and which will be seen to produce exactly the same result as the former method. There is a line called the picture plane line, shown in the sketch by P P L. This runs parallel with the horizontal line, and by the second method of foreshortening it may be assumed at any conveninent distance from the plan when it is not required to make the foreshortening correspond with another method. In this case the picture plane line and the horizontal line are regarded as coinciding in order to produce the same effect in the foreshortening. The second method has the advantage that the plan A can be changed to any position and brought very close to the picture plane line if desired. The closer it is brought to this line the less the reduction in the perspective figure. Imagine the plan A brought down until the picture plane line coincides with the horizontal line and they become one and the same; then it is easy to see that perpendicular lines drawn from the picture plane line would increase to a considerable extent the size of the perspective figure B. Thus far the perspective D has been considered without regard to hight. It is reasonable to suppose that if perspective reduces an object in length and width the hight must also in some cases be reduced in order that the figure may be kept proportional. For this purpose we must establish a hight line, which is done in the following manner: Run lines parallel with the side of the plan to intersect the picture plane line and from the intersection draw perpendicular lines to the ground line, which will establish the lines on which to set off the hight of the drawing. These lines are called hight lines. In Fig. 57 we have produced a hight line for each side of the object, but in this drawing only one hight line is required. Two hight lines have been given, to show that it does not matter to which side the hight line is produced, as the result is the same. Assuming that the object has a certain hight, set it off on the hight lines, as H T or H' T', and the lines drawn from the vanishing points through the points T and T' will establish the perspective hight, as shown. It will be seen by referring to the drawing that the real hight of the perspective figure has been considerably lessened from the actual hight of the object, as set off on the hight lines. We have now established the use of a hight line and a second method of foreshortening the retreating sides of objects in perspective. In our last drawing we combined the two methods to show that each produced the same result when certain points were observed; but if the points referred to were not observed, then the result would be vastly different. The latter method has a very decided advantage over the former in the manner of producing the perspective, as the actual proportions of the objects to be placed in perspective may be retained with a much less reduction than usually follows by the former method. We will now proceed to some drawings which will set forth the advantages of the second method of foreshortening and maintaining the actual proportions in producing perspective figures.

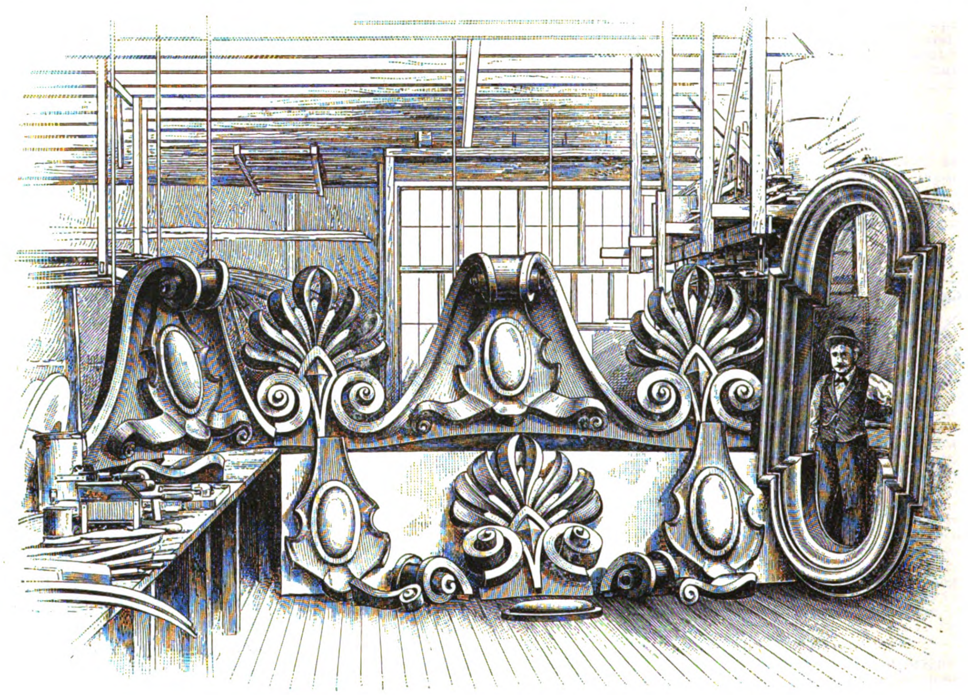
(To be continued.)

The Workingmen's College, Melbourne, Australia.

We have been favored by the secretary of the Workingmen's College, Melbourne, Australia, with a copy of the prospectus of that institution for the year 1896. The publication in question shows that a wide range of trade and technical education is being carried on in the institution referred to. From a perusal of the catalogue it is also evident that the advantages offered by the Workingmen's College are very widely appreciated by the class for whose benefit it was established some 15 years ago. The statement is made that in one quarter no less than 2600 students were enrolled in the various educational and technical classes. Among the trades taught are carpentry, joinery, mason work, bricklaying, fitting, machine work, carriage building, plumbing and gas fitting, house painting and decorating, modeling, electricity, free hand, mechanical and architectural drawing, &c. The system carried out includes the awarding of two kinds of certificates. One, termed a "technical" certificate, is presented by the institution to the successful candidates after a two years' course. An "expert's" certificate is given, in addition to the former, after a third year's course and a final examination. These examinations are held every year in the months of July and December. Class work is divided into four terms of ten weeks each, extending from February to November. December and January, being the midsummer months in Australia, are devoted to a period of vacation. Very moderate fees are charged, and even these are reduced 50 per cent to apprentices in most of the classes. The course for a technical certificate in plumbing and gas fitting includes four terms in the first year, during which, in addition to practical work in the trade two nights a week, mensuration and geometry are taught. In the second year a higher grade of trade instruction is imparted, and, in addition, sanitation is taught by means of lectures, while a portion of the time is devoted to instruction in solid geometry. In the third year's course, necessary to obtain an "expert's" certificate, the higher branches of scientific plumbing and gas fitting are taught, also twice a week, as well as practical chemistry and elementary mechanics. It is claimed that this curriculum has been found effective in turning out an excellent quality of craftsmen. The same general principles applied to all the other trade classes Special prizes are given by the college for particular excellence. During the last year, the Verdon prize, which is awarded annually to the best workman among the students, was secured by George C. Knights, a student of the plumbing class.

Copper Work for the San Francisco City Hall.

The new City Hall which is in course of construction in San Francisco, Cal., is surmounted by a dome 332 feet in hight, on top of which is a copper ball 17 feet in diameter, making what is said to be the largest ball of its kind on any public building in this country, if not in the world. The engraving which we present herewith represents some of the sheet metal work employed in the finish of the dome, the picture being reproduced from a photograph taken for the purpose. The contract was executed by the Eagle Sheet Metal Works of 1213-1215 Market street, San Francisco, Cal. From the proprietor, William Cronan, we learn that the copper ball on the dome is 311 feet from the ground, and that it is surmounted by a metal figure representing the Angel of Peace, 28 feet high, and weighing 8000 pounds. The ornament shown in the center of the picture is a shield and scroll, and the two ornaments on each side which join the shield and scroll represent a honeysuckle. The hight of the ornament is 5 feet and the projection 2½ feet, forming a cresting immediately below the copper ball. The frames on the right are for the windows in the dome, and are 7 feet 6 inches in hight by 2 feet 6 inches inside measurement. These frames are made on three different sweeps, the circle long one way and two different circles on each end. All of the work is hand hammered copper.



Some of the Copper Work for the San Francisco City Hall.

The Builders' Exchange

Directory and Official Announcements of the National Association of Builders.

Officers for 1896.

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Massachusetts State Association.

The semi-annual meeting of the Massachusetts State Association of Builders will be held in Worcester on June 9, in the rooms of the Builders' Exchange.

Exchanges throughout the State that are not affiliated with the association are urged to send representatives to the meeting, full particulars in relation to which will be furnished by the secretary, W. H. Sayward, 166 Devonshire street, Boston, Mass.

Chicago Mason Builders' Code of Practice.

The Masons and Builders' Association of Chicago have put into operation a set of rules for governing the relations between their members and dealers in masons' supplies, based upon the assumption that a mason builder is entitled to advantages in buying material that should not be given to the occasional buyer. The association maintains that the practice of selling masons' supplies to owners and others not mason contractors, at the same, and sometimes less, price as that charged the mason, is unjust, and is an unfair discrimination against the rights of the regular buyer. The association argues that the practice reduces the contractor to competition with the workman without relief from the responsibility which the workman does not share. It is believed to be unwise for the association to attempt to control prices of material by agreement between the contractors and the dealers; and the co operation of the latter is requested in the rules, which are as follows:

1. Members of this Association shall purchase materials only from those dealers and manufacturers of masons' materials who will agree to sell to members of this Association said materials at a price 10 per cent. lower than same materials are sold to others who are not members of this Association.

2. Members of this Association shall not purchase materials of any kind from dealers who have failed to comply with the provision of Rule 1, if such materials can be purchased from dealers who have so complied.

3. Members of this Association shall purchase materials only upon terms of purchase by which on any purchase they shall be allowed and given an additional 5 per cent. discount on bills paid on or before the 10th of the month, or 2½ per cent on bills paid on or before the 20th of the month succeeding delivery.

4. Members of this Association shall not purchase materials from any dealer or manufacturer who does not comply with Rule 3, or who allows a discount to others than members of this Association.

Section 5 provides for the posting in the rooms of the association of the names of the dealers in masons' supplies who comply with the requirements of the preceding sections.

At the same time that the foregoing rules went into effect, a new code of practice became operative, both having been previously adopted by the association. Members of the association having suffered damage from being required to base estimates of cost and proposals for work upon indefinite specification and incomplete drawings, it was determined to refuse to submit bids or accept work unless all the conditions requisite to intelligent and legitimate competition were fulfilled.

The following are the conditions under which estimates are to be made, proposals submitted and contracts entered into for mason work by the members of the Chicago Masons and Builders' Association; and which shall govern in all cases except public and railroad corporation work:

1. Plans and details for mason work, when offered for final or competitive estimates, shall be presented on a scale, not less than ⅛ inch to the foot, must be done in ink or by some process that will not fade or obliterate, and be completed in every part, with given dimensions marked in plain figures thereon.

2. Portions of drawings that require a larger scale than general drawings for a thorough comprehension of what will be demanded, shall be presented at the time estimates are requested, and when ornamental brick is to be used, name of maker and number of design must be marked thereon in plain letters and figures.

3. Specifications shall be presented in ink, or by some process as called for in the foregoing for plans.

4. Specifications must be definite. All such indefinite demands as "The contractor must furnish all work that is necessary," or "All work that the architect may require," or any demand having in contemplation the shielding of the owner or architect from responsibility arising from a violation of the building ordinances, are improper and must not appear in the specifications.

5. The specifications shall be taken as a guide for estimating; and all demands made by the specifications—unless objection be made thereto in writing when proposals are submitted—shall be covered in the estimate offered.

6. Demands made by the plans, and not referred to in the specifications, shall not be considered in the proposals.

7. Everything that will be required in the mason work must be mentioned in the specifications, classified and grouped under appropriate headings.

8. Specifications shall distinctly state that when it is necessary to cut or change the work of one contractor in the placing of the work of another, then the said cutting shall be done by the contractor whose work is so changed or cut, he to be paid therefor by the contractor whose work makes the said cutting necessary.

9. Proposals shall not be given to cover an indefinite depth of foundation. Foundations which have to go below the depths shown upon plans must be paid for as additional work, at prices agreed upon.

10. Members of this Association when requested to submit proposals for work (other than their own branch) must not be restricted as to whom they shall employ as sub-contractors, unless previously notified in the specifications.

11. Should portions of the work be reserved by owners or architects and estimates therefor be obtained by them, a member of this Association, if required to include the said estimates in his contract, shall receive compensation therefor of not less than 10 per cent. on the amount of the said estimates (except in the case of materials. See Condition 19).

12. When proposals are asked for on work, and payments to be made other than cash, same must be specified; when not so specified no member shall contract except for cash.

13. Specifications shall state distinctly the date and hour when proposals are to be opened; in case of postponement of date specified, all bidders shall receive notice in writing of said postponed date and hour, and no proposal shall be received or considered after the time specified.

Proposals shall be opened, read and listed at the time specified before such bidders as are present. Contracts shall be awarded by owners or architects within a reasonable time thereafter.

Members shall not be held on proposals retained longer than ten days after date of opening.

14. In all cases where work is let under plans and specifications prepared by an architect, for which proposals have been received and opened, the lowest invited bidder shall be awarded the contract, and estimates for changes shall be made by him only, unless the said changes involve an alteration in the plans of 25 per cent. or more of the proposal price, in which case the full competition shall again be opened.

In case the price estimated for changes should not be satisfactory to the owner, it shall be settled by arbitration, as provided for in the form of contract adopted by this Association.

15. When security is exacted from a member, a like amount of security shall be required of the owner, but no member shall take without security any contract that another member has refused because he was unable to get such security.

16. Members shall decline to give architects or owners proposals in the aggregate when the said architects or owners are soliciting proposals in detail, nor shall proposals be furnished in detail when proposals are being solicited in the aggregate, and same shall be specified in the specifications.

17. Whenever the completion of a contract will be required in a certain time, then that time shall be mentioned in the specifications, and if a penalty for non-completion is to be exacted of a member, it shall be so stated, and also that the owner will be required to pay a premium of like amount to the member for any and all delays caused by owner, or other contractors, selected by owner or architects.

18. A member shall not be permitted to alter his proposal after proposals have been opened, and previous to the award.

A member to whom a contract is awarded shall be required to sign a contract (except as provided for in Condition 14) for the amount of the proposal he has submitted, or withdraw his proposal.

19. For any and all materials furnished by the owners or architects in connection with contracts for mason work, the following demands shall be made and no contracts executed by a member of this Association, unless said demands be complied with by the owner, agents or architects, viz.:

The amount to be demanded on materials or certain parts of materials furnished by owners, agents or architects shall be as follows, and amount of same shall be added to the contract price:

Rubble stone	$1.50 per cord.
Dimension stone	5 cents per superficial foot.
Common brick	$1 per M.
Pressed brick	Under $16 per M—$1.50 per M.
Pressed brick	Over $16 per M—$2 per M.
On cement, lime, sand, &c	10% added to cost per bbl., yard, &c.

20. All measurements of additional work or for quantities of materials furnished by owners, agents, or architects, shall be governed by Rules and Measurements for Mason Work, adopted by Master Masons' Association and approved by the Architects in 1880.

21. No member of this Association shall let a sub-contract for mason work except for stone setting, tile setting and terra cotta setting.

No member of this Association shall take a sub-contract for mason work on any one job for an amount exceeding $500, except for mason work in heating or power plants.

22. Any member unable to obtain a settlement, according to the terms of his contract for work done, may present his claim in detail to the secretary of this Association, who shall demand in the name of this Association from any party or parties, owing said member, a prompt settlement of the account. In case said party or parties refuse to comply with said demand, no member of this Association shall do any work for said party or parties until such settlement has been effected.

23. When a member is engaged upon any building or buildings, if building masonry either by contract or otherwise, no member of this Association shall furnish estimate or do any mason work on such building until the member first engaged thereon shall have been settled with in full.

24. The form of contract adopted by this Association is the contract known as the Mason and Builders' Contract, and is the only form of contract a member of this Association is allowed to execute for mason work.

The form of contract mentioned in the last paragraph is based largely upon the Uniform Contract approved by the National Association of Builders and the American Institute of Archiects, the principal difference being a specific and detailed agreement in regard to arbitration; one of the arbitrators, who shall also be the umpire, being named in the contract.

The penalties fixed for breaking the foregoing conditions is a fine of not less than $100 nor more than $500 or expulsion from the association, or both. Rules are laid down under which complaint shall be brought, and for the government of investigations, &c.

Unjust Specifications

The following "Information for Bidders" appears in conjunction with the specifications for certain iron work, upon which the water board of one of the principal cities of the East solicits bids:

Sealed proposals for furnishing 25 sets of steel work for chambers for 36-inch valves will be received at the office of this board until 12 o'clock noon, on Tuesday, the 12th day of May, 1896.

The quantities given are approximate only, and the board reserves the right to increase or decrease the amount of the work, as may be deemed necessary by the engineer; and to reject any or all bids, or to accept any bid should it deem it to be for the interests of the Commonwealth so to do.

The form of proposal under which the board requires that bids shall be submitted is as follows:

The undersigned declares that he has carefully examined the annexed contract and the plans therein referred to, and he proposes and agrees that he will contract to furnish and deliver all the steel work in the manner and within the time specified in the annexed specifications, for the sum of $—— for each complete set.

The specifications state, without qualification, that the work to be done consists in furnishing and delivering 25 sets of steel work, the quantities of a set being specifically stated. The clause in relation to payment for the work states that, "The Commonwealth shall pay, as full compensation for each complete set of steel work delivered as herein provided, the sum of," &c.

Under the foregoing requirements this water board proposes to obtain a contract for 25 sets of steel work at a price based upon certain fixed quantities for each set; it proposes to pay for each set the amount determined by the contractor, as being the sum for which they can construct each set in accordance with definite quantities as specified in the specifications; and it proposes, after the contract is let, to increase or decrease the quantities as it sees fit without reference to the contractor.

Inasmuch as it is the "quantities" that are referred to as being "approximate only," it is assumed that the uncertainty does not lie in the number of "sets" to be constructed, but in the quantities that shall enter into their construction. The contract, which includes the specifications, explicitly states that 25 sets of steel work are requisite to its fulfillment, and with equal clearness states the quantities of which a set shall be composed. No reference is made in the contract to any condition of uncertainty as to the quantities upon which the contractor shall base his estimate of cost, and no provision appears for extra or reduced compensation in the event of the quantities being increased or decreased.

Inasmuch as the specifications are included in the contract, it is evident that it is proposed to let the work upon the basis of the cost as determined by the specifications, as presented; and that such increase or decrease of quantities, as the board may decide upon, will be made after the contract has been signed. Were the intent of the board otherwise, bids would doubtless have been solicited in accordance with the specifications, under the proviso that if they exceeded the sum to which the board was limited, or were otherwise legitimately unsatisfactory, the required changes would be made in the specifications and a new competition solicited. No protection to the contractor appearing in either contract or Information for Bidders, the action of the board is tantamount to a request to the contractor to pledge himself to the performance of an unknown quantity of work for a fixed price.

The conditions prescribed by the board, in reality, prohibit the possibility of a contract; for thereunder the contractor is required to stipulate a price for certain completed work, constructed in accordance with certain definite specifications; to sign a contract in which he obligates himself to perform that specified work for which the board pledges payment, regardless of its reservation to increase or decrease the quantities as it sees fit. If the quantities are increased or decreased, in the smallest particular, from the specifications under which the contract has been made, then the work cannot be delivered in accordance with the specifications.

There is no provision in the contract for increasing or decreasing the quantities, or for increased or reduced compensation in event of change, therefore should the board alter the quantities from those for which they have contracted to pay, they would annul the contract before work under it could be begun. A binding contract under such conditions being impossible, the contractor has wasted his time in fixing, for the benefit of the board, the cost of the proposed work as specified. The reservation of the right to increase or decrease the quantities, which action would annul the contract, had one been signed, together with the right to reject any or all bids, or to accept any bid whether the lowest or otherwise, leaves the contractor no legal ground for justice or compensation; he is, in fact, completely at the mercy of the board.

Contractors should decline to bid under such conditions as these; they should insist that the element of uncertainty in specifications be wiped out, in order that both owner and contractor shall be bound to certain fixed and definite conditions.

The "Code of Practice" framed by the National Association of Builders was prepared for the special purpose of governing in such cases as the foregoing.

CONTENTS.

Carpentry and Building

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ENTERED AT THE POST OFFICE NEW YORK, AS SECOND-CLASS MATTER

— A SCRAP.—"This morn," said Jones,
"a scrap occurred
Between my scarf and I (!)
Which, though I got it 'in the neck,'
Resulted in a tie."—*New York Press.*

— HE GUESSED AT WHAT IT WAS.—He was new at the game.

But he knew it all. Thought he did, at least. The proprietor was not sure of this, however, so when he turned his first customer over to the new clerk, he kept within earshot to see how the new employee handled the prospective buyer.

"What do you mean by this machine being 64 gear?" she asked the clerk.

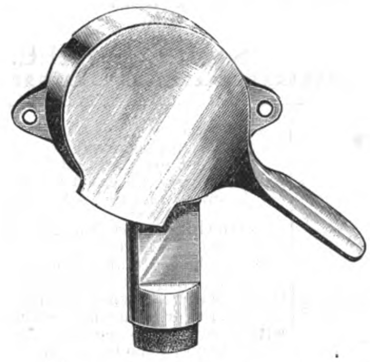
"Oh, the front wheel revolves 64 times every time the pedals go round once," answered the polite attendant.

That night he was without a situation. —*The Wheel.*

NOVELTIES.

The Caldwell Door Holder.

The Caldwell Mfg. Company of Rochester, N. Y., are offering the door holder shown in Fig. 1. The projecting foot is rubber tipped and engages with the floor when the handle is revolved, as shown. The holders are made in malleable iron, bronzed or polished bronze plated, also in bronze metal, plain polished. Each style is made in two sizes.



Novelties.—Fig. 1 —The Caldwell Door Holder in Use.

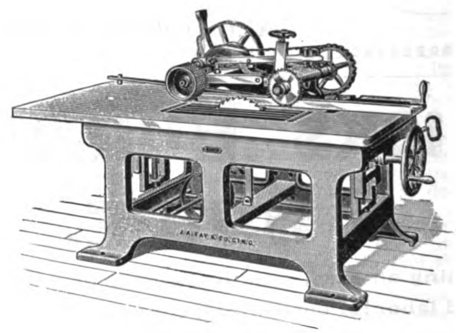


Fig. 3.—Self Feeding Ripping Saw.

Self-Feeding Ripping Saw.

A machine which has been designed especially for ripping material into parallel strips for planing mills, furniture, wheel, wagon and piano factories, car, railway and locomotive shops, navy yards, arsenals, &c., has recently been placed upon the market by J. A. Fay & Co., 513-533 West Front street, Cincinnati, Ohio. The frame of the machine, which is illustrated in Fig. 3 of the engravings, is made of iron with plate sides and ends heavily ribbed. The saw arbor is of steel, 1⅜ inches in diameter where the saw is applied, and is mounted in long connected bearings in the inside of the frame, by which it is retained in line. The construction of the end of the arbor is such that several saws can be used simultaneously if desired. Saws up to 22 inches in diameter can be employed, and the machine will rip 23½ inches wide. The table is 78 x 38 inches in area, and is made either of wood or iron, as the purchaser may prefer. It is connected to planed stands, on which it raises and lowers by a screw and beveled gears operated by a hand wheel. The adjustment is parallel as well as vertical, so that the table always remains perfectly level. The section around the saw is detachable, so that heads for gaining, rabbeting, &c., or a series of saws for ripping several pieces at one time can be used. The fence is long and has a movement across the face of the table by a hand lever, which instantly releases, moves and locks it, or *vice versa*. An index gauge shows the distance from the saw at which it is set. A side roll and bevel fence attachment for making siding can be furnished with the machine when desired The saw arbor pulley is 10 x 8 inches, and should make 2400 revolutions per minute. When a countershaft is supplied, it is fitted with tight and loose pulleys, 12 x 8 inches, and should make 923 revolutions a minute.

Double Multiple Sheave Electric Passenger Elevator.

The double multiple sheave electric passenger elevator just installed in the Gerken Building at the corner of Chambers street and West Broadway, by the Sprague Electric Elevator Company of 253 Broadway, New York, is illustrated in the accompanying engraving As will be seen by reference to Fig. 2 the machine consists of two separate and independent electric elevators, mounted, one above the other, upon the same frame. Each is of the horizontal multiple sheave type, with a traveling cross head and frictionless nut, driven by a 1¼-inch pitch screw revolved by a motor directly connected. The entire operative machinery, both electric and mechanical, is self contained. Each car is lifted by its motor and descends under gravity action against the motor variably operated as a dynamo brake. The motor is of ample capacity, and will stand temporary excessive loads. It is of the four-pole type, and the direction of current in the field coils is constant, and the machine is never fully demagnetized. The rear and the thrust bearing yoke stands are made from a single casting. To one end of this the main beam is securely bolted and to the other the thrust bearing yoke and brake are secured. To this casting are also independently attached the field castings. The armature is of a two path ring construction. The armature has a hollow sleeve and is securely keyed to the main screw; it is removable through the yoke at the rear end of the machine. The carbon brushes are double, have independent movement and ample capacity to carry the full current under all conditions without flashing. The machine is self oiling, and the main bearings are accurately lined. The thrust bearing consists of two special hardened and reversible steel plates, one of which is carried in the yoke plate of the field magnet and the other is backed up by a nut of ample capacity on the end of the screw, having between them a bronze plate with independently pocketed hardened steel balls, so disposed as to planish the entire surface of the plate. The thrust bearing is inclosed in a case and the balls run in oil. It can be independently removed without disturbing any part of the machine except the brake pulley. The main brake consists of an accurately turned flange pulley carried on the in-board end of the screw, which is gripped by a wood lined steel band anchored on one side and continually pulled down on the other by a powerful spring under adjustable compression. This brake is released

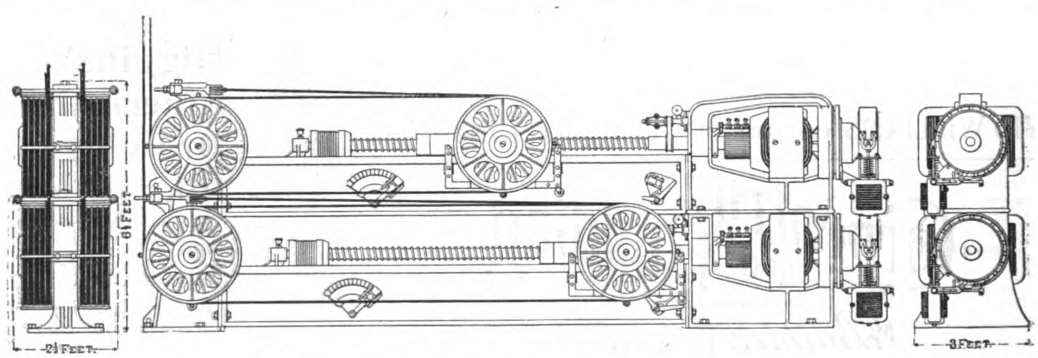


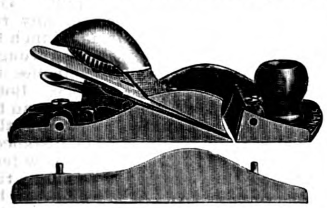
Fig. 2.—Side and End Elevations of Double Multiple Sheave Electric Passenger Elevator.

in hoisting by the hoisting current, and in going down by a special circuit. On failure of current for any reason, or when running down at an excess speed, the brake instantly becomes operative. Whenever the machine stops the brake is automatically locked.

The sheaves are made up in nests, mounted on roller bearings, and carried on independent detachable sleeves, thus relieving the cross head trunnions and the outboard shafts from all wear. The hoisting or working nut has 12 convolutions of interlocking threads, and forms a spiral thrust bearing over 300 ½-inch hardened steel balls under pressure. A safety nut forms a part of the nut system in friction contact with the cross head and normally out of contact with the screw, having thick and deep threads; when brought into use it interlocks a part of the screw threads not subject to wear, and prevents lineal movement of the cross head due to wearing out of threads of the working nut or screw. These elevators have a rise of 166 feet at an average speed of 350 feet per minute.

Combined Rabbet and Block Plane.

The Stanley Rule & Level Company of New Britain, Conn., have recently put upon the market an ingenious



Novelties.—Fig. 4.—Combined Rabbet and Block Plane

combination of a block plane and a rabbet plane, as illustrated in Fig. 4. One side of the plane is detachable, and the tool can thus be easily converted for such use as the owner requires. The cutter is set on a skew, which is referred to as a great advantage in working against the grain of wood. The manufacturers report a large sale of these planes during the short time they have been offered to the trade.

New Form of Compass Saw.

George H. Bishop & Co. of Cincinnati, Ohio, and Lawrenceburg, Ind., are introducing a new form of compass saw, illustrated in Fig. 5 of the cuts. The blade is removable from the handle, to which different sized blades can be readily affixed. The blade is described as working upon a peculiarly constructed bolt which fastens it securely into the handle, and as controlled in its varied adjustments by a lever that permits the blade to be adjusted to any angle or slant desired. A screw or pin set in the handle fits snugly in slots in the butt of the blade, holding it firm and immovable in any angle or position the workman may place it, enabling the user to saw up or down, backward or forward, in every form and position, in corners or otherwise inaccessible places. The back of the saw blade and the back of the saw handles are constructed to form a flush bevel. The saw handle is of apple wood, carved. The blade, it is stated, is unexcelled in quality and temper, finely finished and highly polished; and the adjustment to various positions is simple and easy. The point is made that there is no mechanism to get out of order.

The Warner Electric Elevator.

In the high speed direct connected electric passenger elevator built by the Warner Elevator Mfg. Company of Cincinnati, Ohio, the electric engine, which includes the motor and winding apparatus, is mounted on one heavy iron bed plate. This is securely anchored to a masonry foundation

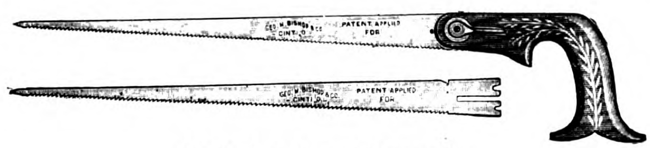


Fig. 5.—New Form of Compass Saw.

when placed in the cellar. Immediately above the motor is placed an electric controller which operates and governs the movement of the platform and regulates the flow of electricity to the motor. The worm wheel is made of phosphor bronze, and the worm is hammered steel, lathe chased and made a part of the armature shaft. The housing that incloses the worm and worm wheel is so designed as to permit the worm and wheel to run in an oil well. Provision is made for replenishing the oil, for adjustment of the end thrust bearing, and also for removing the old oil. The brake attachment is of powerful construction, is operated in connection

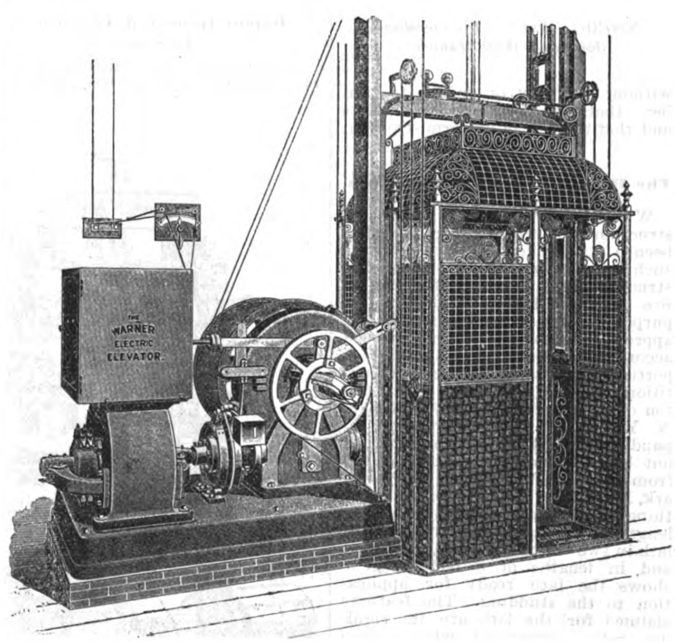
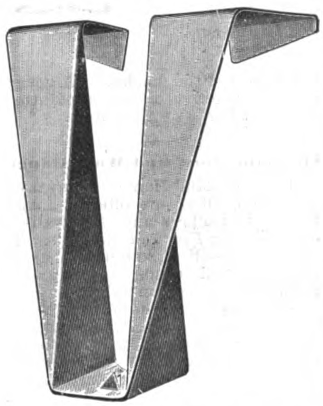


Fig 6.—The Warner Electric Elevator.

with the electric controller and will safely hold the platform and load at any desired point. An automatic limitation electric cut off cuts off the current of electricity every time the platform reaches the terminal landings independently of the operator or the operating ropes, thereby preventing the platform from ever going beyond the proper limits of its travel. A device is provided for automatically cutting off the electric current if the lifting cables should become slack by reason of the car meeting an obstruction. This is so arranged that the platform can be instantly raised and the obstruction removed. To the car is attached a safety speed governor, which will apply the brakes if the speed exceeds the normal. In the car is located the pilot wheel, which is connected to the electric controller through the agency of tiller cables. It takes the place of the usual hand rope, and permits the operator to have better control of the machine. A general view of the elevator and apparatus is shown in Fig. 6 of the cuts.

Cleveland Joist and Wall Hanger.

The Cleveland Hanger Company of Cleveland, Ohio, are offering hangers for joist, timbers and for walls, as illustrated in Fig. 7 of the cuts. The hanger, it will be observed, has two long diagonal bends, forming, it is remarked, a web member in direct line of strain from the seat of the joist to the point of support, and with the web face against the joist presents a uniform section to insure a constant resistance. The hangers are made of wrought steel bent hot, the two arms at the top extending back 2 inches, in the case of all ordinary sized joists, and engage back of the first joist where timbers are built up, and, being beveled, admit of being driven into solid beams. Timber hangers are made single and double. The single hanger is practically the same as the joist hanger, but with supporting arms made of any desired length. Where joists are suspended from both sides of the timber with ends opposite one another double hangers are recommended for use, these being, it is ex plained, practically two single hangers with the ends united. Wall hangers are substantially the same as the joist hanger, but made of heavier stock and with supporting arms 4 inches in depth to hook back of the first course of brick. All the hangers are treated to an asphalt dip as a preventive against rust. The manufacturers claim the following points of excellence for the hangers: That being bent when hot undiminished strength of material is insured; that they do not weaken the timber, as no boring of holes nor fitting is required; that the hangers are easily applied; that should occasion require they can be removed



Novelties.—Fig. 7.—The Cleveland Joist and Wall Hanger.

without difficulty or injury to timber; that there are no weak points and that they are of uniform strength.

The Hilton Expanded Metal Lath.

With the growth of fire proof construction in large buildings there has been a strong tendency to embrace such features in ordinary house construction as will reduce the risk of fire. None of the inventions for this purpose has received a more general appreciation than that which has been accorded to the metal lath for supporting the plastering used in partition walls of buildings. D. B. Hilton of 256-258 State street, Brooklyn, N. Y., has put on the market an expanded metal lath, which is turned out by a machine recently received from George A. Ohl & Co., Newark, N. J. The machine weighs something over a ton, and is 18 feet in length. It is designed to turn out the lath in two widths, 14 and 18 inches, and in lengths of 8 feet. Fig. 8 shows the lath ready for application to the studding. The features claimed for the lath are its rigidity, being corrugated with a deep groove along the straight sections, and the diagonal sections having a deep edge turned on each side. When nailed to the studding of a building it is well calculated to stand the operation of applying the plaster, and also affords excellent facilities for securing a good key for the mortar. In applying it to the studding in a building, the operation is so simple that any of the workmen employed are competent to do the work, and it is adapted for curved as well as flat surfaces. When fastened to timbers it may be secured by the ordinary wire nails used by roofers and builders, or by means of a special staple provided for the purpose, which is 3 inches in length between the prongs, which are made 1 inch in length. Where the building is of the fire proof type and provided with T irons to which the lath must be attached, the construction affords an excellent opportunity for its being secured by means of wire. Where it is not desired to cover the entire building with lathing of this character, its merits are emphasized for use in the shafts of dumb waiters, elevators or ventilating shafts. With the machine,

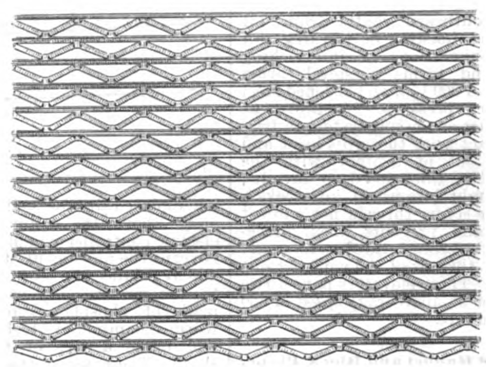


Fig. 8.—The Hilton Expanded Metal Lath.

it is pointed out that a sufficient quantity of laths for covering the walls of a large building can be turned out in a day and that orders for this material can be promptly filled.

Patent Improved Tenoning Machine.

A new heavy pedestal frame tenoning machine, with ball bearing roller carriage, and adapted for making tenons for doors, sash and blinds, framing furniture and doing similar work, has just been placed upon the market by the Rowley & Hermance Company, Williamsport, Pa. A general view of the machine is shown in Fig. 9 of the accompanying illustrations. The frame is cast in one piece, and the extension for a support under the outer end gives very rigid bearings upon which the carriage operates. The manufacturers state that the carriage is of new design and constructed with ball bearing rollers, thus reducing the friction to a minimum. The machine will cut tenons of any required thickness, and from ¼ inch to 6½ inches in length, passing through the machine once, and 9 inches in length passing through twice. Both upper and lower head stocks can be adjusted horizontally to permit the shoulder to be cut at uneven distances from the end. An entirely new feature in this machine is found in the clearance in the heads, which can be increased without rebabbiting the boxes. The cope heads are attached to the head stocks and adjusted simultaneously with them, in addition to which they have a separate, independent horizontal and vertical adjustment. The cutter heads are either single, 3½ inches long, or double, 6½

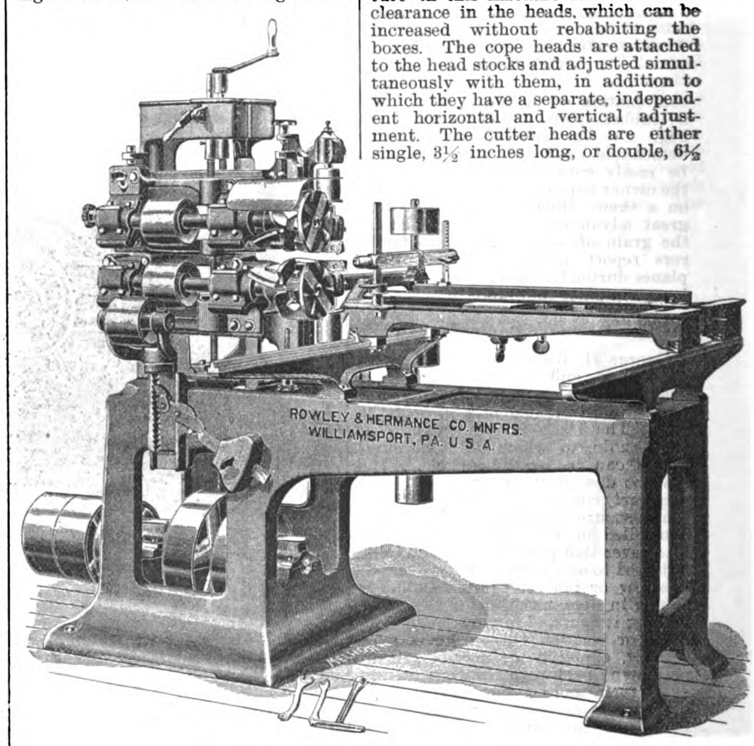


Fig. 9.—Patent Improved Tenoning Machine.

inches long, as may be desired, and are provided with the manufacturers' patent corrugated spurs. Underneath the carriage are safety hooks to prevent its rising and getting into the cutters. The hold down bar is convenient to the operator, and can be adjusted for different thicknesses of work. The fence is adjustable to any angle desired.

TRADE NOTES.

THE TRADE will learn with regret of the recent death of G. William Morstatt, senior member of the firm of Morstatt & Son, well known manufacturers of the Morstatt and Improved Acme inside blinds, which have proven so popular wherever introduced. The business will be continued under the old firm name at 227-229 West Twenty-ninth street, New York City, where it has been located for many years past.

THE Sprague Electric Elevator Company, 235 Broadway, New York City, have been awarded the contract for three of their electric elevators for the new building of the Mutual Benefit Insurance Company of Boston, Mass.

WE ARE INDEBTED to Alfred Stone, secretary of the American Institute of Architects, for a copy of the proceedings of the twenty-ninth annual convention of that organization, held in the St. Nicholas Hotel, St. Louis, on October 15, 16 and 17 of last year. The proceedings are handsomely bound in dark covers with gilt side title, and carry as a frontispiece an excellent likeness of the late Richard Morris Hunt, reproduced from a photograph taken in September, 1893. In addition to the proceedings of the convention are to be found a list of chapters of the American Institute of Architects, the names of the officers and those constituting the various committees, a list of members and a very comprehensive index.

THE American Berkshire Association of Springfield, Ill., recently offered cash prizes amounting to $100 for the best plans and specifications of pens, buildings, location of lots, &c., for the convenience of farmers or breeders keeping more than ten brood sows, and for plans and specifications of pens, buildings and location of lots, &c., for farmers or breeders keeping ten or less brood sows. The contestants were to furnish the ground plans and elevations of pens for service boars, sows with litters, pigs of both sexes after weaning, fattening pens, slaughter house, smoke house, granaries, steam or cooking house, shop for making shipping crates, &c., the drawings to be to a scale of ¼ inch to the foot.

E. T. BARNUM of Detroit, Mich., has issued from the press his annual spring catalogue in the shape of an oblong publication of 64 pages printed in a green ink and bound in red paper covers. The catalogue is known as No. 890, and embraces within its covers a wide range of iron, wire and brass goods, such as settees, drinking fountains, flower pot stands, reservoir vases, wire trellises, galvanized netting and fencing, wire mats, sand screens, iron and steel wire cloth, brass and copper wire cloth, wire window guards, spark guards, radiator screens, window screens, counter and partition railings, metal borders, elevator inclosures, metal and wire signs, cast and malleable cresting, finials, tower ornaments, copper vanes, balls, stars, &c. Mr. Barnum issues besides this general catalogue a number of others, each devoted to a special class of work, there being one for builders' iron, wire and brass goods, one covering fencing, one covering jail cells and jail work and another covering bank and office railings, &c. Mr. Barnum states that he will be glad to mail a copy of any one of these catalogues to any address, if in writing the person will specify the kind of work wanted.

"TOOLS AND CUTTERS" is the title of a new catalogue which is being distributed to the trade by the L. S. Starrett Company of Athol, Mass. The little volume is known as Catalogue No. 14, and illustrates the leading lines of fine mechanical tools and milling and other cutters manufactured. The 98 pages are neatly printed, the illustrations being numerous, and conveying a very good idea of the styles with which the company are prepared to supply the trade. The frontispiece is a bird's eye view of the company's works, showing the extent of their plant. In the introductory remarks, the statement is made that every tool listed in the catalogue is warranted accurate and satisfactory, the prices given being net. The little volume is bound in neat paper covers embellished with a design appropriate to the purpose. Accompanying the volume is a leaflet showing wherein Catalogue No. 14 differs from those previously issued. The assortment covered is so varied that it would seem to meet every possible requirement of the trade in the way of fine mechanical tools.

THE F. A. Requarth Company of Dayton, Ohio, send us an illustrated sheet showing some of the turned and ornamental work with which they are prepared to furnish the trade on short notice. The illustrations show square turned and roped columns, newels, balusters and drops, together with designs of balconies and porch work. By means of special machinery the company are prepared to execute from drawings stair newels, balusters, railings, &c., and they state that they will quote close prices. The sheet which they send is intended to be hung up in the shop where it will be convenient for reference. The company have also distributed a neat calendar for the month of May, the general style and make up being in keeping with those to which reference has previously been made in these columns.

CROSS BROS., Northfield, Vt., manufacturers and wholesale dealers in granite and statuary, are introducing a patented preparation for the cleaning of granite, which, it is stated, contains no acids, and is guaranteed not to be injurious to the granite. They advise us that they intend to make a business of cleaning granite buildings, entrances, curbings, posts, monuments, or anything that is made of granite, by means of this preparaton. They state that it does not matter in what condition the granite may be, and that they can clean it so that it will be practically as nice as when it was erected. Their process is intended to take the place of axing, and it is claimed will do the work for one quarter the price. Cross Bros. will go to any place in the country to do any job warranting the expense of the journey.

THE "Saw Book Quarterly" is the title of a neat pamphlet issued in the interests of Joshua Oldham & Sons of the New York Saw Works, 351 and 353 East Sixty-first street, New York City. The issue for May contains an interesting article for the saw filer, on the tension of saws, together with some remarks on the subject of band resaws. We understand a copy of the little quarterly will be sent to any address on request.

WE ARE INDEBTED to the Chase Turbine Mfg. Company of Orange, Mass., for a copy of a 72-page catalogue descriptive of the circular saw mills and wood working machinery which they manufacture. In offering this catalogue to the trade, the company also call attention to their water wheels, of which they issue a separate catalogue, containing also lists of spur, bevel and miter gears. The early portion of the catalogue is given up to circular saw mills, of which many varieties are shown. The cuts are of such proportions that folded plates are used to show them. Cut off sawing machines, board clippers, self shipping power feed saw machines, improved swing cut off saws, gang lath machines, improved traveling bed planing machines, chair back machines, clapboard machines, saw arbors, fan blowers, speed indicators, &c., are also illustrated and described. Accompanying the catalogue is a circular of two new machines which the company have recently added to their assortment. One of these is a novel construction for automatically grooving bodies and tonguing covers and bottoms for boxes with sliding covers. We understand that the company will send a copy of their illustrated catalogue to any one who may apply for it.

THE trade will be interested in the result of a suit brought by Follansbee Brothers Company, Pittsburgh, Pa., to restrain the Morris & Lane Furnace Company of Cleveland, Ohio, from using a trade-mark on tin plate which they made and sold, and which was claimed to be an infringement of one owned by the plaintiffs. Judge Ricks has granted an injunction against the furnace company, who in addition to being perpetually enjoined, were ordered to pay the costs of the suit.

THE slate trade in Vermont is at present much depressed, the demand for the finished product being very light, both in the roofing line and in plumbers' goods. Business in plumbers' and furniture marble work is also light and prices very low. This appears to be due somewhat to the use of other materials, and a great deal to the competition of Italian finished marble, which is being brought into the country in large quantities and sold at a low price. Manufacturers are hoping for relief from a change in the tariff laws, or a change in fashion that will bring again into favor the slate mantel and marble top furniture.

"SOUND PROOF CONSTRUCTION BY MEANS OF CABOT'S DEAFENING QUILTS," is the suggestive title of a little pamphlet which reaches us from Samuel Cabot, 70 Kilby street, Boston, Mass. The text is comprised in eight pages, which discuss the subject of sound proof construction in a way to interest all having to do with the erection of buildings of any kind whatsoever. Illustrations are presented showing different methods of deafening walls or partitions, as well as indicating the best methods of deafening floors with Cabot's quilt. The deafening of floors is a matter which, in connection with private dwellings and apartment houses, especially the latter, does not receive the attention which the health and comfort of the occupants demand. In a large number of instances, the reason given for apartments proving unsatisfactory is the noise resulting from thin partitions and floors which are so constructed that they do not prevent sound from readily passing through, to the intense annoyance of adjoining occupants. The directions given in the little pamphlet under review are explicit, and show in a very clear and comprehensive manner how floors may be easily rendered sound proof. The pamphlet also tells how the "quilt" may be applied for heat insulation in houses, refrigerators, cold storage warehouses, and all places where uniformity of temperature is required. The text is right to the point, and the make-up of the matter is in keeping with the high standard of excellence which characterizes the literature distributed by Mr. Cabot.

W. R OSTRANDER & Co., electric and speaking tube goods, announce to the trade that they have removed to 22 Dey street, New York City.

CENTRAL EXPANDED METAL COMPANY, Pittsburgh, Pa., advise us that they are doing a much larger business than last year. They state that they are just completing machinery which will enable them to turn out material from plates up to 3-16 inch thick, the limit on their old machines having been 1-16 inch.

THE Lufkin Rule Company, Saginaw. Mich., have issued a number of supplementary pages to their 1893 catalogue. In them are illustrated and described steel measuring tapes branded variously Reliable, Paine and Rival, including a frame tape. Also pocket steel and metallic measuring tapes. The metallic tapes are ⅝ inch wide, made of woven linen with metallic warp, covered with hard leather cases, with patent flush handles, which open by pressing a pin on opposite side. The company advise us they are now exporting steel and metallic tapes and steel rules to the British colonies, in competition with English makes. A large stock is carried in New York at their office, 2½ Murray street, in charge of Manager Hollis.

THE LUDLOW-SAYLOR WIRE COMPANY, St. Louis, Mo., have closed a contract for a new building which will be ready for their occupancy on October 1. The rapid increase in their business during the past few years compelled them to look about for larger quarters, and as none could be found fitted to their requirements they made arrangements to have a plant built. In their manufacturing department they have been unusually cramped for floor space and they are naturally looking forward to the construction of their new building with considerable satisfaction. Their jobbing department has always been large and in barbed and plain wires and wire nails they are among the largest jobbers in the country. Carrying large stocks, as they are compelled to, they have had to resort to outside warehouses to store a portion of their goods, which will be obviated when their new building is finished. They will put in a full complement of modern machinery, and will turn out all varieties of metal work for interior and exterior decoration, such as railings, elevator inclosures and cabs, grills, &c. The new building will be six stories in hight and will give the company double the number of square feet that they at present occupy. The building will be of brick and will contain all modern improvements, which will enable them to handle their business expeditiously and economically.

THE American Enameled Brick & Tile Company have taken quarters at 14 East Twenty third street, New York City, in order to be more centrally located and within easy reach of their clients among the leading architects and builders. The company have recently patented what is known as a space economizing enameled brick or tile, which is expected to prove very popular with the trade.

THE Powhattan Clay Mfg. Company, with New York office at 160 Fifth avenue, have arranged a very interesting display of brick at their show rooms, so that architects, builders, contractors and others interested may see at a glance the beautiful effects produced by the brick, and at the same time may the more readily make their selections as to size, shape, &c.

THE Steward & Romaine Mfg. Company, limited, of 123 North Sixth street, Philadelphia, Pa., have issued an illustrated catalogue and price-list of single and double patent parallel expansion bolts in iron and brass. This publication is sent out for the purpose of directing to these goods the attention of architects, builders, carpenters, masons, machinists, plumbers and all others whose business require the use of fastenings of great strength, security and easy application. The makers state that the greatest use of the expansion bolts is in places where it is not desirable or practicable to drill through the material to which the fastenings are to be made. The bolt has the great advantage over other methods of fastenings that it can be removed with as much ease and facility as applied and without injury to the article fastened, that to which it is fixed or to the bolt itself. The goods are fully illustrated and described, while tables show the prices of the various sizes manufactured

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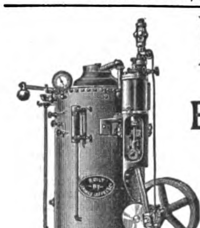

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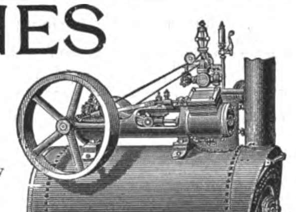

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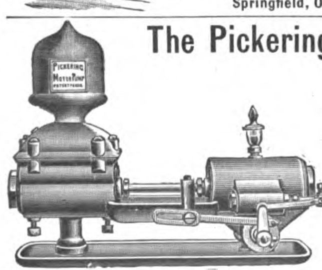

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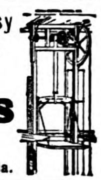

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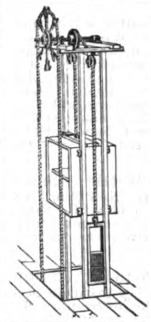

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Cantilever Principle in Building Construction.

An interesting phase of building construction, involving a rather unique application of the cantilever principle, is found in connection with the 15-story addition now being put up by the Standard Oil Company, immediately adjoining their present offices in lower Broadway, New York City. The old building is nine stories in hight, and it is intended to increase this number by six, so as to make it conform in hight and external appearance to the new building. It was found after a very careful examination by the architects that, while the walls of the old structure were, for the most part, sufficiently strong to carry the weight of the additional six stories, there were places where this was not the case, so a plan was devised to apply the cantilever principle to the work and make the foundations of the new building, which were sunk to bed rock 40 feet below the street level, sustain a part of the weight to be added to the old one. At certain points new columns were inserted through the old structure, their weight being transmitted to the foundations by means of a system of grillage located at points where the foundations were fully capable of carrying it. As it was necessary in some places to concentrate loads where there might be a local weakness in the walls, a system of equalizing girders about 10 feet deep, solidly framed together in the corners and to one another, was introduced, which formed a capping for the old building and a foundation for the new. The interior columns of the old building were utilized to suppport all the weight they would carry, while for the remainder, extra columns were carried upon double girders straddling the nine-story columns of the old building. On the front section of the building were placed two such girders running north and south, resting at one end upon new columns and framed at the other end into a girder running east and west, which in turn was framed into the equalizing girders. At the rear of the building similar girders running east and west were framed into a truss of 84 feet span and 20 feet hight. The southerly end of this is supported by the end of the equalizing girder, which at this point forms a cantilever with an overhang of 10 feet. The other end rests on a column carrying the weight to rock bottom on the site of the new building. At the present roof level it is intended to insert between the beams and girders a system of diagonal bracing, so as to securely brace the lower chords of the equalizing girders. Ten feet above this point will be inserted an entire floor of buckle plates securely riveted to beams and girder flanges, thereby bracing all parts of the structure. The beam and girder work used to support the six stories to be added will be laid at the level of the present roof or between the ninth and tenth stories of the completed structure, a space 10 feet high having been reserved for it, which will make a blind story. The old structure has a frontage of 87 feet on Broadway, with a depth of 206 feet, but when the 15-story addition is completed the building will cover 114 feet on Broadway and have an interior court on the north side of the new structure 98 x 17 feet. The hight of the building on the Broadway side will be 232 feet, and a tower will rise 48 feet above the roof line.

Architecture at Columbia University.

Probably no more striking illustration of the character of the work done by the students taking the course of architecture the past year at Columbia University could be given the public than the exhibition of drawings recently held in the rooms occupied by the department. The course of study pursued covers a period of four years, three of which are devoted to architectural history and elementary design, while the fourth year is given up to advanced work in designing as well as construction and practice. The examples of work of the various classes filled several rooms, and the exhibition, considered as a whole, was probably the best which the department has ever held. A very interesting feature was found in the room devoted to the Thesis Designs of the fourth-year men, comprising 17 different subjects, among them being the Consolidated Library, an Opera House, a State Library, a Savings Bank and a Boarding School for Boys. One of the other rooms contained the work of the second and third year men in what is termed "Historical Research," consisting of sketches and tracings made in illustration of modern architectural history; drawings from descriptions written by students of the second and third classes and interchanged, together with studies in historic styles. A feature also of the third-year work was the pen and ink drawings from photographs. In another room was shown the third and fourth year work, consisting in part of water color designs, figures from the flat and problems in design, the last named being made up of such subjects as a City House, a College Library, a Museum of Sculpture and Painting, a Staircase in a Public Building and an Interstate Exhibition Building. The drawings made from measurements included in the work of the third and fourth year men were well executed and embraced, among others, the Seventy-first Regiment Armory, the Astor Library, the Greenwich Savings Bank and the Garden Theater. There were also on exhibition the drawings in competition for a scholarship in the American School of Architecture in Rome, open to graduates in architecture from various colleges and universities where architecture is taught; also for the Columbia Traveling Scholarship, which is open only to graduates of the School of Architecture at Columbia University.

Free Libraries.

Andrew Carnegie, when asked some time ago what he considered the form of beneficence best calculated in these days to bestow the greatest good on the greatest number replied, "A free library." This deliberate conclusion of one of the most successful self-educated men of affairs of the present day was reached after long years of practical experience and extended study of the needs of the working classes. All the world knows how abundantly Mr. Carnegie has shown his faith by his works. Free libraries founded by him in many centers of population on both sides of the Atlantic are to-day bestowing mental food on thousands who would not otherwise be able to secure it. Happily the number of weathy philanthropists who are turning their liberality into the same channel is multiplying. Free libraries are being founded and extended by private munificence or enlightened public effort all over the country. Indeed, so marked has become the movement that Melvil Dewey, State Librarian of New York, in an address at the recent opening of the splendid new free library attached to the Pratt Institute in Brooklyn, broadly predicted that the present era would go down in history as pre-eminently the "Library Age." It is a happy thing for the present and coming generations that it is so. More and more is it becoming recognized that the public library may, and should, be made one of the most potent factors in the education and elevation of the race. These benefits, too, are not now confined alone to the dwellers in cities. An interesting and significant feature in the development of the free library idea at the present day is a system lately adopted in New York whereby some 300 free libraries are sent traveling all over the State, visiting every little out of the way town and village, and opening their treasures gratuitously to every man, woman and child. These itinerant libraries, moreover, contain the best editions of the best books published, so that even the rural population is now beginning to partake of the blessings and benefits of the free library movement.

Chimney Building.

All who sell heating and cooking apparatus have more or less trouble from bad chimneys, due not so much to poor workmanship as to improper shape. Some chimney builders hold the opinion that if the area of the flue is sufficient the form is of small importance. A little consideration, however, will discover the fallacy of this statement. It is not open to question that air when heated rises with a curling, spiral movement. Consequently, the flue best adapted in shape for conveying it in its natural state or mingled with smoke or gases would be a round flue, says a writer in *The Metal Worker*. The conclusion of many students of the subject is that the smallest dimension of a flue, rather than its cross area, gives the correct basis for calculating its capacity. They agree that a square flue has practically no advantage over a round flue of the same diameter. Though a 9 x 9 inch square flue has an area of 81 inches, a 9-inch round flue with an area of but 63 inches is considered to be more desirable when a good draft is needed. In some cases, in order to avoid a breast in a building, a chimney 4 x 20 inches has been built, with the idea that the area gives the required capacity, while in fact such a flue is very discouraging in operation. The diameter of the largest circle that could be inscribed in it would only be 4 inches, and the working capacity of such a flue would not greatly exceed in effect the work of a 4-inch round flue. Friction is a very prominent factor that must be considered, and a 4 x 20 inch flue would present a surface of 48 inches against 36 inches for a 9 x 9 inch flue and 28¼ inches for a 9-inch round flue. The excessive friction surface of the oblong flue will be readily understood to be a serious drawback when it is considered that a 9-inch round flue is about equal in working capacity to a 9 inch square flue, though the latter has a greater area. Another factor which is said by some to be important is the depth to which the friction affects the current. They say it influences the current through a layer of at least ½ inch on each side, leaving only 8 inches of the current in a 9-inch flue unaffected by friction. It thus reduces a 9 x 9 inch flue to 8 x 8 inches and a 4 x 20 inch flue to 3 x 19 inches, showing that the oblong suffers severely in the application of this method of calculation. Those who have not followed this course of reasoning to discover the cause of dissatisfaction with oblong flues can recall instances in their experience which will corroborate the conclusions. They will know that a heating apparatus of ample capacity has been condemned as inadequate, because the chimney could not develop its full power even when an excessive quantity of fuel was run through it in the attempt. With such information, a heating contractor should not allow the owner of a building in course of construction to become the victim of a bad flue through the ignorance of the builder or through a desire to avoid the obtrusion of a breast. The chimney must have diameter rather than area to have working capacity.

Why Country Builders Fail of Success.

It is a noticeable fact that few carpenters and contractors living in the smaller towns and cities gain a competence, notwithstanding that houses are built more expensively and artistically than in former years. Indeed, it would hardly be erroneous to state that for the amount of business done few branches of trade have less profit to show. The cause of this is probably to be found in the fact that although nominally wages appear to be satisfactory, yet the average result is considerably reduced by the inevitable interruption to work that the winter season brings with it, during which any small surplus is consumed. Contracts, too, are of short duration, and especially in the smaller cities the interval between two contracts is a long one.

The system of letting contracts by bids or competition, however fair it may be in theory, still works very unjustly where many of the bidders make no accurate, thorough and itemized estimate. It is extremely common to hear a country builder say that his employees have earned more than himself upon a job, or even that had he had to pay wages he would have been money out of pocket at its completion ; and that, to avoid this, he had worked it out himself alone, at a remuneration which left only starvation wages or even worse. This is, of course, not intentional.

Very few, indeed, have any system which enables them to see day by day what is the result that a given job is showing. At the best this is discovered at the end of the season. It is no wonder that they underestimate, for underestimation is the natural consequence of overeagerness to obtain a contract, unchecked by a thorough and accurate fore-estimate of the result.

Underestimating means working for nothing and forcing others to do the same ; it means impoverishment and poor work. The contractor has himself and his family to maintain and the temptation is great to get out by doing poor work. I would suggest that where this is not already done, says a writer in one of our Western contemporaries, every contractor should purchase an account book large enough to enter, line upon line, upon a single page every item of his estimate, giving quantity, price and labor for each item. Let him leave opposite to this page a blank one on which he may enter on the corresponding line the actual amount purchased and the actual price paid, together with the actual amount of labor expended upon the item, and he will thus be able to see the result of his contract.

Were such a system adopted it would never be abandoned. An estimate, if clear and explicit, would be gone over 20 times, with the result that the contractor would become an expert in estimating, and a mistake once made would never be repeated. There is an advantage in taking the items in a certain order and preserving that order. It is impossible to exaggerate the good effects of a system which enables the tradesman to know day by day exactly how he stands. Every contractor has an interest in his competitor's knowing how to estimate correctly. It does not need many underestimators to ruin a business for a season.

Carpenters are far too apt to imagine that all that is wanted to make a successful contractor is to be a good mechanic. This is a great mistake. The country contractor should be a good business man and have a constant, clear insight into his business. His business is not like that of the merchant, where he is constantly selling the same articles in small quantities at a steady profit to the same customers. With the contractor each new contract is on a new basis, with a new customer in one large amount, composed of varying quantities, at various prices, and it is evident that it must require vastly more care and forethought to conduct his business successfully than one that is steadier. He is also entitled to a profit on the labor he employs and for which he pays. He should also estimate the risk of damage to the building while in course of construction. Prudence and wise precaution are not a waste of time and trouble, and if not exercised when called for the consequence will assuredly have to be borne in loss and anxiety.

RESIDENCE OF MRS. JULIA M. HARSH WARREN, OHIO.

MILTON LOGAN, Architect

SUPPLEMENT CARPENTRY AND BUILDING, JULY, 1896.

AN OHIO RESIDENCE.

THE subject of our supplemental plate this month is a Western residence, possessing a number of architectural features likely to prove of interest to the readers of the paper. The treatment of the exterior is such as to give a well balanced appearance to the building, while the round tower at the corner and the kiosk effect of the front porch are noticeable features. The floor plans, which are presented herewith, show the interior arrangement of the house, while the miscellaneous details give an idea of the construction employed.

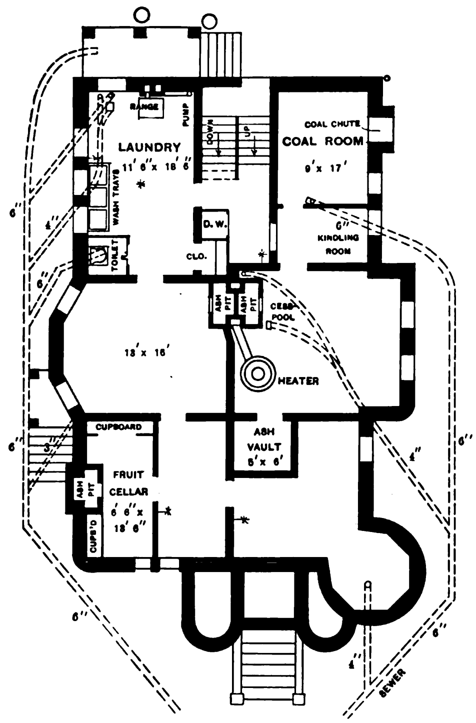
From the architect's specifications we learn that the cellar, which extends under the entire area of the building, is divided into several spaces, as may be seen from an inspection of the foundation plan. The cellar is 8 feet deep in the clear, and is cemented to a depth of 3 inches. The laundry has a Georgia pine floor laid on 4 x 4 inch oak joists, which rest on the cement. The cellar wall rests on footing stone, 4 inches thick by 24 inches wide, and is composed of flagstone up to the grade line, above which is blue Amherst stone, rock faced, and coped with an 8-inch water table of the same material, cut The frame of the house is of Norway pine, covered with dry matched boards, not over 6 inches wide. on which is laid heavy building paper, this in turn being covered with yellow poplar bevel siding 5 inches wide. The tower, however, is covered with round pointed and planed cypress shingles, 5 x 16 inches in size and painted the same color as the house. All outside trim is $1\frac{1}{8}$ inches thick. The roofs are covered with surfaced hemlock boards laid with close joints and well nailed, on which is placed saturated roofing felt and old Bangor black slate. All partitions are braced by putting 2 x 4 inch studding between at an angle of nearly 45 degrees wherever it can be done to advantage. All is throughly nailed so as to prevent the building being swayed by the wind.

On the first floor the parlor and bedroom are finished in cherry, the dining room in white oak, the reception hall and the second hall stairs in red oak. The other rooms and halls on the first and second floors are finished in yellow poplar. The floor over the dining room and bedroom on the first floor is deadened. All windows in the principal rooms on the first and second floors are paneled below the sill. The hardware of the principal rooms and halls is copper bronze with sand blast finish made by the Russell & Erwin Mfg. Company. Various rooms, as indicated on the plans, are fitted with hardwood mantels of new design having bevel plate mirrors. The front stairs are of neat design and were furnished by S. E. Smith & Bro. of St. Paul, Minn. The windows are hung with Russell's anti-friction pulleys and braided sash cord. The plastering is three-coat work finished white, while the attic has a brown finish. The plumbing is of the open

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

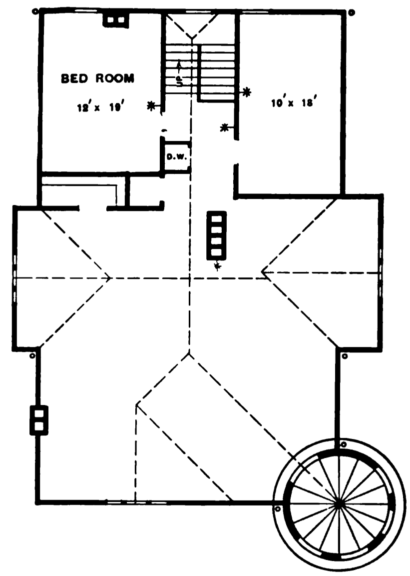
An Ohio Residence.—Milton Logan, Architect, Warren, Ohio.

work type, with brass hot water circulating pipes throughout. There is a coal range in the laundry and a gas range in the kitchen, both connected to a 40-gallon Brown copper boiler. All the sinks are of enameled iron. The bath-



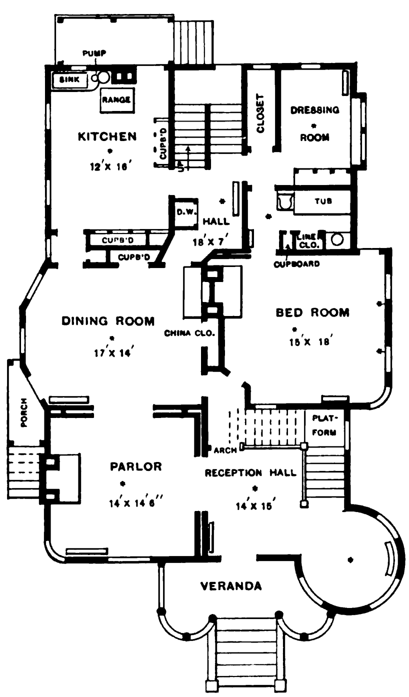
Foundation.

as that already mentioned and an instantaneous heater to the bath. The dumb waiter, running from the cellar to the attic, is Lane's patent and is 30 x 36 inches in size, with a capacity of 150 pounds. The heating system employed is that of the American Boiler Company, their Spence hot water boiler being used for the purpose. There

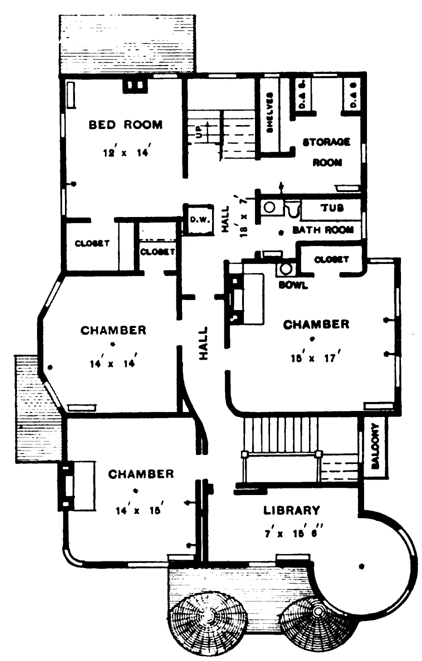


Attic Plan with Outline of Roof.

are two cesspools, one in the laundry and the other in the furnace room.



First Floor.

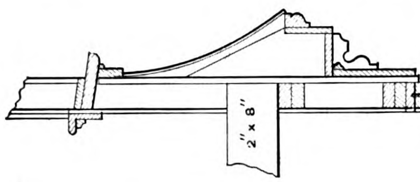


Second Floor.

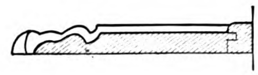
An Ohio Residence—Floor Plans.—Scale, 1-16 Inch to the Foot.

room, on the first floor, is fitted with one of J. L. Mott Iron Works' solid porcelain bathtubs and a Dalton-Ingersoll Company's siphon closet. The bathroom on the second floor has a copper tub, the same style of closet

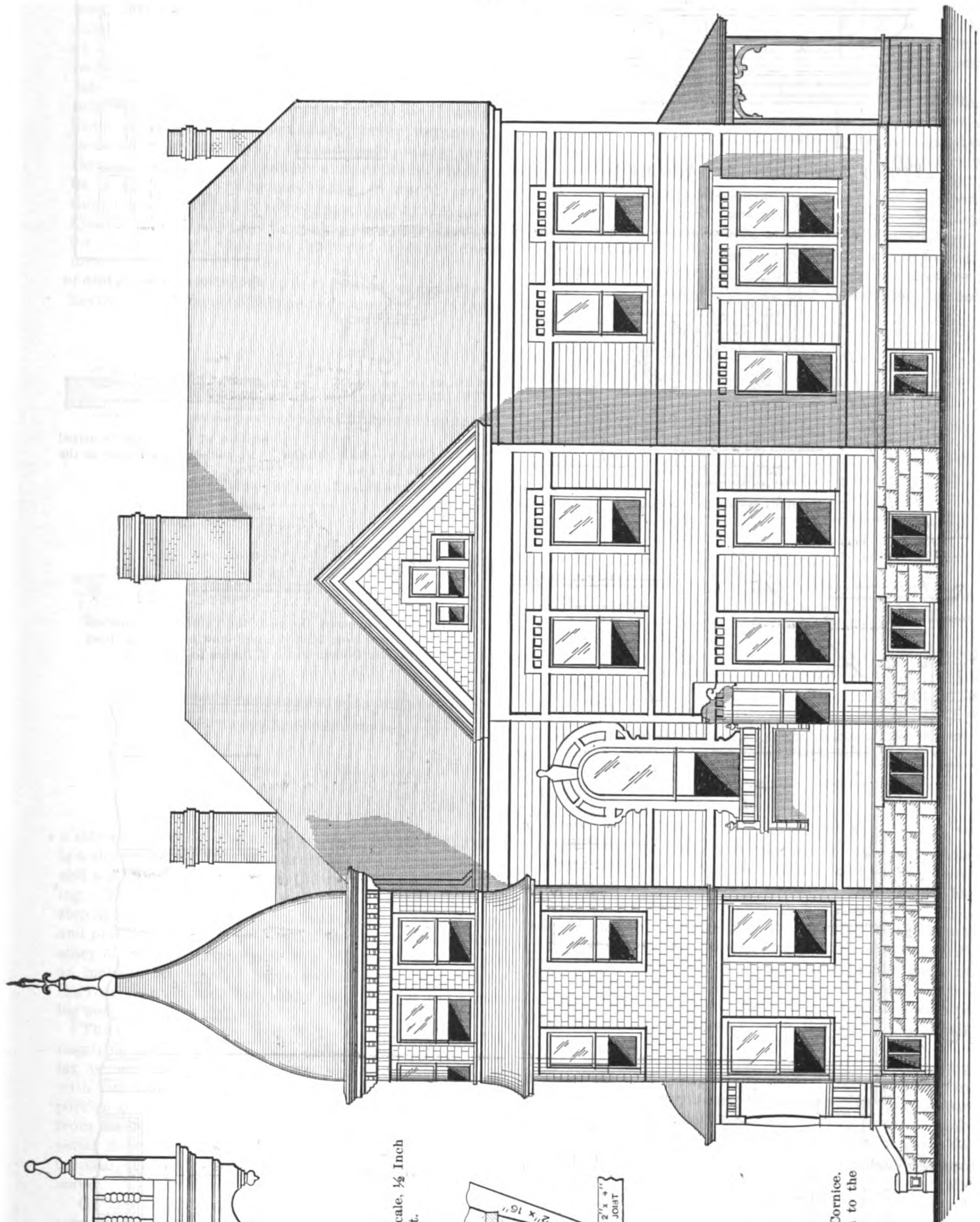
The dwelling here shown was erected last summer at a cost of about $5000 for Mrs. Julia M. Harsh, from drawings prepared by Milton Logan, architect, of Warren, Ohio.



Section of Tower Cornice Above Second Story of House.—Scale, ½ Inch to the Foot.

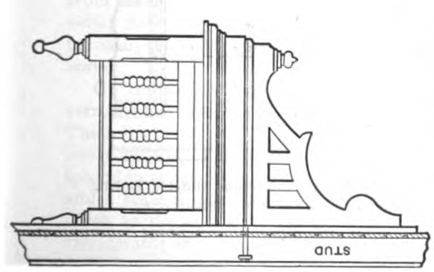


Section of Base Board and Plinth Block.—Scale, 1½ Inches to the Foot.

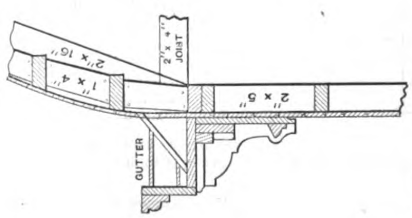


Side (Right) Elevation.—Scale, ⅛ Inch to the Foot.

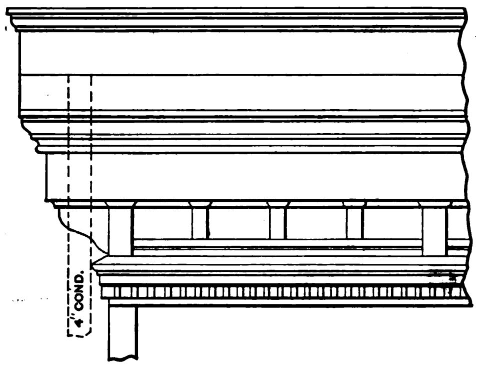
Miscellaneous Details and Side Elevation of an Ohio Residence.



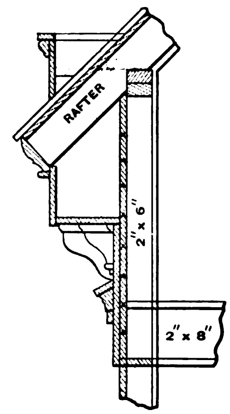
Detail of Balcony.—Scale, ½ Inch to the Foot.



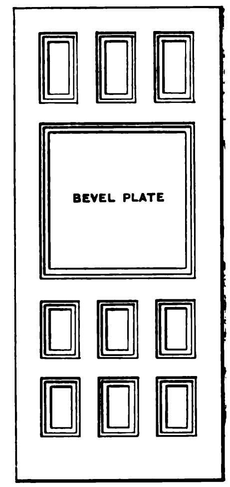
Section of Tower Cornice.—Scale, ½ Inch to the Foot.



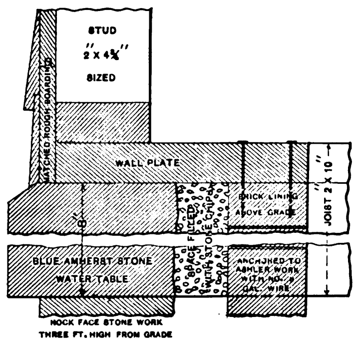
Elevation of Main Cornice.—Scale, ½ Inch to the foot.



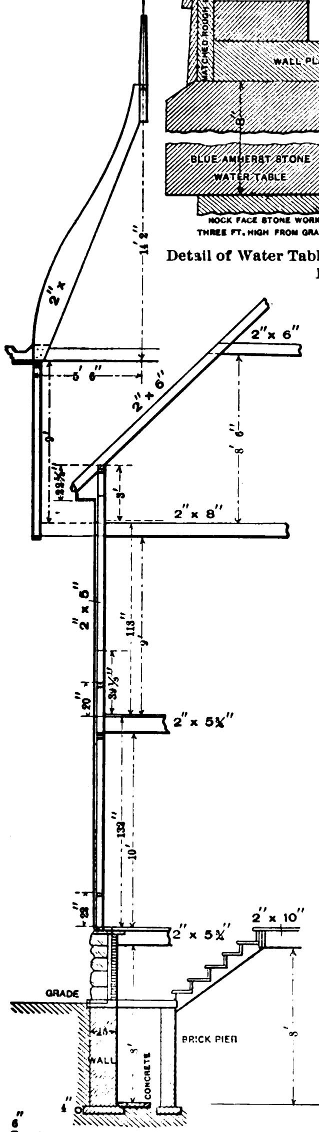
Section of Main Cornice.—Scale, ½ Inch to the Foot.



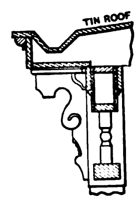
Front Door.—Scale, ⅜ Inch to the Foot.



Detail of Water Table.—Scale, 1½ Inches to the Foot.

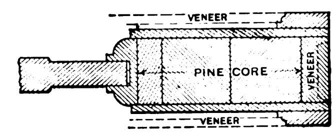


Section.—Scale, ⅛ Inch to the Foot.

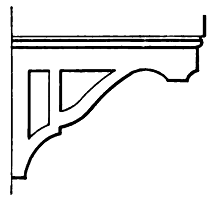


Porch Cornice.—Scale, ½ Inch to the Foot.

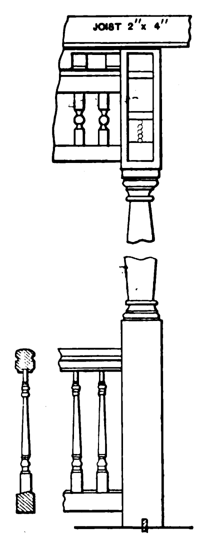
Section of Casing for Principal Rooms.—Scale, 3 Inches to the Foot.



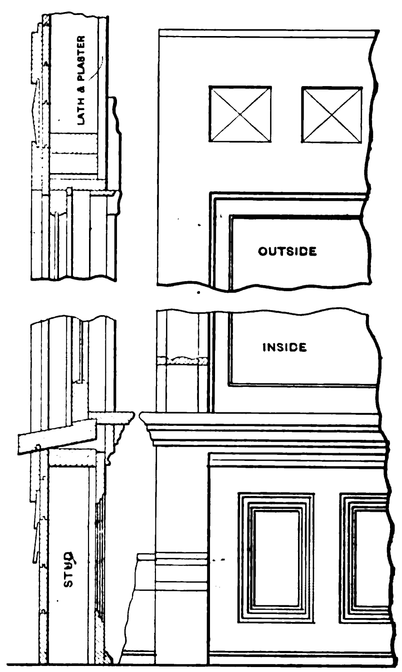
Detail of Veneered Doors in the Principal Rooms on the First Floor, Dotted Lines Showing Chafing Bead for Sliding Doors.—Scale, 3 Inches to the Foot.



Detail of Bracket in Left Gable.—Scale, ½ Inch to the Foot.



Detail of Front Porch.—Scale, ½ Inch to the Foot.



Detail of Windows, Showing Inside and Outside Finish.—Scale, ¾ Inch to the Foot.

Miscellaneous Details of an Ohio Residence.

COLD STORAGE CONSTRUCTION.

IN large cities where cold storage warehouses are accessible, and for great commercial interests which justify the installation of mechancial refrigerating plants, simple and efficient private cold rooms of moderate size are not of great importance, but in the many small cities and towns their use is necessary in different kinds of business, and such a construction as can be easily and economically constructed, conveniently used and operated at a reasonable expense will be of value to many architects, contractors and builders. The following description, taken from the *Engineering Record*, to which we are also indebted for the illustrations presented herewith, comprehends arrangement and details of the ice box and cold room recently built for a dressed beef jobbing firm in Central New York, and presents a construction which may be modified for varying conditions. It was in fact designed essentially like a refrigerator used by the Armour Company, and is a type of the system substantially adopted for use by many wholesale dealers of fresh and dressed meats.

This store and refrigerator is located on a corner lot having a frontage of 50 feet on the main street, 75 feet on a side street, while on the rear is a railroad switch. There is a show window in front, a trucking entrance at the side and a platform extends across the rear of the whole building. The grade of the lot is such that there is but a single step at the front entrance, while at the rear the first floor and platform are on a level with the car floor. The first story of the store is occupied as a salesroom in front, has an inclosed office and a private office at the side, and in the rear is an elevator and stairs connecting with the cellar and the stories above.

The upper stories are used for the storage of stock not requiring low temperature for preservation and the cellar is used largely for packing purposes. Connecting with this packing room is a cool cellar in the refrigerator portion of the building, which is supplied with cold air from the ice chamber through ducts front and rear. The cellar floors throughout are of cement, so that they can be easily cleaned at any time with the use of hose and water.

On the first story and opening off the salesroom is the refrigerator, in which are kept the fresh and dressed meats. The meat is taken from the refrigerator cars, placed upon hooks suspended from an overhead track hung from the second story joist, and this track is provided with switches and a scale at the office, so that meat can be weighed and taken to the side door for the truckman or run into the refrigerator or meat room, the ceiling of which is provided with a number of suspended tracks extending to the front and rear of the room.

The ice chamber is directly over the meat room and has an opening in the rear for receiving ice, which can be delivered at the building by either wagons or cars, and is hoisted to the ice chamber by horse-power. With the ice chamber filled 20 feet high with good solid ice in the winter, the stock would be enough to last until the next winter by refilling once during the summer with one-half to two-thirds the quantity put in at the winter time.

The cellar of the refrigerator portion of the building is of ordinary construction, except that its walls have a hollow or air space in them where they adjoin another cellar, and special care is taken to build all frames very tightly into the masonry. The first story joist and floor, the roof timbers, roof boarding and the roof are constructed the same as for an ordinary building. The joists under the ice chamber are extra strong and well supported to carry the weight of the dressed meats in addition to the great weight of the ice in the ice chamber; they are of yellow pine, with planed surfaces finished with varnish.

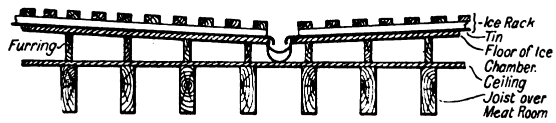


Fig. 1.—Section of Floor Between Meat Room and Ice Chamber.

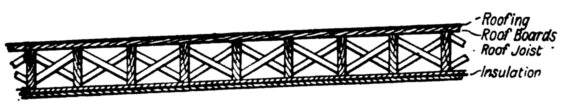


Fig. 2.—Section Showing Roof Construction.

Fig. 3.—Ceiling of the Ice Chamber.

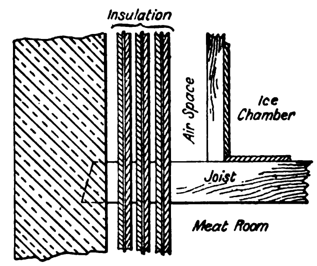


Fig. 4.—Air Space at the Side of the Ice Chamber.

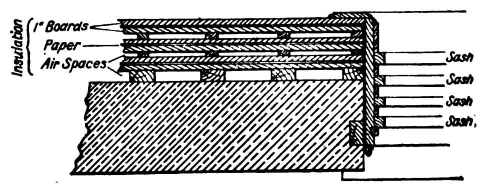


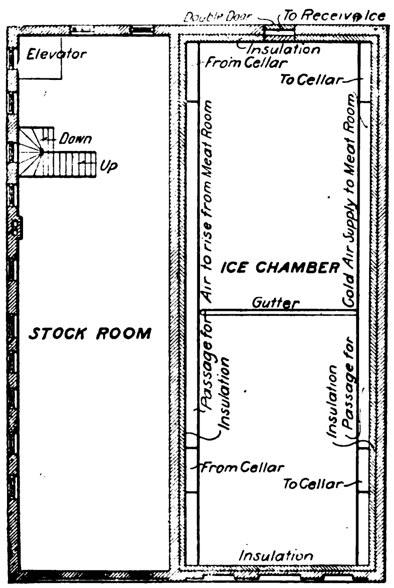
Fig. 5.—Section Showing the Construction of the Walls.

Cold Storage Construction.

The windows and other openings in the brick walls have 2 x 4 inch strips, top, bottom and sides, built solidly into the masonry, the frames being set after the building is inclosed and the insulation has been put in. The window frames are made with plank jambs, closely fitted to the brick openings, pressed into position with paper all around the frames, and all well secured to the strips in the brick work and to the insulation. The sash are the full size of the frames, and there are four or five sash to each opening, with stops between the sash forming air spaces.

The insulation of the side walls, Fig. 5, is formed by first furring all brick walls from the first-story floor to the under side of the ceiling timbers over the ice chamber with 2 x 4 inch studding, then sheeting with 1-inch matched boards, which, in turn, are covered with a double thickness of building paper and then with a second sheeting of 1-inch matched boards. The furring forms an air space between the brick wall and the sheeting. A second air space is formed with a 1-inch furring strip, which is covered with two thicknesses of sheeting boards with a double layer of paper between. A third air space is also formed with a double thickness of sheeting with paper between. The outer layer of boards forms the walls of the room, and the boards are selected, smoothed and finished with varnish.

The under sides of the roof timbers, Fig. 2, are sheeted with two thicknesses of matched boards with a double layer of paper between. The ceiling timbers are also sheeted with two thicknesses of matched boards and a double layer of paper between, and where there is space enough to admit it an insulation is put in on the top of the



Second Floor.

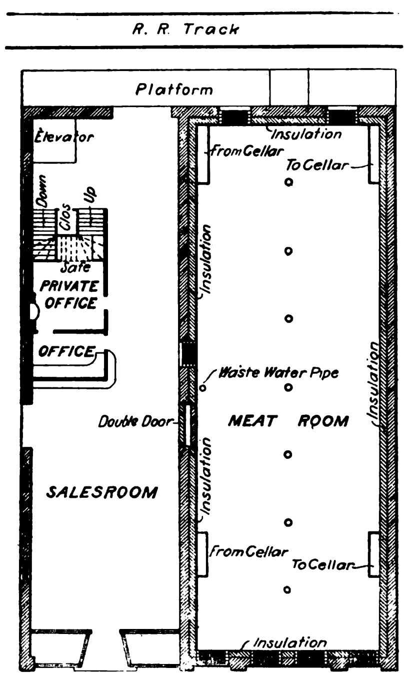


Fig. 6.—Main Floor.

only between the timbers forming the sides of the ice chamber. To form the sides of the ice chamber, Fig. 4, the upright timbers are sheeted on one side from the joist to within 2 feet of the ceiling with 1½ or 2 inch boards, forming an air space of 20 inches, in which the warm air rises and passes into the ice chamber, while on the other side the sheeting extends only about 2 feet above the ice chamber floor, and from thence to the top the sheeting is done with horizontal strips secured to the upright timbers, forming a wall with open spaces, which allow of free exit of the cooled air from the ice chamber into the air space at the side of the chamber, which is 16 inches wide.

The floor of the ice chamber, Fig. 1, is made pitching toward the center, where there is a gutter which catches the water formed by the melting ice and carries it to a leader discharging the water into a sink in the cellar, which in turn is trapped, the water carried into the other cellar, and again trapped into the sewer drain.

On top of the flooring forming the ceiling of the meat room a furring is put in to support the pitching floor of the ice chamber, which is made water proof. In some cases this floor is made water proof by a covering of tin, or better, with galvanized iron, while in other cases felt and asphalt are used. To protect this water proof floor from injury racks are made in sections, covering the entire floor space, and so made as to allow the free passage of water to the gutter and to the drain. The greater the ease with which the water is carried off the ice the drier the air in the refrigerator. The cold air ducts to and from the cellar are formed of matched boards extending from the under side of the first-story floor to the sides of the cold air space on either side of the chamber, the ends being carried as high as the closed sides of the chamber. Around the exposed sides of the ducts is a layer of paper and sheeting, finished to correspond with the side walls of the meat room.

The operation of the refrigerator consists in the passage of the warm air up through the conduit on the closed side of the ice chamber, then over the top of the ice,

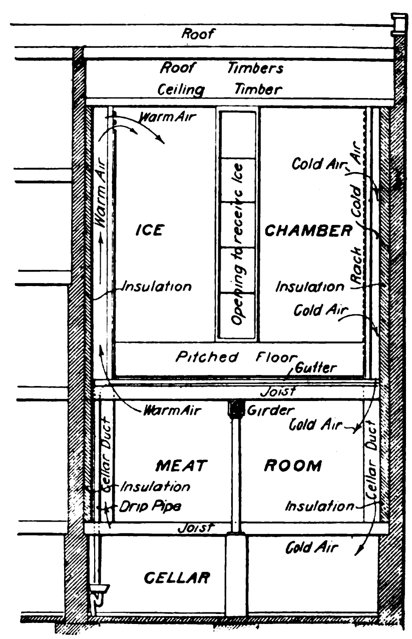


Fig. 7.—Vertical Cross Section through the Building.

Cold Storage Construction.

ceiling timbers. To form the ducts at the side of the ice chamber for the passage of the cooled air timbers are put up from the ice chamber joist to the ceiling timbers of the chamber and are well secured to joist and ceiling timbers, with braces from the side walls where necessary. On the top of the ice chamber joist a matched floor is laid with the finished side down, forming the finished ceiling of the meat room. The floor extends whence, after being cooled, it falls back through the open side of the chamber into the meat room, thus keeping up a constant circulation of air from the meat room to the ice chamber and back again, and to the cellar in the same way. By this system, with good insulation and suitable doors and windows, a temperature of 36 degrees to 40 degrees F. is maintained in the warmest weather if care is taken to keep the doors well closed, both in the meat room and in the cellar, when not actually in use for passing in or out.

GLASS ROOFS FOR GREENHOUSES.

ONE of the lectures delivered during the winter course at the School of Horticulture, Cornell University, had reference to glass roofs as applied to greenhouses. It was given by E. G. Lodeman, and some of the points brought out are as follows:

Greenhouses differ from ordinary structures in that they are exposed to the weather, both inside and out. For this reason they are peculiarly subject to decay and need frequent painting to protect the wood. Some men are very careful to paint the outside of their houses, but are not so careful with the inside. The fact is the inside of a greenhouse needs the protection of paint more than the outside. The air inside of a house is moist all winter, and water from the hose or condensation is continually running over the plates or other parts. This dampness, together with the temperature maintained, is just the condition to favor decay. When paint is used only the best quality should be applied.

Crude oil or petroleum and crude carbolic acid are good preservatives of wood, and may in some parts take the place of paint or be used for saturating parts especially liable to decay, and be followed in some cases by a coat of paint subsequently. The crude carbolic acid, however, is liable to discolor paint The crude petroleum, if allowed time to soak in and dry, may be painted over. In applying paint not only should surfaces be covered, but the greatest care should be used to fill joints and cracks. These are always weak places, and need to be filled with paint, not only to preserve the wood but to keep out air and make a tighter house. The rule in building should be good joints and well painted joints.

Practice varies as to the frequency of painting greenhouses. Some paint only once in five or six years; but wide awake commercial men recommend painting every two years. If the entire wood work is not painted so often, those parts especially liable to decay at least should be painted every two years. It is a good thing to remove the glass along the lower parts of the roof in order to make thorough work.

Material for Roofs.

As for material for roofs, cypress, it is generally agreed, is the best. It is not, however, absolutely proof against decay. Tests of posts standing in water showed that at the edge of the water where the parts were alternately wet and dry they decayed. The part submerged and that in the air remained sound. One advantage of cypress, in addition to its lasting qualities, is its freedom from cross grain and knots. Its expense stands in the way of its use for posts or parts where locust or cedar will answer. For temporary purposes there are some substitutes for glass which answer very well, but for the regular growing or forcing of plants nothing can take the place of glass.

Gutters should be deep to avoid the accumulation of ice on the lower part of the roof. The bottom board should be thick—2 inches at least—and from 6 to 12 inches wide. The latter width is better, as it permits of walking more conveniently between roofs when necessary to shade plants, &c. A method of joining the ends of these bottom timbers consists in sawing a transverse groove across the end of each part to be joined, the cut extending centrally across the longest diameter. This groove having been made in the end of each piece, a rectangular piece of heavy galvanized sheet iron is fitted into the groove with white lead, and then the parts are brought snugly together. The side pieces may be attached to the bottom timber in two ways, but this is, perhaps, a matter of mere choice. Making a good joint and filling it with white lead is a matter of more importance. Sometimes the sides of the trough are made lower at one end than the other to provide for the slope of the gutter. This allows the upper edge of the sides to be horizontal while the bottom slopes. Again, the sides are made of equal hight throughout their length. In this case the house itself must be slightly elevated at one end to give slope to the trough.

The sides of the trough should never be made to serve as plates, or to support the lower edge of the roof, since the sides of the trough will "give" under the lateral pressure and throw the roof out of shape. The trough should be independent of the roof, and serve merely as a water passage and as an occasional footpath between houses.

The Roof Plate.

The plate is regarded by the lecturer as the weakest part of a greenhouse, as it is so situated as to be almost constantly moist or alternately wet and dry. Never should a plate be left with its upper surface flat. It should be sloping more or less to shed water. The plate should rest at the top of a double wall (in case wall is of wood), and be sufficiently broad for the side to extend beyond the plane of the wall on each side. This prevents drip water from running down the wall. On the under side of the projecting edge is a groove which prevents water running to the wall. Behind this groove, in the line where the outer wall or siding meets the under side of the plate, should be another groove to receive the tongue of the siding. This makes a very tight joint at this place.

The upper side of the plate is made sloping in two ways. Either we may use a solid piece of timber for the plate and bevel the upper side so as to get an equal double slope, or the same thing may be secured by nailing two boards, forming an obtuse inverted V on the upper side of a flat timber. The solid plate is doubtless preferable, although it involves somewhat more work in the making.

In case the plate is to rest upon a solid brick or grout wall, a slight flat topped elevation along the middle of the wall upon which the plate is to rest will secure more dryness for the plate. The ridge should be about ¾ to 1 inch high and narrower than the plate. On either side of this the top of the wall should be slightly sloping.

The Ridge Pole.

The ridge pole is the next important part, and has everything to do with keeping a house in good shape. It is the backbone of a greenhouse and should be rigid. This requires ordinarily a timber 1½ to 2 inches thick and 6 inches wide. Along each side, about the middle, is to be made a groove to accommodate the upper ends of the sash or sash strips.

In the matter of rafters and sash strips strength should be sought in depth. The weight is vertical. They need not be strong laterally, for when the glass is in place they are sufficiently braced at the sides. Narrow and deep sash strips meet the requirements much better and cast less shadow than square ones of equal strength. In case movable roofs are required, as is sometimes the case, the method of arranging and securing the sash will readily suggest itself.

When the roof is narrow no rafters nor posts are required to support the roof. This is the case with houses 10 or 12 feet wide. When the roof is wider it will need support from either rafters or posts, and sometimes both.

A 16-foot slope of roof should have one support under the middle and a 20 or 24 foot slope requires two.

For posts, ¾-inch iron pipe makes a good support. It casts but little shadow and second hand pipe may usually be had cheaply. Small round castings should be used at the bottom, fastened on, and angle iron, or other suitable attachment, at the top to secure the post to the rafter or purlin.

The direction in which a house faces, as well as the pitch of roof and the span, are governed by the purpose for which the house is to be used.

Not only should the frame work of the roof be as light as possible and the inclination great, but it is desirable to arrange the parts of the roof so that the larger pieces, such as the plate and ridge pole, shall not cast their shadows on the benches where plants are growing.

A church is a "building" within the laws of California giving a lien for material used in a building, and is not exempt because another statute makes "pews rented by householders in a place of public worship exempt from debt."

An Ingenious Traveling Scaffold.

An ingenious traveling stage or scaffold devised by the contractor for the work has lately been used to facilitate the painting of the inside of the roof of the main train shed at King Cross station, the metropolitan terminus of the Great Northern Railroad, says a London correspondent of the *American Architect and Building News.* This roof, which when it was first constructed, about 40 years ago, was the largest in the world, was until quite recently an object of special interest because of its peculiar construction. Till seven years ago its girders were of wood, being composed, one might almost say, of bundles of planks, fastened together and overlapping each other lengthways ; then bent round and forced by sheer pressure to assume the shape of a bow. The design was borrowed from the Czar's riding school at Moscow. There was, however, one obvious objection, that the planks, like a bow when stretched, always strove to restraighten themselves, and so exerted a powerful thrust on the outside walls. The west wall was safe enough, for it had the whole range of the company's offices built upon it ; but the east side, even in spite of its flying buttresses, showed signs of being shaky at an early period, and as long ago as 1869 the span of the roof over the arrival platforms was reconstructed with iron girders. It was not until 17 years afterward, in the course of the years 1886-87, that the other span was renewed. For the renewal work, a huge traveling stage was employed, somewhat similar in principle to the one about to be described, but, of course, of much heavier construction than one designed simply for painters' work. Moreover, the old stage traveled on wheels along the platforms, from end to end, necessitating the removal of clocks, lamps and other objects which impeded its progress. The new scaffold, on the other hand, runs on rails supported on brackets hung from the roof principals, and thus it is able to move along high up in the arch of the roof without meeting with any obstruction. In fact, the old stage was such a cumbrous and unwieldy affair that on the first occasion of painting the roof since its renewal no attempt was made to employ a traveler, but a stationary scaffold of ordinary builders' poles was erected, which was taken down from time to time and reconstructed on another spot as the necessities of the work demanded. This plan, however, involved considerable risk of accident, both to the painters and to passers along the platforms.

By last year's arrangement, on the other hand, nearly all the danger and difficulty involved in the other two methods was avoided, and at the same time the painting was carried out with a facility never before attained. The new scaffold is in four pieces, each 36 x 25 feet. It is constructed of 1½-inch boarding nailed to 11 x 3 inch joists. Each portion is carried on two steel "queen post" trusses, to each end of which cast iron flanged wheels are attached. The rails on which these wheels run are bolted to 5 x 4½ inch joists, which are carried on brackets hung from the roof principals. Four rails are thus provided, on each pair of which two portions of the scaffold run. Two of these rails are carried on brackets hung from the top of the principals by large bolts stiffened with wooden struts. The other two rails are on brackets fastened by six smaller bolts apiece, about half way up the principal girders on either side of the roof span. Each portion of the scaffold runs on one of the side and one of the top rails ; there are two portions on each side of the apex of the span, and the whole covers two 20-foot bays (*i. e.*, sections between the principals) and overlaps 5 feet on each side. The gap of 4 feet between the two top rails can, for painting purposes, be covered by a flap hinged to the scaffold on one side. The whole traveler weighs about 8 tons, and the moving is easily performed by a crab winch worked on the platform below, the rope from which runs over a pulley attached to the flange of a girder at a convenient distance from the scaffold, thus giving a straight pull from the scaffold.

During the recent operations 50 men were employed on the scaffold, and these could give one coat of paint to two bays each day. As the roof had to receive two coats, this meant that, to keep the men fully employed, the stage must be moved one bay each day. Accordingly, very early each morning one set of rear brackets was taken down and hung to the next girder in front of the scaffold, the rails adjusted, and the traveler moved forward on its daily journey. As the roof is in two spans, each 800 feet long, 100 feet wide and 91 feet high and containing 40 bays, the whole work took just about 80 days. It may be mentioned further, that the wooden trestles of the scaffold were stiffened by diagonal hoop iron ties, and battens were nailed on the boarding about 2 feet apart to give foothold to the workmen. The portion of the roof below the scaffold was painted from wide ladders resting on beams fastened to the flanges of the girders. The ladders were drawn up and moved along on the traveler, while the beams were moved by hand along the platform below. The scaffold has now been taken to pieces, and its parts put away, carefully numbered, for use again when the time of painting comes round three years hence.

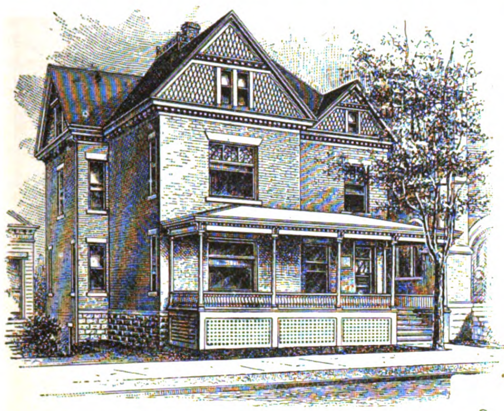
Working Rules for London Bricklayers.

A set of revised rules to govern the work of bricklayers in the London district has recently been agreed upon by the Central Association of Master Builders of London and the Operative Bricklayers' Society, whereby there are to be "50 working hours per week during 40 weeks, 47 hours per week during 6 weeks and 44 hours during 6 weeks, the present rate of wages to be advanced 1 halfpenny per hour. Overtime, when worked at the request of employers, but not otherwise, shall be paid at the following rates—namely, from leaving off time until 8 p.m., time and a quarter ; from 8 p.m. to 10 p.m., time and a half ; after 10 p.m., double time. No overtime shall be reckoned until each full day has been made, except where time is lost by stress of weather. On Saturday the pay for overtime from noon to 4 p.m. shall be time and a half, and after 4 p.m. and Sunday double time. Christmas Day shall be paid for the same as Sunday. Workmen engaged on a night gang shall be paid 1 penny per hour in addition to the ordinary rate of wages. One hour's notice to be given or one hour's time be paid by either side on determining an engagement. All wages due to be paid at the expiration of such notice, or walking time if sent to yard. In the event of more than 10 per cent. of the workmen of the trade employed at the job giving notice to leave during any one day (except Saturday), they are not to be entitled to receive their money until noon on the following day. Men who are sent from the shop or job, including those engaged in London and sent to the country, are to be allowed as expenses 6 pence per day for any distance over 6 miles from the shop or job, exclusive of traveling expenses, time occupied in traveling and lodging money. Payment of wages is to commence at noon or as soon thereafter as practicable on Saturday, and be paid on the job. But if otherwise arranged walking time at the rate of 3 miles per hour to be allowed to get to the pay table at 12 noon. Employers are to provide where practicable and reasonable a suitable place for the workmen to have their meals on the works, with a laborer to assist in preparing them. Wages earned after leaving off time on Friday and Saturday only shall be kept in hand as back time. The term "London district" is to mean 12 miles radius from Charing Cross. If application be made to any employer by the Central Committee of the Operative Bricklayers' Society to discharge any workman, on the ground that such workman is obnoxious, and the employer refuses to accede, no strike shall be sanctioned, but the question shall be referred to the decision of the Board of Conciliation. But no such application shall be made in consequence of such workman belonging or not belonging to any trade society. Six months' notice on either side shall terminate the foregoing rules."

DESIGN OF A BRICK PARSONAGE.

THE dwelling which we illustrate at this time was erected not long ago by Hon. Charles Willard of Battle Creek, Mich., and by him presented to the First Baptist Church, to be used as a parsonage. The perspective view and elevations given upon this and the following pages will enable the reader to form a good idea of the external appearance of the structure, while the floor plans show the arrangement of the rooms. It will be seen that the basement is divided into various apartments, including furnace and fuel rooms, laundry and vegetable cellar, all of which are provided with concrete floors. The walls below grade are of rubble masonry, with a footing of concrete, while above grade they are rock faced ashlar. All walls extend 3 feet below the grade line. The studding for the basement is 2 x 6 inches and that for the balance of the structure 2 x 4 inches, placed 16 inches on centers and doubled at angles and openings, all corners being made solid. The floor joist of the several stories are 2 x 8 inches ; the ceiling joist and rafters 2 x 6 inches, placed 16 inches on centers, and the hip and valley rafters 2 x 8 inches. The building is sheeted with 6-inch matched hemlock, covered with water proof building paper. The entire structure to the plates is covered with red brick veneer laid in white mortar and tied to the frame work with 20d. nails driven in every alternate stud every eighth course. The window sills, lintels and water table are of rock faced Bedford stone. The porch roof, main roof and gables are covered with 10 x 20 inch No. 1 Black Bangor slate, laid with 3-inch cover over roof boards of 6-inch dressed and matched hemlock. The ridge and ridge rolls are of 2-inch galvanized iron. The rain gutters are set on the tin and double tinned, the roof not being slated below the gutters. The basement is 9 feet in the clear and the first and second stories 10 feet.

The interior of the building is provided with double floors, having a layer of building paper between. The rough floor is of $\frac{7}{8}$-inch boards, laid diagonally. The finished floor in the vestibule and hall is of quarter sawed red oak with $2\frac{1}{4}$-inch face ; the floor in the dining room, bathroom and kitchen is quarter sawed Georgia pine with $2\frac{1}{2}$-inch face, finished in the natural color, while all other floors, including the attic, are $\frac{7}{8}$ x $5\frac{1}{2}$ inch white pine. The vestibule and hall are finished in red oak, while the finish of the rest of the building is Georgia pine, natural color. The sitting room and study have a



Perspective View.

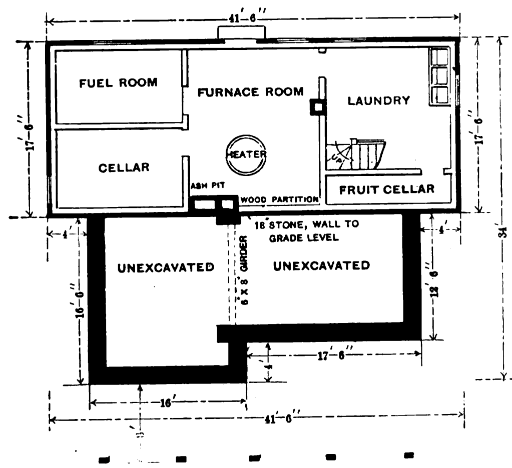
Front Elevation.—Scale, $\frac{1}{8}$ Inch to the Foot.

Design of a Brick Parsonage.—M. S. Alden, Architect, Battle Creek, Mich.

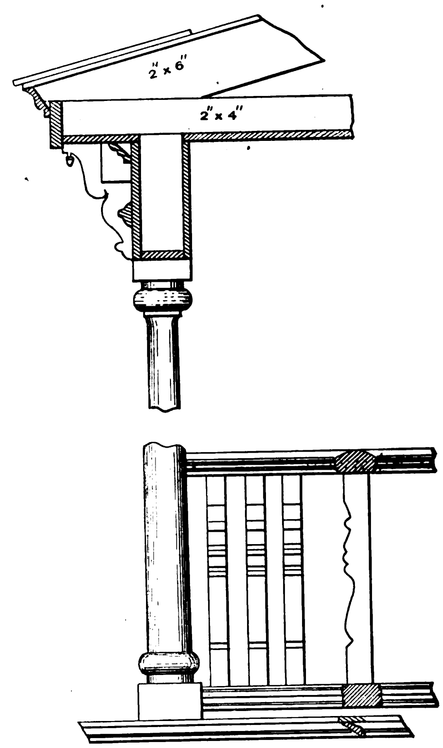
wood mantel with mirror, tile hearth and grate fitted for hard or soft coal. In addition to these the house is provided with a Howard hot air furnace.

An inspection of the plans shows that on the main floor there are sitting room, dining room, kitchen, bedroom and a large hall, which can be used as a reception room should occasion arise. Between the kitchen and dining room is a pantry 5 x 12 feet, while opening from the bedroom is a closet lighted by an outside window. The kitchen is fitted with a steel sink, hot water boiler and gas range. From this room access may be had to the cellar or to the second story, the position of the stairs being clearly indicated on the plan. On the second floor there are three sleeping rooms, a study and a bathroom, the latter being provided with hot and cold water and fitted with tub, open bowl and closet.

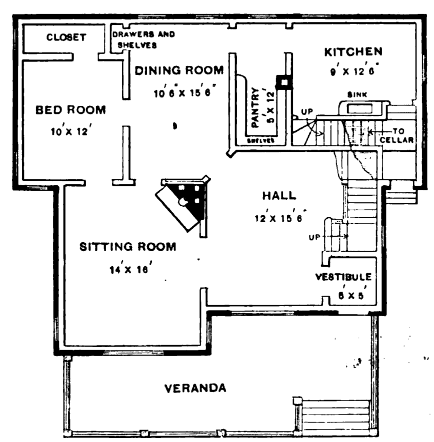
The entire house is piped for gas and wired for electric lighting, with switches at the most convenient places for the occupants. The building cost a little less than $8500



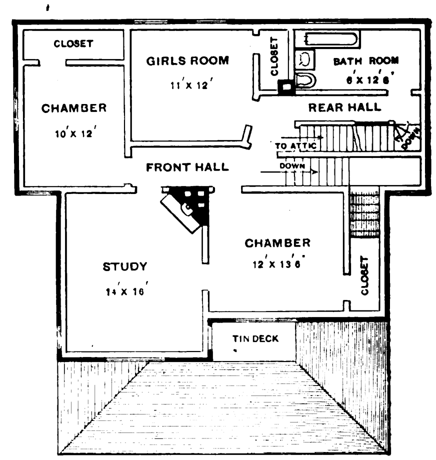
Foundation.



Detail of Porch Cornice, Column and Rail.



First Floor.



Second Floor.

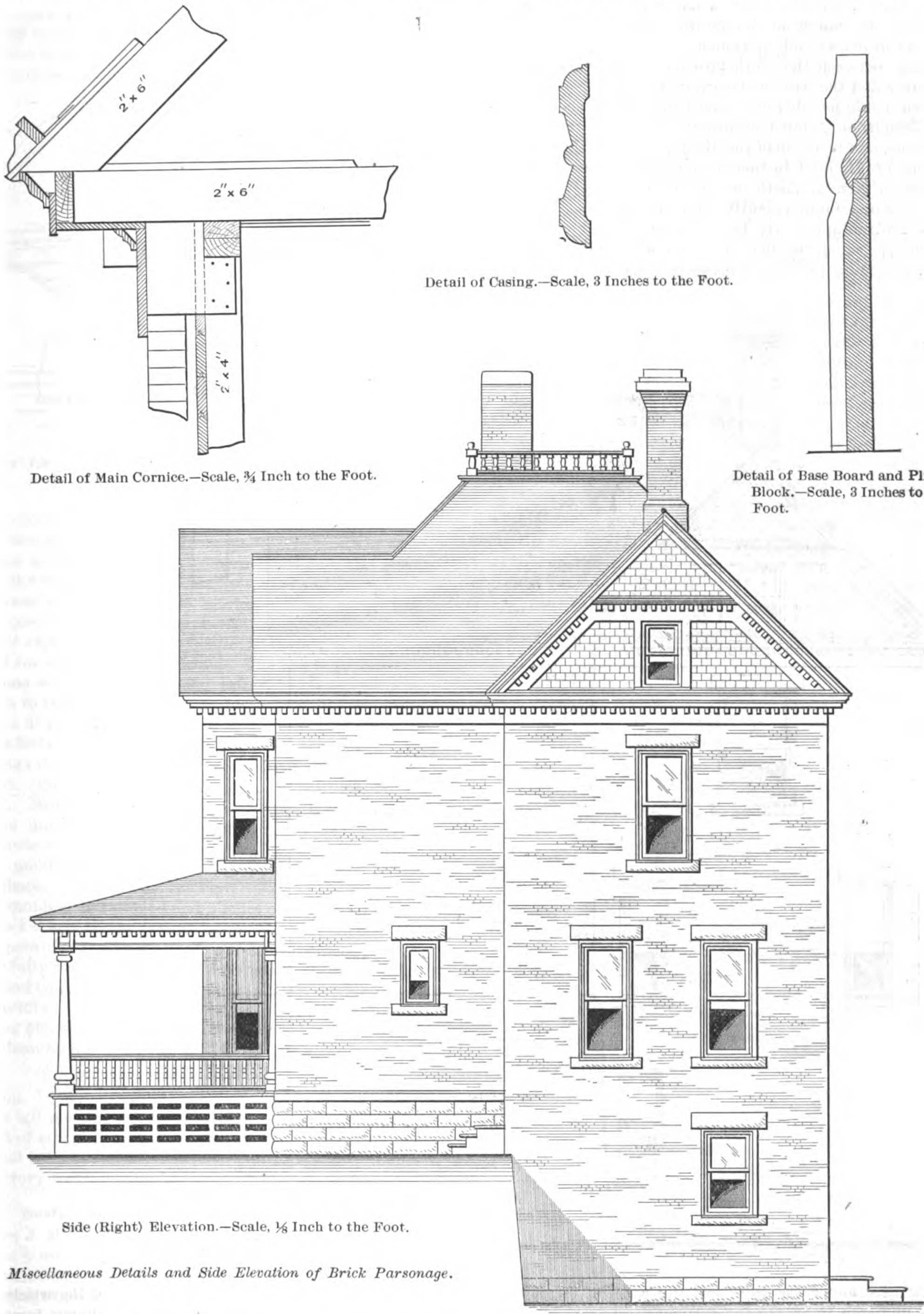
Design of a Brick Parsonage.—Floor Plans.—Scale, 1-16 *Inch to the Foot.—Detail —Scale,* ¾ *Inch to the Foot.*

and is finished in a first-class manner. The plans were drawn by M. S. Alden, architect, of Battle Creek, Mich., to whom we are indebted for the drawings from which our engravings were prepared.

ONE of the most remarkable products of Nevada is a species of wood known as mountain mahogany, which, when dry, is as hard as boxwood, very fine grained, of a rich red color, and in weight very heavy. It has been used for boxes for shafting, and in some instances for slides and dies in quartz batteries. It burns with a blaze as long lasting as ordinary wood, and is then found almost unchanged in form converted to a charcoal that lasts about twice as long as ordinary wood, giving also an intense heat, greater than coal gives. Another notable species of wood having extraordinary durability is said to be the quebracho wood of Argentina. Posts that have been in the ground 150 years, in soil alternately sodden by tropical rains or parched by intense heat, are found to be in sound condition. The wood is also described as free from attacks of insects, does not decay and is not compressible, and weighs nearly 80 pounds per cubic foot.

Concrete.

The discovery of the use of concrete is curious, says a writer in the *Architect and Contract Reporter*. In excavating for one of the piers of Waterloo bridge the workmen had a good deal of difficulty, owing to the very compact state of the gravel forming the bed of the river, which everywhere else they had found perfectly loose. This effect had been produced by the accidental sinking of a barge load of lime over that spot some time before, which had cemented the loose gravel into a solid mass, resembling the calcareous conglomerates of nature, which are gradually formed by a similar process. Mr. Rennie having mentioned this circumstance to Sir Robert (then Mr.) Smirke, the latter with great judgment availed himself of the hint and subsequently used it in all his foundations, none of which have ever been known to fail. Part of the Penitentiary at Millbank, begun by another architect in a different manner before Sir Robert Smirke was employed there, was evidently giving way. The superior efficiency of concrete was also proved in a remarkable manner at the new Custom House, where the floor of the large apartment called the Long Room actually fell in and the whole building was in danger, owing to the in-



Detail of Main Cornice.—Scale, ¾ Inch to the Foot.

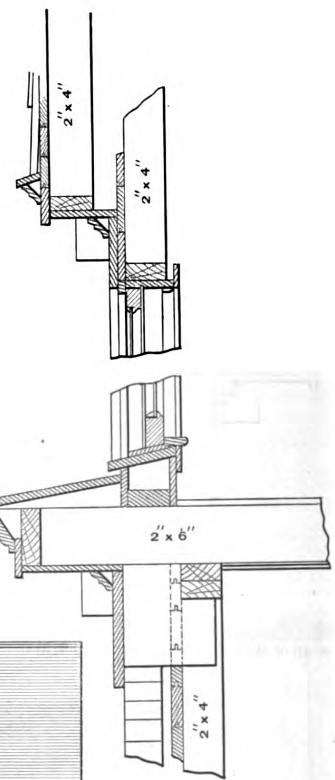
Detail of Casing.—Scale, 3 Inches to the Foot.

Detail of Base Board and Plinth Block.—Scale, 3 Inches to the Foot.

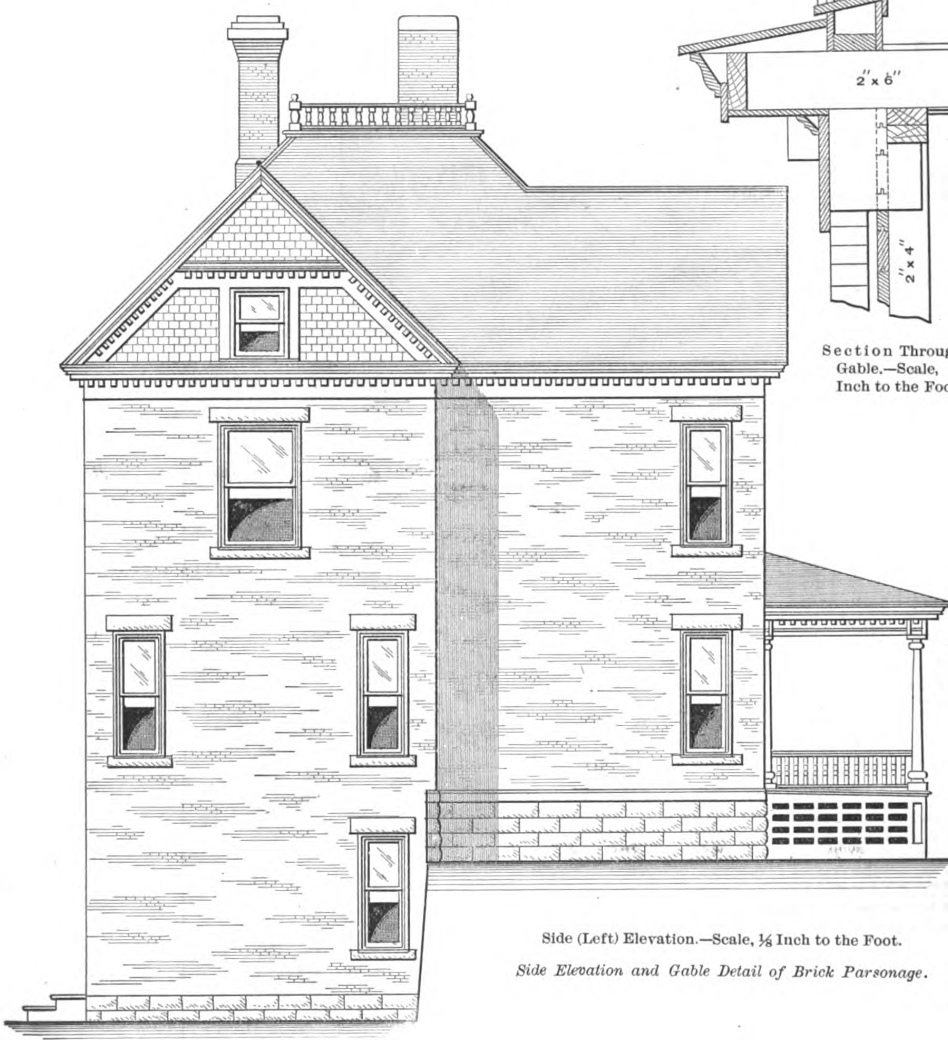
Side (Right) Elevation.—Scale, ⅛ Inch to the Foot.

Miscellaneous Details and Side Elevation of Brick Parsonage.

sufficient manner in which the piling had been originally executed in a very difficult situation. At this period Sir Robert Smirke was consulted, who found it necessary to pull down a small part of the building, but saved the rest of it by undersetting all the walls with concrete, to the average width of 12 feet and to the depth of from 12 to 15 feet—that is, until he found a natural bed of gravel—including one course of Yorkshire landing stones and 12 courses of bricks laid in cement, having three offsets or footings between the Yorkshire landings, resting on the concrete and the base of the original walls. No other expedient could possibly have saved this fine edifice from entire demolition. It must be allowed that not only the ancient Romans, and after them the Moors, but even the Norman barons of England in their feudal castles, used concrete, of which Kendal Castle is one of the most striking examples; and more recently Belidor, in his "Architecture Hydraulique," treats of Béton mortar, which is much the same; so that it is not absolutely new. In fact, according to the old proverb, there is scarcely anything new under the sun; but the merit of introducing this immense improvement systematically and generally into the modern practice of architecture is undoubtedly due to Sir Robert Smirke.



Section Through Gable.—Scale, ¾ Inch to the Foot.



Side (Left) Elevation.—Scale, ⅛ Inch to the Foot.

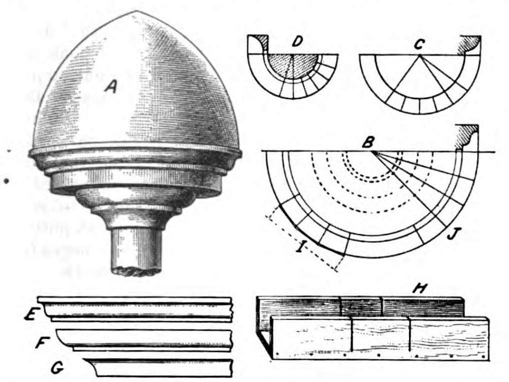
Side Elevation and Gable Detail of Brick Parsonage.

The Attorney-General of Wisconsin has begun an action looking to the abolition of the sash, door and blind combination, known as the National Mfg. Company, and which includes nearly all the manufacturers of the articles named in Wisconsin, Illinois, Minnesota, Michigan, Iowa, Missouri, Ohio, Indiana and Kansas. The complaint alleges that the real object of the corporation is to maintain a combination for the purpose of injuring the business of such firms as are not members, resulting in restraint of trade. The court has granted an injunction forbidding the company to do business pending the hearing of the motion to dissolve the corporation.

CORRESPONDENCE.

Kerfing for a Round Tower.

From M. A. M., *Santa Monica, Cal.*—I send herewith a rule for kerfing which may prove of interest to some of the numerous readers of the paper, more especially where wood working mills are located at a distance. The subject for treatment is an imaginary round tower, A, the sketches showing all the moldings that will be necessary for the construction of cornices, &c. The sketch marked



Kerfing for a Round Tower.—Sketches Accompanying Letter of "M. A. M."

B is a crown molding struck full size of the circle. The outer line is divided into 5-inch spaces and marked from tangent to center of circle. These lines give the joints when the work is applied. The letters C and D represent the lower members and are marked in the same way. Their positions are shown by the dotted lines. The letters E F G represent moldings, while H is the miter box designed for use in doing the work. The box is constructed the same as any other wooden miter box, and just wide enough to take in the large molding with the top down and the fillet up standing square against the side and with the outside of the molding toward the workman. All moldings must be used in the same way. For the cuts in the box, take the bevel from the lines on the tangent and center. Make a right and left cut. Space the tangent for the number of joints required, always using judgment as to the length of the cuts in proportion to the size of the moldings. If too long they will not come up in good shape. The shorter the better, so that the full form of the molding in retained and fidelity considered. When the blocks are all on rub off with coarse sandpaper the sharp points of the joints with conformation to the circle. If carefully finished the joints will not be detected under paint and can be finished to polish. Referring again to the sketches, I represents blocks as planted on before cleaning off, while J represents the blocks as they appear after cleaning off.

Filling Cracks in Floors

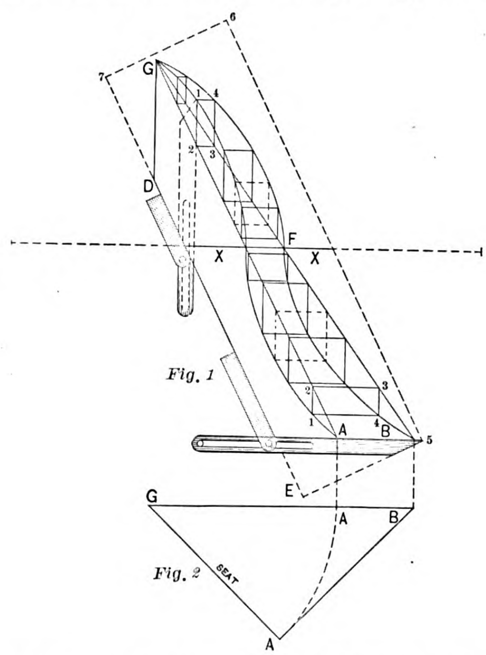
From J. W. P., *Providence, R. I.*—Can any of the readers tell me through the columns of the paper the best method of stopping the cracks in shrunken floorings? I have had calls to repair such floors, but have not found a satisfactory way of doing the work.

Design for Stable and Carriage House.

From J. H. K., *Jamestown, N. Y.*—I am a reader of *Carpentry and Building* and would like some one to send for publication the plans and specifications for a stable and carriage house with a cupola, the first floor to contain two open stalls, one box stall, carriage room, harness cupboard, stairs for second floor and a small workshop. The entrance to the workshop is to be from a small hall and entrance to the stable part from the same hall, which also communicates with the outside of the building. There is also to be a door at the rear of the stable portion through which to lead the cattle to the yard. This makes two small outside doors and one set of large doors. The second floor is to be of sufficient size to supply feed for three head of cattle. There should be no waste room in the building, which is to be constructed in cottage style, plain, neat and attractive, the roof to be of half pitch and the cost to be $500 complete.

Development of Ogee Rafters.

From Jere, *Davenport, Iowa.*—In the January issue of the paper "H. W. N." of Salt Lake City, Utah, submitted a method of curved hip construction, and requested me, in connection with others, to pass on the simplicity of it. I admit that it is as simple as anything I have ever seen. All methods seem to cover the ground all right—in fact, too much ground for practical purposes. In my communication, published in the September issue, I should have stated that the curved line could be produced upon the boards from which the pattern was made. To correct that omission and to reduce to a minimum the process of elongating the minor curve to range with the hip line, I have originated a similar method which I submit for criticism. Referring to Fig. 1 of the sketches, let the dotted lines E 5 6 7 represent the board for the pattern. Draw the length of the minor rafter, as at A G, parallel with E 7, the edge of the board. Make plumb and level cuts, as at D G and A B, using large wooden bevels, as shown. Draw the length of the hip, as B G. Draw the level line X X at the center. Screw a strip on any side of the board at X X, extending it both ways. Draw the curved line A G from centers on the strips. Commence at the point 1 of the minor curve and complete the parallelogram 1 2 3 4, using the bevels. The major curve will pass through 4. Repeat the operation to the center X X and reverse it above, as at 1 2 3 4. The curve here being above the pitch line A G, the hip curve will pass through the upper corner



Development of Ogee Rafters.—Sketches Contributed by "Jere."

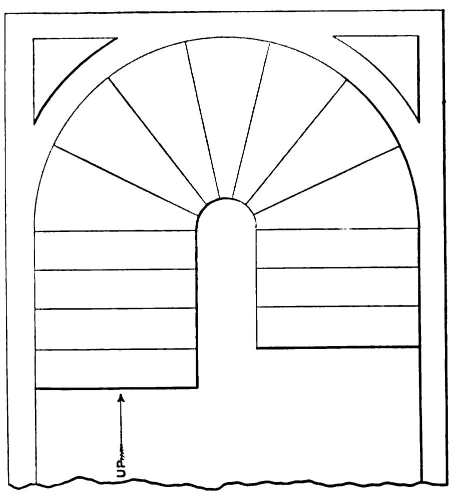
at 4. Now trace the curved hip through the points B 4 F 4 G. Additional points can be used if necessary, as indicated by the dotted squares. Saw out the pattern of the hip; first mark them out and then cut on pattern. The line A B being the factor of the seat of the hip rafter, it therefore elongates the curve at that point as much as it exceeds the seat of the common rafter. A line drawn parallel with it and joining both pitches will produce the same result, the side line being plumb over the minor curve. Fig. 2 of the sketches is introduced here to illustrate the relation that the seat line bears to the length, and why the line A B is a factor of the seat or diagonal line G B The length of the different pitches is all that will be necessary to determine, no matter whether the roof is square or any other figure. It will be seen that the pattern can be made at the building on a pair of trestles and the lengths of the rafters taken for the positions they occupy.

Design for a Writing Desk.

From W. B. B., *Ansonia, Conn.*—I shall be glad to have some reader of the paper furnish a plan and elevation of a small writing desk of neat design. I have been a reader of the paper since 1889, and have looked through all the issues, but failed to find a design that suited me. Most of them had a book case attached.

Problem in Stair Building.

From P. C. D., *Richmond, Maine.*—I send a sketch of a pair of circular stairs about which I desire the opinions of practical stair builders. We have no stair builder in this place, and what I want to know is the best manner of springing the skirting board or continuation of the base board. Can it be dadoed into the riser, or would it



Problem in Stair Building.—Sketch Submitted by "P. C. D."

be better to spring it in place before the circular carriage is put in position? The stairs are to be finished in oak and I want to make a first-class job. I shall be glad to have those who have had experience in work of this kind tell how they would finish the small or inner circle. The large circle will be lathed and plastered and the small one will be studded under the stringers.

Operation of Incubator.

From W. W. B., *Ansonia, Conn.*—I would like to ask "W. S." of Kansas if the incubator illustrated and described in the issue of *Carpentry and Building* for September, 1894, works satisfactorily.

Carving for Walnut Bedstead.

From C. T. F., *Virgilinear, Va.*—I am a reader of the paper and am much interested in the Correspondence department. I would like some of the readers to send for publication a design of carving suitable for a walnut bedstead, which I want to cost $75. It is possible that the author of the articles on wood carving which have been running through the paper for some time would be willing to consider my request.

Raising the Roof of a One-Story Cottage.

From H. S. L., *East Pharsalia, N. Y.*—In a recent issue a correspondent wanted to know how to raise the roof of a one-story cottage, and as I have executed work of this kind, I take the liberty of telling how I did the work. I first tore off the portion of the old roof directly over the plate and cut the studding the length I wished to raise the roof—6 or 7 feet, as the case may be. I then set the studding on the sill, placing them 16 inches on centers, and put on the plate of 2 x 4, doubled, the same as if I was building a new house. I always used new rafters for the reason that I made the roof steeper than the old one. In this way most of the old roof can be left on until the new one is finished, and thus protect the interior of the house from any storm which may come up while the work is in progress.

Trouble With Oak Casings.

From A. E. P., *Sparta, Wis.*—In answer to "J. E. H.," Sidney, N. Y., who asked with regard to oak casings, I would advise him to take them off and put up new ones, charging it up to experience, for the reason that they will always give him more or less trouble. Refined coal oil is good to kill the borers and it can be applied with a brush or cloth. I would suggest giving the wood several coats. I would say to the readers in regard to hardwood interior finish that more care should be taken to throw out the sappy pieces, as they are not worth putting on—they always look bad and spoil a good job, where a few dollars more would make a first-class piece of work.

Replacing Old With New Flooring.

From A. E. P., *Sparta, Wis.*—I notice on page 67 of the paper an inquiry from "J. J. D.," Cornwall Station, Cal., in regard to replacing old with new flooring. The correspondent in stating his question does not intimate, as I think he should have done, whether it is a single or double floor. If it is a single floor and the partitions were set after the flooring was laid, it is not practicable to take out the old flooring, and the best way is to lay the new flooring over the old one and cut off the doors to suit it. This, I think, would be the best way out of the difficulty. In case, however, it is a double floor, it will be very easy to take up the quarter round and then the old floor. If the second or top floor runs under the partitions, cut off with a chisel or saw close enough to the base, casings, &c., to make a tight joint when the new floor is laid. Then put the quarter round down again if he desires so.

Preparation of Drawings for Publication.

From INFORMATION, *Minnesota.*—Will the editor please publish in *Carpentry and Building* an answer to the following questions, which I know will be appreciated by many who would send drawings for publication if they knew in what form to prepare them. What is the size and quality of paper that should be used? What scale is the best to employ in making the drawings? Can you work from lead pencil drawings? Does coloring the plans make any difference? Would they answer if drawn in ink on manila paper? In answering the above I know you will accommodate me, and perhaps help many other readers.

Answer.—In preparing drawings for publication, almost any size and quality of paper may be used, according to the convenience of the person making them. Any scale may be employed, as in the process of engraving the drawings are photographed to the size required to suit the columns of the paper. It should be borne in mind, however, that it is not well to make the drawings too small, for the reason that the lines are likely to be indistinct and confusing. In a general way we would state that it is much better to have the drawings to a large rather than a small scale. For example, a good scale for elevations and floor plans is ¼ inch to the foot, while details of construction, interior trim, &c., may be all the way from ½ inch up to 3 inches to the foot, and even full size, for small sections.

We prefer drawings in ink rather than pencil, for the reason that they are more clear and distinct, and not so likely to become blurred in handling. We can use without trouble drawings in ink on manila paper, or in fact on any kind of paper, as stated at the outset. Coloring the drawings is not of any assistance whatever in the preparation of the engravings. We would emphasize at this time the importance of all our readers taking part in the discussion of trade matters which come up from month to month in this department of the paper, and we hope that no one will hesitate through a fear of lack of ability to prepare the necessary drawings, as all that we require are sketches indicating the idea intended to be conveyed.

Columns for Outside Work.

From P. A. E., *Sparta, Wis.*—In answer to "H. E. W.," Santa Barbara, Cal., with regard to columns for outside work, I would say that the cheapest and best columns are made of wood and bored in the center from end to end. The best kind of wood for the purpose, in my estimation, is cypress, but it may not be the cheapest in California. If the correspondent will send the sizes of the columns, accompanied by a sketch, to the A. T. Stearns Lumber Company of Neponset, Mass., they will give him prices, as they are large dealers in cypress lumber. I would also say that using a 6 x 6 inch square pine stick for the core as suggested by "H. E. W." is all right, provided he puts sweeps or circles around every 16 inches instead of 30 inches. The work, however, will not stand as well as the wooden columns.

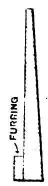


Fig. 1.—Section of Siding, showing Furring Tacked in Position.

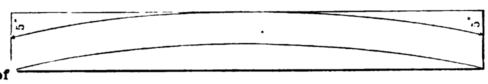


Fig. 2.—Showing How the Siding was Cut.

Weather Boarding a Circular Tower.

Weather Boarding a Circular Tower.

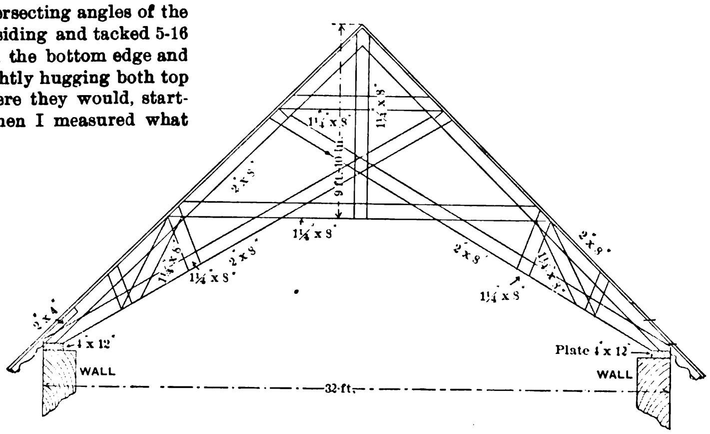
From J. E. S., *Grand Junction, Colo.*—In the November number of *Carpentry and Building* I notice a letter from "G. G. R.," New Philadelphia, Ohio, who wants to know how to weather board a circular tower with lap siding. As I had some experience about a year ago in a job of this kind, I will try and explain how I worked it out. The tower was a three-quarter circle of 3 feet 6 inches radius, and from the porch floor to the window sills there was to be no joint except at the intersecting angles of the main house. I took a piece of lap siding and tacked 5-16 inch furring, as shown in Fig. 1, on the bottom edge and then sprung it around the tower, tightly hugging both top and foot, letting the ends come where they would, starting of course from the middle. Then I measured what drop there was, say, 5 inches, although I do not recall that this was exactly the amount. I then took a ⅝-inch board, 12 inches wide, and with a thin stick struck my radius. After cutting it out to the circle shown in Fig. 2, I reduced the hollow edge to 5-16 inch, the same as any lap siding. Then when it was sprung around, starting, of course, from the middle, the ends came level. Now I might have studied it until I could go at it with figures and work out my radius on any size circle, but it was the first one I ever saw where the siding was sprung clear around, and as the other men had spent so much time and lumber we were glad to get it in the way we did. I have blocked off panels 2 to 3 feet long and sprung them in between, but this was new to me, as I do not think I ever saw one before. I do not know that this will be of any use to the many readers of the paper, but it is by noting the odds and ends that one is often saved many times the cost of a year's subscription to the paper. I know that had I seen anything on this particular subject before I could have saved a day or two of labor, besides numerous boards that went to the kindling pile through the other men trying to do the job by means of saw kerfs.

Starting a Business.

From A READER, *Indiana.*—Noticing that the columns of the paper are offered to subscribers in which to ask questions and discuss matters of trade interest, I have concluded to ask the advice of the readers in regard to a subject which I have long had under consideration. It is this: Is there a field in which a good mechanic could establish a paying business and build up a trade in the manufacture of special designs of fine furniture, inside finish, bracket work, grills, &c.? Take a man with small means, who would intend to grow as the business increased, starting with a small shop fitted with a few Seneca Falls Company's foot power machines, what would be the best method of procedure, and what, in the opinion of the readers, would be the best branch in which to commence operations, the location being on a direct east and west road, with good access to timber, &c. I am fairly well posted and versed in the prices and art of decoration, outside of the hand carving, most of which I could do myself. Any suggestions which the readers of the paper may give me will be thankfully received. I would like a business that is light and steady the year round, as I am tired of going from place to place as a carpenter, living in a small country town. I trust this communication will prove of sufficient interest to find a place in the columns of the paper and merit consideration at the hands of its readers. I am an interested reader of *Carpentry and Building*, especially of the articles on wood carving and designs of household furniture.

Gothic Roof Truss.

From J. F. W., *Danville, Pa.*—I inclose a sketch of a roof truss in answer to the inquiry of "E. E. C.," Whitesboro, N. Y. I do not think the design which he sends will stand very well, as it appears to me to be altogether too frail. The cross braces at A in his sketch, on page 19 of the January issue, come too near the center of the rafters. The sketch of the church roof which I inclose is one I have constructed here, the building having a slate roof. The truss will not spread if well spiked and built as shown. The trusses of the beams are placed 2 feet 8 inches on centers and the wall plates are 14 feet from the floor. The sketch shows so clearly what construction is employed that it does not seem necessary for me to describe it further.



Gothic Roof Truss, Submitted by "J. F. W."

Design for a Stone House.

From M. E. H., *Chestnut Hill, Philadelphia, Pa.*—I should like very much to see published the design for a French roofed house 16 x 42 feet, the material to be of rough stone. which is cheap here, as is also labor. The idea is to have on the first floor three rooms consisting of parlor, dining room, kitchen with pantry and back stairs from the kitchen. On the second floor it is intended to have three bedrooms with bathroom. I should like to know what it would cost to build such a house.

Finish for Slate Roof at Ridge and Hip.

From M. A., *Suffolk, Va.*—Will some one inform me how to make a ridge finish for a slate roof, the same being made from the slate with which the roof is covered, as shown by the inclosed drawings? I tried to put a ridge roll made of galvanized iron on the ridge and hips, but the architect claimed the effect was destroyed. Which is the better finish at ridge or hip, to have the slate lap and use roofing cement, or to have the ends butt together ?

Answer.—In Fig. 1 is shown a portion of a slate roof as derived from our correspondent's drawing. The hip finish is made by laying one row of slate with the edges parallel with the hip. To make this finish a hip board, which is about one-half the width of the slate used, is first nailed to the hip, as shown in Fig. 2. This board can be cut on a bevel, being 1 inch thick at the hip and ½ inch thick where

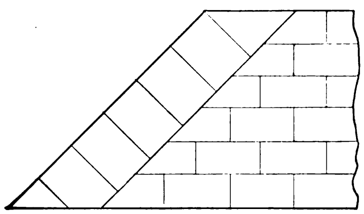


Fig. 1.—The Sketch Submitted by "M. A."

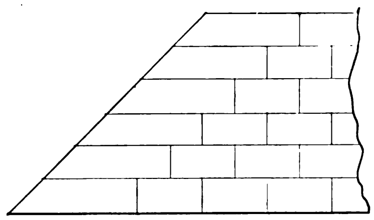


Fig. 3.—Double Width Slate Used at Hip.

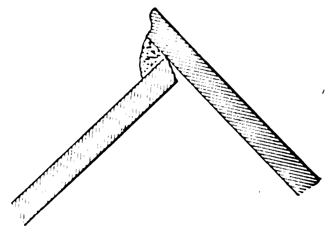


Fig. 5.—Lap Joint at Ridge or Hip.

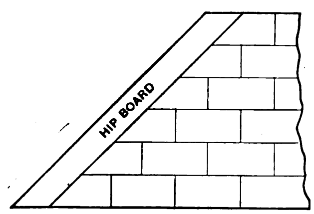


Fig. 2.—Strip of Board Applied to Hip.

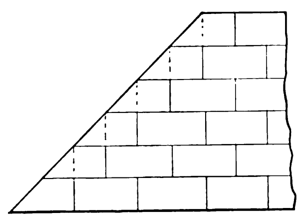


Fig. 4.—Finish Made with Slate of Usual Width.

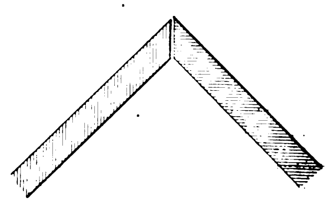


Fig. 6.—Butt Joint at Ridge or Hip.

Finish for Slate Roof at Ridge and Hip

the slate joins. The roof slate are then cut on a bevel so as to butt against the edge of the board. Paper can then be put over the boards, when the hip slate are to be laid as shown in Fig. 1, and secured by nailing. Another kind of finish is shown in Fig. 3, the hip slate being of double width, so that for a roof of the pitch shown they extend up the roof sufficiently to allow for proper nailing. If slate of ordinary width were used for this finish, as indicated by the dotted lines in Fig. 4, the slate would not extend up the roof far enough to be nailed. There are a number of methods for making the joints at hip or ridge. For the hip sheet metal caps can be placed over the hip joints, being so laid as not to be exposed, but extending up the roof far enough to be nailed and laid with each row of slate. The slate can be laid with butt joints at the hip, as shown in Fig. 5. Another method is to dispense with the caps and bed the hip joints in roofing cement. Lapping the slate, as shown in Fig. 4, and then filling with roofing cement does not give as sightly a finish as is shown in Fig. 5. For a ridge finish the last row of slate can be laid with butt ends, being laid in cement at the ridge. Another method is to place bent strips of sheet metal over the ridge, the strips to extend on either side nearly as far as the last row of slate. After these strips are in position the slate are applied. When finished without a ridge roll the nail heads can be covered with roofing cement. When making a butt joint, as shown in Fig. 6, the slate are to be cut from the upper side, thus giving the slate a beveled edge.

Hight of Chimney above Roof.

From J. J. D., *California.*—How far above the highest roof of a house should the chimney extend so as to give a good draft in all the rooms ?

Note.—Very much depends upon the location of the building and its immediate surroundings. If there is nothing to obstruct the current of the wind almost any distance above the highest point of the roof will give a satisfactory draft in the rooms within the house, provided of course the flues are of proper proportions and construction. If, however, there are objects adjoining the building which interfere with the currents of air the chimney should be made higher than the objects causing the obstruction.

Durable Roof Wanted.

From J. T. H., *Washington, D. C.*—Will common salt, such as is used for the table and cooking purposes, tend to destroy copper ? I am consulted with regard to roofing a bay window at a club house, on the top story of which is the kitchen, and the bay window roof, which is covered with galvanized iron with a wood grating on top, is used as a storage place for ice, &c. I saw a large bucket of salt on the grating, and of course in taking from the same more or less of it will fall on the roof. The roof is leaking and the salt has corroded the metal, or rather, there are rust spots showing, which are due to some cause or other. Please let me know if salt will destroy copper, and if copper would be better than galvanized iron for roofing purposes.

Note.—We think our correspondent will undoubtedly get better results by using copper instead of galvanized iron. If he will call to mind the fact that the sheathing of ocean going vessels is of copper it will show him that copper can resist salt water for an almost indefinite period. Salt is corrosive and it will show in stains on the roof, but copper will withstand the action for a very long time. We would advise him to use the precaution of putting on fairly heavy copper for the purpose.

Suggestions for Sash and Door Makers.

From C. J. W., *Virginia.*—I hope some of the readers of the paper will take up the suggestions of "H. E.," published in the March issue of the paper, as I think the subject is one which can be made interesting, especially if the methods used in small shops where there is no shaper, but all the work done upon the molder, are described. "F. G. J." of Denver could have cut his screw in the lathe in less time than he took to do it with paper and file; but more of this at some future time.

WHAT BUILDERS ARE DOING.

GENERAL building conditions throughout the country seem to be more prosperous than at the time of the last report, the smaller cities having more work under way than indications seemed to warrant at the opening of the season. The amount of work on hand in the large cities promises to maintain about normal conditions, with the possible exception of St. Louis, in which city the cyclone will doubtless cause an unusual amount of new building to be done this season. The territory lying west of the Mississippi, and particularly west of the Rocky Mountains, still continues to suffer from depression. St. Paul and Minneapolis report general conditions as being better than those of last year, but still far from satisfactory. In spite of the numberless individual cases of strike throughout the country, there seems to be a steady decease in the total number of differences between employers and workmen which are allowed to reach the strike or lock-out stage. Workmen seem particularly anxious to avoid stoppage of work in a large majority of cases.

Baltimore, Md.

Present indications point to about the amount of building in Baltimore that has been predicted, there being few signs of increased activity at the present time.

The annual meeting of the Builders' Exchange was held June 2, 1896, at the Exchange Building, corner of Charles and Lexington streets. About 110 members were present, and partook of a collation, after which the following officers were elected to serve for the ensuing year :

President, Isaac S. Filbert; first vice-president, William Ferguson ; second vice-president, P. M. Womble, Jr. ; third vice-president, George Mann ; secretary, E. D. Miller; treasurer, B. F. Bennett. Directors: E. L. Bartlett, James A. Smyser, George W. Starr, Wm. V. Wilson, Jr. ; Charles H. Classen, John H. Short, Henry A. Seim, John Trainor, E. Hall Haswell, E. D. Preston, Joseph H. Hellen and J. C. Doyle.

Boston, Mass.

The strike of hoisting engineers reported in last month's statement of the condition of affairs in Boston, while not officially declared off, is no longer obstructing the progress of business as it promised to do at the outset. The workmen have made an attempt to secure co-operation by the Master Builders' Association, asking its assistance in persuading the mason builders to come to some form of agreement. In view of the fact that the mason builders sought the esttablishment of a form of arbitration such as is in use between them and the bricklayers and stonemasons, and which agreement was refused as stated last month, the Master Builders' Association could take no action in the matter. The secretary of the Master Builders' Association, to whom the engineers addressed their communication, replied to the effect that he had always maintained the willingness, even the anxiety, of the workmen to become a party to any just arrangement which would result in the establishment of arbitration ; but that the hoisting engineers, by their action, had practically nullified this statement which he had repeatedly made to the employers. He felt especially disappointed at the action of the union, which he deplored as being likely to obstruct, for some period, any further conference or prospect of agreement between employers and workmen in this branch of the building business. Since the last report employers have had less difficulty in securing licenses for hoisting engineers owing to the activity with which the operations of the department have been prosecuted, largely as a result of urgency on the part of the Master Builders' Association. Early in June the carpenters of New England adopted a resolution looking to the establishment throughout the New England States of an eight-hour day on May 1, 1897.

Building continues active, with every prospect that the predictions of the earlier season will be fulfilled. The residence portion of the city and its suburbs are the scene of unusual activity. Aside from the strike of hosting engineers mentioned in the foregoing, there is little or no disturbance in the field of labor.

Buffalo, N. Y.

In the latter part of May the Builders' Association Exchange of Buffalo took action upon the demand of the carpenters for an eight-hour day. The matter was thoroughly discussed and finally referred to a committee, whose decision favored the adoption of eight hours under the recommendation that the time had arrived when the association should take action looking to the establishment of the shorter day. A portion of their report is as follows :

We therefore recommend the adoption of the following :

Resolved, That on and after November 1, 1896, the Builders' Association Exchange recommend that the members of this body engaged in the contracting business adopt eight hours as the rule for a day's work.

Resolved, That the rate of wages to be paid mechanics and laborers shall be by the hour.

Resolved, That the various employers in arranging with their employees for the adoption of the eight-hour day upon the basis of these resolutions request that in consideration of the reduction of the number of hours constituting a day's work the employees be requested to agree to :

1. Under no circumstances or condition to go out on a sympathetic strike.
2. Not to strike or discriminate against non-union men.
3. Not to interfere with contractors regarding the number of apprentices employed and to prohibit walking delegate or delegates from visiting works during business hours ; all of which is respectfully submitted.

We desire to 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 never be questioned or assailed; that upon it depends the security of our whole social fabric and business prosperity, and that employers and workmen should be equally interested in its defense and preservation.

Secretary J. C. Almendinger stated for the exchange that the action taken was not to be be considered the result of the demand of the carpenters, but that the exchange is taking what it considers a wise and progressive step, the object of which is the betterment of conditions affecting employers and workmen alike, and that its action was purely recommendatory to the various separate trade organizations within its membership. The action seemed to meet approval generally, the only objection manifested by the workmen being opposition to the limitation of what they claimed to be their right of sympathetic strike. Reports from employers and workmen vary greatly as to the situation, the majority of employers claiming that they have a sufficient number of workmen for their needs, and the workmen stating that their strike is going forward as successfully as could be expected.

The recent accidents to buildings in course of repair, with attending loss of life, has created unusual activity in the Department of Building. The superintendent is exercising unusual care, and hopes to highten the efficiency of his department so that such accidents shall be no longer possible.

There has been no change in the prospect of building to be done from the amount anticipated in the past reports.

Chicago, Ill.

The amount of work on hand in the building trades is steadily increasing, although there is no prospect of an excessive amount of new work coming into the market between now and the close of the season. It is thought that the year will not reach in amount of work done the figures established by some of the more prosperous seasons of the past, but the majority of the contractors are being kept busy and there seems to be comparatively little complaint on the part of the workmen. The Builders and Traders' Exchange on May 29 had a large meeting and adopted resolutions offering $500 for the relief of the St. Louis sufferers, the amount to be distributed through its sister organization in the stricken city. The St. Louis Exchange gladly accepted the offer and the amount was immediately forwarded.

During the month of May an exchange, to be known as the South Side Builders and Traders' Exchange, was established, with rooms at the corner of Sixty-third and Halsted streets. The objects of the exchange are similar to those of the downtown organization, and it is intended especially to benefit those contractors doing business in the outlying districts in the southern part of the city. T. P. Hughes was elected secretary.

Detroit, Mich.

The building business is reported as being duller in Detroit than it has been at any time during the past ten years. With the exception of necessary repairs and the erection of a few business buildings and a relatively small number of residences, there is practically nothing doing. The recent attempt of the carpenters to bring about the establishment of a new wage scale and uniform hours of labor was made at a period which was unfavorable to any effective action, because of the scarcity of work and the anxiety for employment on the part of non-union men. However, greater solidity of union workmen was established, and the ultimate outcome will probably be an increase above the present exceedingly low scale. An attempt was made during the early part of June to harmonize unions belonging to the two national carpenters' organizations. The Builders' Exchange is still holding its own in spite of the dull times and is in excellent condition both as regards its finances and membership.

Indianapolis, Ind.

As compared with former seasons the amount of building on hand in Indianapolis shows a decrease, although the majority of the principal contractors are fairly busy. There has been no disturbance of any importance among the unions during the season, and there is little prospect of unfavorable change.

At the annual meeting of the Builders' Exchange the following officers were elected :

President, George W. Stanley ; vice-president, S. W. Hawky.

Directors—H. C. Adams, J. E. Twineham, O. D. Shover, D. W. Sullivan, John Martin, Conrad Bender, H. H. McGaffey and J. C. Adams.

A vote of thanks was tendered to H. C. Adams and Charles E. Balke, the retiring president and secretary, for the manner in which they had conducted their offices. The reports of the secretary and treasurer showed the exchange to be in a flourishing condition.

Kansas City, Mo.

The annual election of directors of the Exchange Building Association, June 2, retired seven old members. The new directory is as follows : Richard Gentry, George W. Jones, Webster Withers, C. J. White, J. V. C. Karnes, W. A. M. Vaughan, W. H. Chapman, J. K. Davidson, E. D. Fisher, Howard M. Holden, J. W. Moore, J. A. Robinson and C. M. Whitehead.

Louisville, Ky.

It is reported that Louisville builders are attempting to establish a new exchange, it being stated in the *Courier Journal* of June 9 that a meeting was held for that purpose. At this meeting John Greiner was elected president and P. J. Gnau secretary. On the same authority it is stated that the old exchange seems to be losing its efficiency and that it is hoped a new organization will infuse new life into the contractors and bring about many necessary reforms. Up to the present time Louisville has been practically free from any serious labor disturbances, and so far as any demands are concerned there is little likelihood that such work as is in progress will be hindered by any action on the part of the workmen.

Milwaukee, Wis.

The builders of Milwaukee report that the building interests of the city are steadily recovering from the long depression of the past three or four years, and that the present outlook is more hopeful than at any time during the period mentioned. There are listed upon the board at the exchange for the benefit of contractors and supplemented by plans in the hands of the secretary calls for bids for an asylum for the blind at Janesville, Wis., to be erected by the State; a German Lutheran church at Racine, to cost between $10,000 and $12,000; a schoolhouse at Kankakee, Ill., to cost about $10,000, and an electric light plant, engine and boiler house for the State prison, at Waupun.

The members of the exchange are preparing for their annual outing, the date of which at this writing has not been fixed. It is hoped that representatives from other exchanges throughout the State may attend as visitors in order that the prosecution of the establishment of the State association may be assisted through the social contact of the builders. No strikes or lockouts of any magnitude have been reported during the past month.

New York City.

The records of the Building Department of New York City show the number of plans of new structures filed during the first five months of both 1896 and 1895, together with their estimated aggregate cost each month of both years. The figures are interesting and show the extent to which building operations have fallen off this year as compared with a year ago. The record is as follows:

	1896.		1895.	
	No.	Estimated cost.	No.	Estimated cost.
January	294	$7,301,670	191	$4,846,603
February	187	7,006,095	424	11,019,965
March	355	9,209,970	483	11,305,285
April	318	4,334,830	428	8,184,525
May	378	7,680,025	516	10,334,715
Totals, 5 months	1,532	$35,532,590	2,042	$45,691,093

During the latter part of May the General Society of Mechanics and Tradesmen held their annual exhibition of clay modeling and architectural and mechanical drawing. The exhibition was one of unusual merit and reflects great credit upon the management of the institution. The work shown was in almost all cases that of pupils who are employed in the various building trades during the day, and who study at the institute in the evening. The purpose of this department of the institute is to give instruction in the finer departments of the trades in order that the pupils may obtain that knowledge of the principles involved which they often fail to acquire when dependent upon practice without instruction.

The one hundred and tenth annual report of the society shows that during the year 1895 the net income was $50,733.24; disbursements, $51,538.14; total revenue, $64,744.65; total expenditures, $62,150.64; cash balance December 31, 1895, $2594.01.

The efficiency of the school was increased last year by improved apppliances and methods of instruction. The average attendance was 170 in the male department and 58 in the female department.

The Department of Buildings has established a branch office at 2775 Third avenue, so that plans for buildings located in the Twenty-third and Twenty-fourth Wards may be filed there or at the main office, examinations being made at the latter place.

The Building Trades Club will have their third annual outing on June 25, the objective point being Iona Island, up the Hudson. A steamer has been specially chartered for the purpose, and we understand a *table d'hôte* dinner will be served on board. These outings have in the past been the means of bringing together socially members of the building and allied trades, and it is expected that the oue this year will be the most enjoyable of all.

Philadelphia, Pa.

The building business in Philadelphia promises to be one of unusual activity in the amount of residence work done. One single permit recently issued for 32 brick and stone dwellings at the corner of Jefferson and Sixth streets is an indication of the character and amount of this work, although this permit was an exceptionally large one. There has been no disturbance during the past month among the union workmen, and aside from some grumblings occasionally heard, from various quarters, there is little likelihood that any unpleasant change will occur.

The members of the Master Builders' Exchange report business as being satisfactorily active, but think more could be handled if presented.

The exchange is in excellent condition, steadily increasing its membership and widening its influence for good among the builders of the city.

Pittsburgh, Pa.

On May 13 the stone masons within the Greater Pittsburgh territory struck for an advance in wages from 30 to 38 cents per hour, and the employers were informed that no work would be thereafter done under 38 cents. A conference was subsequently held between committees representing the employers and the workmen at the Builders' Exchange and the difference over wages was compromised. After a lengthy discussion it was agreed to establish a uniform scale of 35 cents per hour, with the understanding that the workmen are to insist that all employers, whether in or out of the exchange, shall pay not less than that amount. It is reported that an effort is being made by the Building Trades Council of the city to secure the adoption by all its affiliated unions of a form of arbitration similar to that advocated by the National Association of Builders, which comprehends the establishment of a joint committee and under which no strikes nor lockouts can occur pending the settlement of difference. Up to the present time the matter has not been definitely settled, and the ultimate adoption of the system is still undecided.

Providence, R. I.

The building business in the city is of good volume and all mechanics have something to do. Peace reigns in all departments of constructive work with the exception of the plumbing trade, where a strike exists which at the hour of writing seems likely to continue for a while, as both sides seem to be determined to carry their points. Builders are looking forward to a busy summer and fall, as there is considerable work in sight. The bids on the East Side High School of the Sixth Ward Grammar School were rejected and new bids were advertised. The foundations for the State House are under way, but, like all construction of this character, is progressing slowly, and it is intimated that the year 1900 will have opened before residents will be able to point it out to visitors as a thing of beauty. The contractor for the Normal School is waiting for the terra cotta, although the walls are ready for the roof. The new railroad station is under contract and men are at work, but the structure will proceed slowly until the stone is cut for the foundations, when it is expected that it will rise rapidly to the roof.

In the item published last month relative to the bricklayers the statements made were somewhat misleading, as Secretary Cady of the Builders and Traders' Exchange writes us that there has been no move on the part of the bricklayers for an eight-hour day or for an advance in wages. The contractors are paying from 33 to 40 cents an hour for a nine-hour day, and while all are busy, the best of feeling exists between employer and employed.

St. Louis, Mo.

Reports from St. Louis are to the effect that it is beyond the power of words to describe the awful destruction caused by the recent cyclone, and that it will be impossible to predict how soon the destroyed buildings will be restored. Efforts in the building business are now being concentrated on the ruined portion of the city and order is beginning to assert itself where chaos reigned. The following from the *Globe-Democrat* of June 9 is an excellent description of the situation of affairs in this respect:

Contractors, builders and merchants who supply building material report an abatement of the great activity in the building industry occasioned by the necessity for immediate repairs after the tornado. At the Builders' Exchange the opinion prevails that the big flurry is over, and that henceforward the building industry will take its regular course along established channels. It is confidently predicted by a number of substantial contractors and builders that the present building season in St. Louis will be one of greater activity than it has known for several years. The lull occasioned by repairs is looked upon as only a flurry. The steady and heavy work is expected later, when property owners whose houses have been mostly or totally wrecked let contracts for new houses or partial reconstruction. Owing to the general scare about rumored high prices in labor and building material it is not anticipated that work will be commenced upon badly demolished buildings for a few weeks. Not until the flurry occasioned by repairs is practically over do the builders expect to be called upon for estimates on restoring or rebuilding the structures which were most severely damaged.

There is a general complaint among the builders that the flurry caused by repair work has crippled the building industry in districts outside of that injured in the tornado. Buildings which, in the regular course of events, would have now been under way, are still mere outlines on paper, resting snugly in a pigeon hole of the projector's desk. Not until prices for labor and material have ceased to fluctuate do the builders and contractors expect any new building to amount to anything. When matters concerning the building trades have settled down to some definite basis or standard, new building, reconstruction and repairing on a large scale is anticipated.

The builders are still compelled to pay 2½ per cent. increase over pre-tornado prices for window glass. Labor is reported in abundance. There is no scarcity of carpenters. Of the trades, the bricklayers alone have obtained an increase in wages since the storm. The regular schedule of wages for bricklayers is 55 cents per hour. The bricklayers have been receiving since the storm an average of 75 cents an hour.

By some means a rumor gained currency that dealers in builders' supplies, contractors and workmen were charging exorbitant prices as a result of increased demand owing to the cyclone, but upon investigation it is found that there is no basis for the charge, there being comparatively little rise in prices of any kind. Contractors in both St. Louis and East St. Louis have virtually agreed that no prices shall be increased at the present time. Wholesale dealers in building materials are taking steps to counteract the impression that prices will be advanced, and disclaim the responsibility of extortionate prices charged by the jobbers.

The Building Trades Council has established a free employment bureau at 218 North Eighth street, which is in charge of Henry W. Steinbeiss. Mr. Steinbeiss is authority for the statement that the city is already overcrowded with applicants for work in all branches of the building trades, there having been a large influx of outside workmen since the storm. It is predicted by architects, real estate men and others that in spite of the terrible disaster the city will ultimately be benefited by the opportunity for reconstructing buildings in the path of the storm much more substantially than before.

The Builders' Exchange has received from each of its sister exchanges in Chicago and Boston $500, and has itself contributed a like sum to be used as a relief fund. The exchange has also decided to abandon its annual steamboat excursion, and the amount of money set aside to be used for this purpose has been included in the fund. Great care is being exercised in the distribution of the money, and the relief work accomplished by the exchange is being most effectively conducted. The committee having charge of the fund consists of Phil. C. Ring, P. Mulcahey, J. L. Guedry, Stephen O'Connor and Wm. J. Baker.

Notes.

Builders of Bloomington, Ill., report an unusual amount of work this season. Contractors and supply dealers as well as the workmen are reported as being particularly well satisfied with the outlook.

Fond du Lac, Wis., is reported as being in the midst of a building boom. Amount of work now on hand is greater than at any time during the past few years.

Spokane, Wash., reports a building boom in progress. The Northern Pacific car shops are progressing rapidly, and the company are also erecting a round house and station.

The builders of Augusta, Maine, are happy over the unusual briskness of building. It is stated that there is more work going on at present than has been under way at any time since 1893.

A recent strike of painters in Kansas City has been settled by a compromise of 30 cents per hour. The union demanded the recognition of the working card system, which was denied by the employers. The new scale will go into effect on July 1.

ARCHITECTURAL DRAWING FOR MECHANICS.*

By I. P. HICKS.

If the student has thoroughly learned the principles that have been set forth in the preceding figures he should now be able to more readily grasp the ideas of perspective, and not be at all discouraged as the lines increase in number with the more complicated figures.

We will take for the next example a carpenters' tool chest, which is a plain, easy figure, with length, width and hight, and an object which will bring into use the best method of making perspective drawings.

Referring to Fig. 58, we will produce a perspective figure in accordance with a plan, side and end elevations. Draw the horizontal line and P L V, and find the vanishing points as previously given. The ground line and picture plane line are then assumed at convenient distances. Draw the plan to the actual geometric scale of the chest, and at an angle of 45 degrees with the P L V, as shown. The two outer lines represent the base and size of the top, the two inner lines represent the size of the panel in the top. Next lay off on the inside base line the exact location of the stiles of the panels for the side and end of the chest. These are represented by arrow-pointed marks, as shown. The marks for determining the perspective size of the top panel have been transferred to the outside line of the base, as the same line represents the full size of the top. The hight line is drawn by running parallel with the plan to picture plane line, and from this intersection perpendicular to the ground line, as shown. Next draw the retreating ground lines. Set off the hight on the hight line according to the actual scale of the elevations and draw the retreating line of the top and end through this point to the P L V, which will establish the perspective hight in full. The perspective hights of the different members are determined by setting off the actual scale of the elevation on the diagonal line across the end of chest and drawing lines from the vanishing point through the points set off on the diagonal line to the P L V. The reason for this method of proceeding will be made plain in the next drawing, prepared especially for the explanation. The perspective widths are determined by drawing lines toward the S P until they intersect the picture plane line, and from this point then drop to the perspective figure on which it is desired to establish the proportional perspective widths. The diagram is very plain, and if carefully studied will convey to the mind of the student the method of establishing perspective distances better than any further description can do.

In Fig. 59 is represented a partial sketch of Fig. 58, representing the end of the chest in perspective in open lines without shading, in order to show more clearly the use of the hight line and the scale. The hight line is found by running parallel with the side of the plan to the picture plane line and from this point perpendicular to the ground line. The perspective hight is found by setting off on the hight line the actual scale hight of the elevation, as A B, and drawing a line from the vanishing point through the point B to the P L V or central line of vision, as shown. This establishes the full perspective hight, but as there are several different members which go to make this hight we must have some means whereby we can set off the hight of each member respectively. It is plain to be seen that we cannot start from A on the ground line, and if we were to start from the retreating ground line at C and set off the hights according to the actual hights of the elevation scale it would make the drawing all out of proportion. The cause of this is apparent, as the hight line A B reduces the hight of the perspective from that of the elevation the distance from A to C, so that the actual hight of the perspective is the distance C B. Thus the scale of the perspective is reduced, and in order to set off proportional hights on the hight line C B we must work out a proportional scale or adopt another method whereby we can use the elevation scale. It is a very difficult matter to work out a scale for a perspective drawing that would exactly correspond with the elevation scale, and even when the scale is found it might be a very difficult one by which to draw, on account of the small divisions it is often necessary to make to carry out the proportion of the different parts to each other. For example, take Fig. 59, and

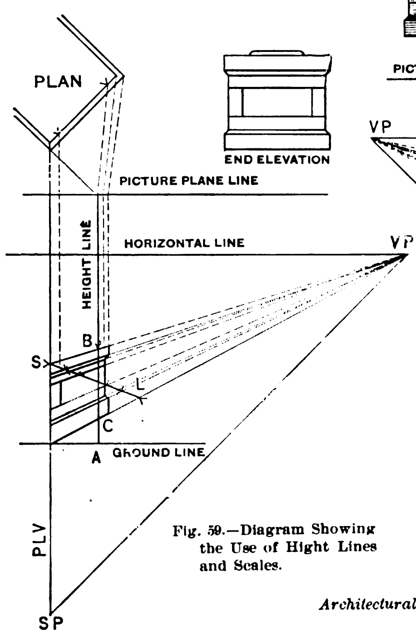


Fig. 59.—Diagram Showing the Use of Hight Lines and Scales.

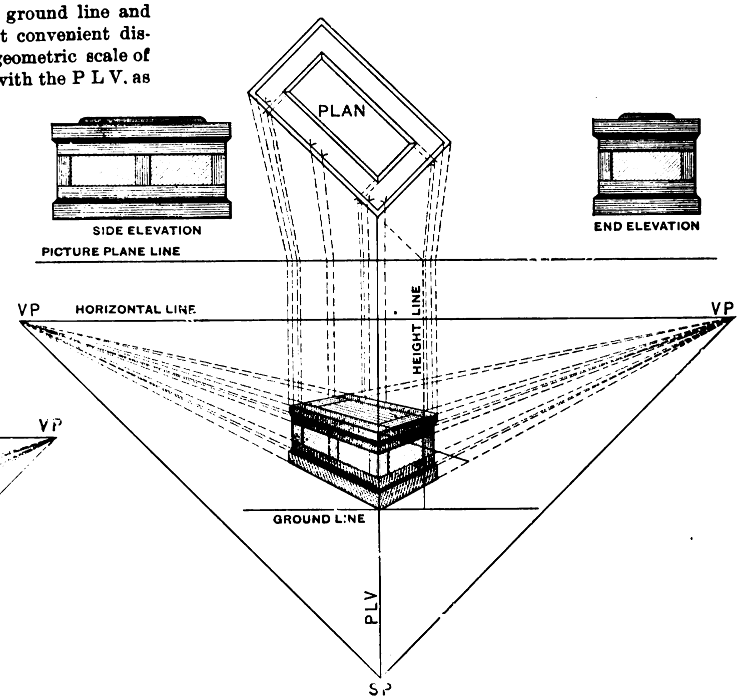


Fig. 58.—Practical Application of the Best Method of Producing a Perspective Figure.

Architectural Drawing for Mechanics.—Scale of Diagrams, ⅜ Inch to the Foot.

* Copyrighted, 1894, by I. P. Hicks.

with an elevation scale of $\frac{1}{8}$ inch to the foot, the scale of the perspective would be a little less than $\frac{3}{8}$ inch to the foot, which would be found a very inconvenient scale by which to transfer hights from the elevation to the perspective. The method of figuring out the scale is as follows:

Take the scale of the elevation in sixteenths for the third term, which is 8; for the second term take the actual hight of the perspective in sixteenths on the hight line from C to B, which is $9\frac{1}{2}$, and for the first term take the scale hight of the elevation in sixteenths, which is 13. We now have a mathematical expression, as follows: $13 : 9\frac{1}{2} :: 8 :$ to the scale required. The operation is easy—$9\frac{1}{2} \times 8 \div 13 = 5\frac{11}{13}$ sixteenths of an inch to the foot, the scale of the perspective drawing by which the hights would have to be established if set off on the line from C to B.

Such scales are not practical, and only tend to worry and confuse the mind of the student. A very simple and practical method of setting off the hights of different members is by means of a scale line, which may be easily drawn after the full perspective hight has been determined. Take the actual scale hight of the elevation, which is shown in the perspective by A B, and set it off from S to L, intersecting the retreating ground line. This line we will call the scale line, and the hight of the different members may be set off on this line according to the elevation scale without any complications of figures and changing of scales. The distances are set off on this line as indicated by the arrow points, and lines drawn from the vanishing point through these points to the P L V will establish the perspective hights of all the different members to the finest point it is possible to obtain and in the most practical manner.

(To be continued.)

Design of a Stained Glass Window.

A beautiful example of the effects that may be produced in stained glass is a window recently completed for the Masonic Home in St. Louis, Mo. The window measures 3 x $4\frac{1}{2}$ feet in size and has a border of Gothic design. The half tone engraving which we present herewith is a reproduction of a photograph of the window, but hardly does the work full justice. The picture represents two children, one gathering flowers, while the other is shown in the attitude of pursuing a butterfly. Both are at the edge of a cliff, while immediately behind them is shown a guardian angel with arms outstretched in protection. In the distance may be seen a series of hills with a busy town at their base, while a broad stream flows between it and the cliffs upon which stand the children. In the window itself the effect is particularly fine, and the work is executed with a high degree of artistic skill. The design was made by A. H. Wallis of St. Louis, Mo., after a painting by Plockhorst, the celebrated German artist, who is a graduate of München University and is regularly employed by Mr. Wallis in the production of his art work.

Design of a Stained Glass Window.

An Old House.

The oldest house in the United States is claimed to be that of Dr. Carver of St. Augustine, Fla. In it he has surrounded himself with a collection of antiquities connected with the history of Florida and the Spanish, who once ruled it, that is of itself a veritable museum. The house was built in 1562, and was occupied by monks before St. Augustine was founded. In some places the wood has rotted away and has been renewed, but much of the old hand hewn timbers and boards are still in fine preservation, and the walls and floors, of powdered shells, made into a plastic with sea water and hardened with age, are still as firm as adamant. Some partitions in the house and several of the doors are the very parts taken from the cabin of a vessel found wrecked upon the shore when the house was built, and are of Spanish cedar. Dr. Carver's collection of curiosities contains relics connected with the first Spanish settlers that date back into Moorish history 1000 years ago.

Making Alterations on Tracings.

In responding to an inquiry for a method of obliterating spots made by accidental spattering of water on tracings, the editor of the *American Machinist* suggests the use of a stick of talc, or "metal workers' crayon," as it is called, and says: "There is, so far as we know, no metho of entirely obliterating such spots, but they may be largely mitigated by careful rubbing with this crayon. The same treatment is also very helpful for obliterating the effects of erasures by the penknife or eraser. The effect of the crayon is to renew, in a great measure, the original glossy surface, and thereby make it feasible to redraw lines over the surface without danger of the ink spreading by running into the fibers of the cloth. It also overcomes the tendency of such spots to collect dirt and so become an increasing eyesore as the tracing gets older. Tracings so treated will make blue prints showing no, or at most but slight, evidences of the erasures. The crayon should be sharpened to an edge like a drawing pencil, and then carefully and thoroughly rubbed over the erasures or other blemishes. If our draftsmen readers will obtain such a crayon they will not again be without it. They may be obtained of the D. M. Stewart Mfg. Company, Chattanooga, Tenn., who, as far as we are aware, do not know of this use for their crayons, which are made especially for the use of sheet iron workers.

The Builders' Exchange

Directory and Official Announcements of the National Association of Builders.

Officers for 1896.

President,
Charles A. Rupp of Buffalo.
First Vice-President,
H. J. Sullivan of Milwaukee.
Secretary,
William H. Sayward of Boston.
Treasurer,
George Tapper of Chicago.

Directors.

Noble H. Creager	Baltimore.
E. Noyes Whitcomb	Boston.
John Feist	Buffalo.
William Grace	Chicago.
Richard Helson	Detroit.
Frank L. Weaver	Lowell.
Louis A. Clas	Milwaukee.
Stephen M. Wright	New York.
Stacy Reeves	Philadelphia.
Thomas B. Ross	Providence.
Justus Herbert Grant	Rochester.
Thomas J. Ward	St. Louis.
George J. Grant	St. Paul.
A. S. Reed	Wilmington.
George H. Cutting	Worcester.

Semi-Annual Meeting of the Massachusetts State Association of Builders.

The first semi-annual meeting of the Massachusetts State Association of Builders was held in Worcester on Wednesday, June 10. The three filial bodies, Boston, Lowell and Worcester, at present constituting the association were well represented. Invitations to send visitors to the convention were extended to organizations in Salem, Fitchburg, New Bedford, Springfield, Lawrence, Marlboro, Fall River and Pittsfield.

The meeting was held in the rooms of the Worcester Exchange and was called to order at 10.30 a.m., with President Chas. A. Vaughan in the chair. President Vaughan welcomed the delegates and visitors on behalf of the Worcester Exchange, of which he is also the president, and briefly alluded to the need for work in the field occupied by the association. Messrs. Hersey of Boston, Conant of Lowell and Kendall of Worcester were appointed a Committee on Credentials.

Secretary's Report.

The secretary next called the roll and read the records of the first meeting, and the president having no formal report to make, the secretary presented his report, which took the form of an extended address, which may be roughly summarized as follows:

After presenting a *résumé* of work done since the establishment of the association, and enlarging upon the importance of the preparatory work being carefully and thoroughly done in order to secure the future welfare of the association, the secretary said: "As a local exchange cannot attain effective existence without a membership sufficient to give weight and dignity to action, so it is with this association. The State association is dependent, in attempting to guide and protect the interests of builders, upon a sufficient membership to insure respect for its counsels and support for its efforts. In considering future accessions of membership to the State Association, the members of local exchanges must not make the error of concluding that in urging affiliation, the State Association has anything to gain for itself. At no time in its history can the association itself profit in any way by the increase in the membership. Affiliation will be urged solely on the ground that increased membership in the State Association will insure increased harmony of business methods and greater strength among the various local bodies of builders in the State, so that the evils that constantly injure and menace the welfare of the individual builder may be more successfully combated. The efficiency of an organization is, in a measure, limited by the proportion its membership bears to the whole number of the fraternity in which it exists, whether the fraternity be composed of individuals or of organizations. It is obvious, therefore, that in order to attain the efficiency desired for it the State Association must represent a sufficient number of organizations to constitute a working majority in order to assure significance and weight to its recommendations. An organization whose action does not represent the voice of a majority of the individuals or organizations in the particular trade or field in which it exists is limited in power, and its work is confined to the announcement only of principles and purposes until such time as its membership is large enough to enable it to extend its action to the enforcement of the principles and purposes for which it stands. In order to render effective service, the State Association needs a membership of sufficient proportions to represent a majority of the best builders of the State; in other words, the builders of the State need to combine in sufficient numbers to control the conditions which menace or injure them as a body and as individuals. An organization of good men, however small in numbers, may define the needs common to all, in their profession, with reasonable accuracy, and formulate efficient methods for satisfying those needs; but the enforcement of those methods depends upon the harmonious and united action of a majority. In practice, in the building trades, the pioneer exchanges in the National Association, at much labor and expense, have formulated methods of action, codes of practice, &c., and sought by every means in their power to obtain their universal establishment. As the various methods defined for improving the transaction of the building business have become known, they have been adopted by outside exchanges already in existence, and have formed the foundation upon which new exchanges have safely established themselves. These outside exchanges, almost without exception, have absorbed all that their sister organizations have labored to define and obtain and have made public through the National and State Associations, without making the least acknowledgment of obligation or in any way seeking to discharge the debt they owe.

"It is the plain duty of every builders' exchange in Massachusetts to become a part of the effort to better the conditions under which the building business is transacted. The motive in establishing the several exchanges is, in spirit, exactly alike, and every member that believes in bettering the conditions by which the building business is surrounded must believe in bettering them in the most efficient manner and to the utmost extent. It is self evident that greater and more widespread results can be produced by unity of action than can possibly follow diversity of action, even though the purpose of the several parts may be the same. Every exchange owes it to the welfare of its members to join the State Association and to contribute its share of brains, effort and money; for the work of the association benefits the whole fraternity and the whole fraternity should contribute to its support. No exchange, in the State, should be liable to the humiliating charge that it has appropriated the results of the labors of its sister organizations and refuses to pay its debt by helping to perpetuate those labors and to support a work whose value they have admitted by their action."

Duties of an Exchange.

The secretary next proceeded to a discussion of the duties of an exchange after it has attained membership in the State Association, pointing out the obligation to give active service in the effort to produce those beneficial conditions in which its membership signify its desire to participate. In considering the attitude taken by most of the local exchanges toward the cost of maintaining the State and National Associations, the secretary laid unusual emphasis upon the fact that the questions invariably asked are: What will it cost? and What will we benefit? and never, What can we do for the general welfare? The attitude of such exchanges as look only at the cost when considering membership was likened to a buyer simply searching for a good bargain; the association being deemed a seller and the dues purchase money for a given commodity. The largest the annual expense of maintaining the working machinery of the National Association of Builders has ever been was $3 per member of the local exchanges, and during the present year its affairs have been prosecuted at an expense of $2 to each member of the filial bodies. The expense to the individual member of an exchange belonging to the Massachusetts State Association during the current year is $2.50, of which $2 is the amount devoted to maintaining the National Association and 50 cents of which is the State Association assessment. It would be hardly fair to assume that any builder doing business in Massachusetts would be unable to pay $2 50 toward the support of any work which he considered worthy; and although the sum paid by an exchange of 100 members, for example, would be $250, the cost per individual is still only $2 50. There is little question that every exchange in the State would join both the State and National Associations if there was no expense connected with membership, and yet by some sort of mental hocus-pocus every member of a local exchange seems to feel as though he was paying out of his own private purse the whole sum assessed upon his organization. If an individual member, believing the work of the association to be beneficial, were asked if he would pay $2.50 once a year to its support, his answer would undoubtedly be yes; but if asked if his exchange of 100 members should pay $250 to its support he hesitates and begins to count the cost, losing sight entirely of the fact that the expense to him remains unchanged

It is almost impossible to make a distinction between exchanges that hesitate to join on account of the cost and those who hesitate because of uncertainty as to the benefits resulting from the work of the association; for, with few exceptions one and all appropriate all that they find beneficial without lending the support of their assistance to the establishment of unity and harmony. Few exchanges, if any, hesitate from an uncertainty as to the wisdom of co-operating with the affiliated bodies in the work they, under a form of organization, are attempting to perform. Such being the case, failure to affiliate must be attributed to lack of understanding of the nature and effect of the efforts of the association, and a consequent stumbling over the cost.

Function of an Exchange.

The secretary next discussed the function of the exchange in the association and then the function of the individual, and closed with specific reference to the objects against which the work of the association should be directed. Under the last head he said: "We are here to devise plans under which we can combine our efforts and under which we shall be able to defend ourselves against abuses from any and all sources. We are here to define wherein the contractor is right and wherein he is wrong in his relations to the owner, to the architect, to the general contractor, to the sub-contractor, to the workmen, to the apprentice, to the dealer in builders' supplies and to all those with whom he comes into business contact. Methods must be adopted for guidance in matters pertaining to the manner in which bids should be solicited, estimates received and treated, conditions of contract, settlement of differences under contracts, bonds on contracts, forfeitures in time contracts without premium for completion within the limit, arbitration between exchange members and between employees and workmen; a just apprenticeship system, and in all matters pertaining to the transaction of the building business. Methods must be devised for placing the work and purpose of the association before the builders in every city in the State in such wise as shall be convincing of its beneficial character and of the obligation of all to combine for the general welfare.

"The future of the association depends upon the thoroughness with which we do our work now, and the ability with which the value of associated effort is presented to exchanges not yet affiliated. There is nothing that would conserve the interests of builders which we cannot accomplish if we but have patience and persistence, for there is no surer truism than that 'patience and perseverance conquereth all things.'"

The secretary's address was listened to with closest attention and appreciation.

A resolution was presented by the Boston Exchange, and adopted, asking the Executive Committee to consider the advisability of employing legal counsel to watch legislation relating to the building interests, and to report at the annual meeting.

The delegates discussed the questions of prices of building materials, means for wiping out irresponsible contractors, the affiliation of all exchanges in the State, and others of interest to the fraternity.

The business of the meeting was finished in time to allow the delegates to accept the invitation of the Worcester Exchange to dine at the Wapiti Club house, which is on an island in Lake Quinsigamund. Special conveyance was provided to the lake, where the delegates and visitors embarked in a little steamer for the club. The dinner tendered by the Worcester builders was a most enjoyable one, and the whole affair, including a ride about the beautiful lake on the return trip, was most delightful.

THE fourth annual graduation exercises of the Baron Hirsch Trade Schools at 225 East Ninth street, New York City, were held on the evening of June 20. The four floors of the building were filled with exhibits of what the pupils had learned during the term of five and a half months. Certificates of graduation from the four departments of carpenter work, machinery, plumbing and painting were presented to 37 pupils. It was stated by the superintendent of the schools that a record of the graduates of the school showed that 83 per cent. of them were at work in their trades.

Definition of "Party Wall."

We have no doubt that many of the readers of the paper will be interested in a point of law relating to the definition of a "party wall," which recently came up for argument in the English courts. A firm of storekeepers were summoned to appear in court on the charge of having violated the London building law by piercing openings in a party wall, the section of the law bearing on the case reading as follows: "Every party wall shall be carried up of a thickness in a building in the warehouse class equal to the thickness of such wall in the topmost story above the roof flat or gutter of the highest building adjoining thereto to such a hight as will give a distance of at least 3 feet measured at right angles to the slope of the roof." The wall in question divided one portion of the defendant's warehouse, one story in hight, from another portion, five stories in hight. The defendants contended that only the portion of the wall to the hight of the one-story part of the warehouse could properly be classed as a party wall, and that above this hight it should be classed as an exterior wall. The court sustained the defendants in this contention.

THE Executive Committee of the Improved Housing Council in New York City, who recently called for plans for a model tenement block, have, out of 20 or 30 plans received, selected those of three architects. These three plans have been finally referred to a sub-committee, who are to report on them within a short space of time. The Association for Improving the Dwellings of the Poor, of which the Improved Housing Council is a part, have finally decided to build a set of model tenements according to the plan finally selected. It is reported that a site for the first eight of these tenements, which are to occupy a whole block, has been determined upon, and negotiations for the purchase of the ground are now under way.

CONTENTS.

Carpentry and Building

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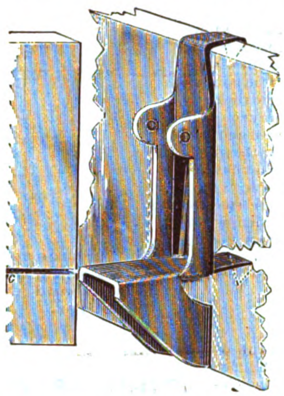
NOVELTIES.

The Daly Joist and Wall Hangers.

A form of joist hanger possessing features of interest to a large class among the readers of *Carpentry and Building* is being introduced to the building trades by the Daly Stamping & Mfg. Company, with office at the corner of Fourth and Porter streets,



Novelties.—The Daly Joist and Wall Hangers.—Fig. 1.—View of Joist Hanger, Showing Method of Application.

Detroit, Mich. This hanger, illustrated in Fig. 1 of the engravings, is offered under the name Daly, and is stamped from 8, 10 and 12 gauge of sheet steel, of no less than 64,000 pounds tensile strength to the square inch. The makers state that the lightest hanger is guaranteed to stand a breaking strain of not less than 5000 pounds. An important advantage claimed for the Daly hangers is that the headers or stringers are not weakened by cutting or boring away part of the timber, as the hanger is put in position by placing its points on the joist center line and driving them through the header, when the points are turned over and clinched, thus clamping together the fibers of the wood and giving it additional strength, so that it will hold even cross grained timber from splitting. The company also refer to the bracket like shape as increasing its carrying capacity and holding the joist in position. The en-

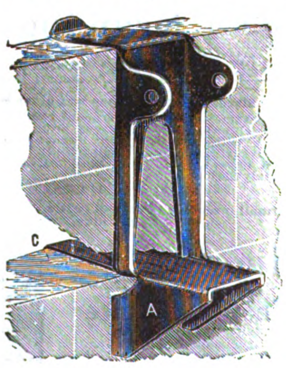


Fig. 2.—The Wall Hanger in Position

graving shows the appearance of the hanger when in position, and also gives an idea of the way in which it is secured in place. In Fig. 2 of the illustrations we give a view of the wall hanger which, like the joist hanger, is stamped from wrought sheet steel of great tensile strength, and is guaranteed to bear a strain of 5000 pounds. The statement is made that in constructing the brick walls of a building no bond timbers are required where the Daly wall hanger is used. The ends of the joist are not built into the brick walls as by the old methods, but extend from the inside of one wall to the inside of the opposite wall, the ends resting on the hangers, by which they are held firmly in position. By the use of hangers the walls may be constructed solid, thus rendering them much stronger than would be the case if it was necessary to make openings every 12 to 16 inches in order to admit the joist. When the mason has built the wall to the required floor hight it is only necessary to place the hangers in position at every 12, 14 or 16 inch center, as may be required, without regard to the ends of the bricks. By this means the use of the hanger does not hinder the masonry work in the slightest degree. Another important point to be considered by architects and builders is the great saving of time in not having to build or brick in between the joists. The Daly hangers are referred to as being economical in use and as being approved by the leading architects and builders wherever introduced. The company also make a studding joist hanger which, like the others, is stamped from the same quality of sheet steel and guaranteed to suspend all the weight that 2 x 4 studding will carry.

THE FAIRFIELD LAWN SWING COMPANY of Brunswick, Maine, are sending out a neat little pamphlet relating to the lawn swings which they manufacture; also their adjustable clothes dryer, which is made of spruce in natural colors. The lawn swings are constructed of spruce, attractively finished, and are said to combine in their construction mechanical perfection, durability and ease of operation.

The Standard Hot Air Furnace.

A line of furnaces in which builders, contractors and house owners generally are likely to be interested has recently been placed upon the market, under the name of Standard, by Giblin & Co., No. 105 Broad street, Utica, N. Y. The heater is intended for using soft coal, which, it is claimed, burns without smoke, soot or dust, and with the same effect as when hard coal is employed as a fuel. The arrangement of parts is such that by means of a combination door, which opens and closes with the draft door, the necessary air needed for combustion is introduced below and above the fuel. The broken view of the heater presented in Fig. 3 of the engravings gives an idea of the interior construction. An inspection of the engraving shows that the fire drafts tend toward the outside of the fire chamber and pass upward into four domes at just the point where the cold air encircles the castings, thus preventing them from becoming hot enough to be damaged. The Standard is fitted with what is known as the reverse motion grate, the bars of which are heavy and formed so that they will readily crush anything placed between them. The bearings are simple and work easily, while the entire grate can be removed and replaced through the ash pit door. The Standard is offered in several sizes, thus adapting it to meet varying requirements. The fire pots range in diameter from 22 to 32 inches, and in depth from 12 to 15 inches, while the hight of the castings vary from 51 to 70 inches. The furnace is well made in all its parts and is fully up to the high standard of excellence which the goods of the company have established wherever introduced.

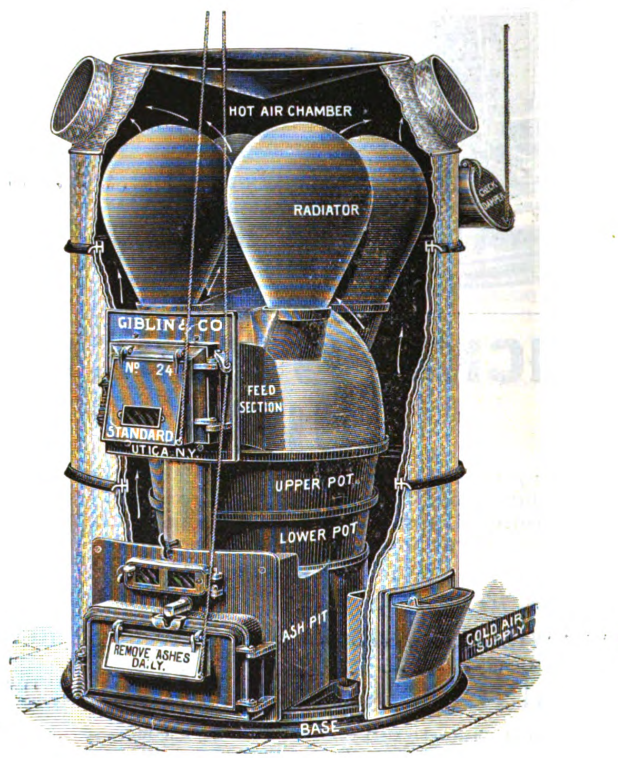
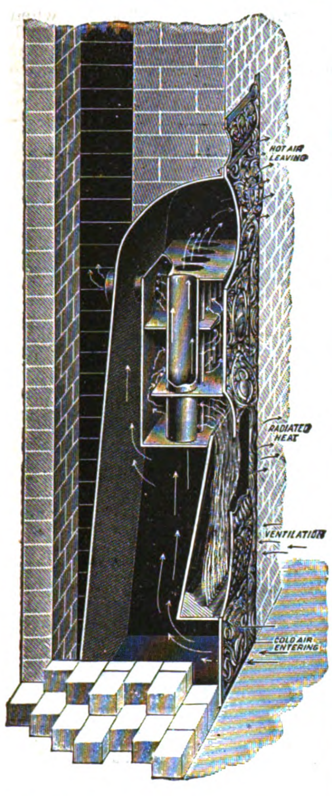


Fig. 3.—View of the Standard Hot Air Furnace with a Portion of the Outer Casing Broken Away.

Fireside Electric Gas Grate.

The Electric Gas Stove Company, with office and factory at Fifteenth street and Warren avenue, Detroit, Mich., are introducing to the trade what is known as the Fireside electric gas grate, a sectional view of which is presented in Fig. 4 of the cuts. The latter so clearly shows the principal features of construction, the passage of air currents and the



Novelties.—Fig. 4.—Sectional View of Fireside Electric Gas Grate.

course of the products of combustion, that little description is necessary. The Fireside Electric has been brought out to meet a well defined want for an open fire place heater, and possesses an originality which distinguishes it from ordinary constructions. From an inspection of the sectional view it will be seen that the cold air is drawn in at the bottom, passes up the rear and enters four 5-inch tubes, from which the heated air escapes at the top, entering the room through the open fret work of the grate frame. The heated air first passes around the tubes, then forward to the front, and then back again to the smoke flue, by which system the heat is abstracted very thoroughly from the gas before the products of combustion escape to the chimney.

The Steel Clad Bath Mfg. Company

occupy a large six-story building at the corner of Wayne and Congress streets, Detroit, Mich., where they manufacture Booth's Steel Clad all copper bathtub, and their new Resisto copper range boiler. The energy of the house is devoted to the production of high grade goods and establishing a trade for them by their reputation. Galvanized steel is now used in the manufacture of the Steel Clad Bath and in the all steel bath, which is finished with Aspinall's English enamel. These tubs are painted in different colors, as are the all copper baths. The copper used in all their tubs and in their Resisto range boilers is tinned in their shop and then finished by being rolled by their special machinery in order to secure the handsome finish shown by their goods. In addition to the tubs made to suit the requirements of every day plumbing, they make two special tubs. One is portable and has a valve by which the water can be readily drawn off and the tub carried to any convenient place of storage. Another tub is called a perambulator, and is provided with rubber tired wheels, so that it can be easily moved to the bedside of a sick person, and is specially adapted to hospital use. A number of these tubs have been used in the various forts of the United States. Another special tub is provided with a series of tubes which extend outward, so that the flames of a wood, coal or gasoline fire can be used for heating water in places where there is no supply of hot water. The company also have a fine line of plumbers' wood work, which they market under the name Resisto, and which includes closet seats, tanks and pipe boards in various woods, of different designs and excellent finish. The company contemplate some important changes in increasing their facilities for production and for the introduction of a new method of coating copper, which, it is claimed, is superior to tinning or nickel plate, the product having been under test for some time with gratifying results.

The Oettinger Automatic Sash Lock.

The Oettinger Automatic Sash Lock Company, Cincinnati, Ohio, are making the automatic sash lock shown in Fig. 6 of the cuts. The lock consists of a keeper and bolt, the latter working in a groove and having a small knob, by means of which, when turned to the right, the lock is thrown off when it is desired to open the windows. When closing the window the beard of the bolt strikes the keeper, reversing the bolt and allowing the latter to fly into a socket. When the upper sash is down and is thrown up into place the bolt

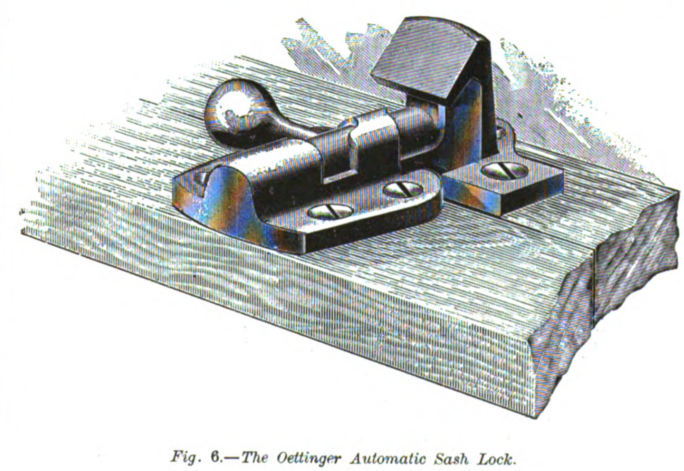


Fig. 6.—The Oettinger Automatic Sash Lock.

reverses its action in striking the keeper, securely locking the sash automatically. The point is made that locking both meeting rails by automatic action is a feature peculiar to this lock. After the window is locked, if it is desired to draw the sash still closer together in order to prevent rattling of the frames, the bolt is thrown to the left, as in Fig. 6. The manufacturers claim that whenever the upper and lower sash are closed there is a certainty that they are securely locked; that the lock cannot be picked from the outside; that the mechanism is simple, and that there is little liability of its getting out of order.

Banta's Adjustable Window Screen.

The Banta Mfg. Company of South Bend, Ind., have brought out the adjustable window screen which is illustrated in Fig. 5 of the cuts. With this window screen the clip itself forms the

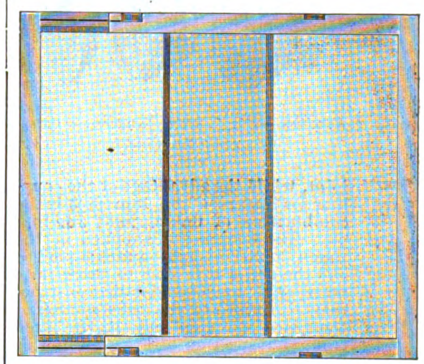


Fig. 5.—Banta's Adjustable Window Screen.

slide as well as the lock, so that when the clip is fastened in its position it is impossible to pull it loose by working the window. The clip or guide being metal it cannot shrink or swell, nor will it allow the window to sag. Two sizes are made, No. 1 being 24 and No. 2 being 30 inches high, while both extend from 23 to 35 inches in width. They are packed in crates of one dozen.

THE J. J. NORMAN COMPANY, 61 South Clinton street, Chicago, Ill., are manufacturing what is known as the Chicago gas and gasoline engine, especially designed for electric lighting and furnishing cheap power for all classes of light manufacturing. The engine is constructed both stationary and portable, being built with horse-power ranging from 2 to 50. The manufacturers have issued a catalogue illustrating and describing the engine and a copy will be forwarded to any one who may apply for it.

The Anderson Patent Sink Coupling.

A coupling which it is claimed does not reduce the diameter of the pipe in any place, and hence offers no stoppage in the pipe through the accumulation of matter, is being called to the attention of architects, builders, plumbers and house owners by Bell & Anderson of Portland, Conn. This patent coupling may be used for all kinds of lead pipe connections and is claimed to be entirely free from leak age. The manufacturers point out that in connecting two lead pipes the coupling makes a combination of union and

Novelties.—Fig. 7.—The Anderson Patent Sink Coupling.

joint, while the advantage of the coupling for lead pipe and iron pipe is the combination of union, joint and nipple. The coupling is supplied in the rough, brass finished or nickel plated, and the use of it is said to necessitate no special tools nor detailed instructions. An idea of the construction of their sink coupling may be gathered from an inspection of Fig. 7 of the illustrations, which represent the various parts. Another article which Bell & Anderson are putting on the market is lead pipe expanding pliers. It is stated that in expanding the ends of the lead pipe by the use of these pliers there is no danger of stocking or bending the pipe, and while the makers state that it is not absolutely necessary to use the pliers in connection with their coupling, they recommend them for the sake of convenience.

Case of Rules.

The Sawyer Tool Company, Athol, Mass., are introducing a case of rules shown in Fig. 8 of the cuts. The dimensions of the case are $12\frac{1}{2}$ x $1\frac{3}{8}$ x $1\frac{3}{4}$ inches, and it is provided with a finger hole at the end of each rule, so arranged that by pressing upon the rule at this point it rises up and is easily extracted. The case is supplied with steel tempered rules, of any desired graduation, of the following lengths: One each 1, 2, 3, 4, 6, 9 and 12 inch rules; also one 4-inch narrow spring tempered rule and one center gauge. It is remarked that mechanics often find it difficult to have a place for their rules, and to keep them in that place. The case with the set of rules is put on the market to obviate this difficulty.

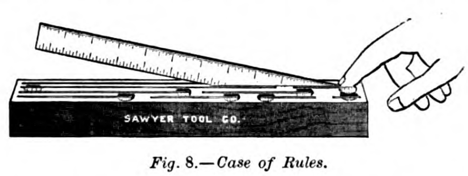


Fig. 8.—Case of Rules.

THE E. E. JOSEF MFG. COMPANY, Washington and Perry streets, Buffalo, N. Y., are offering the trade the Buffalo Universal handy bench clamp, an illustration of which is presented in their advertising card this month. This device is referred to as indispensable in all workshops for clamping in any position that may be desired by cabinet, makers, carvers, machinists and others. The manufacturers will send to any one who may be sufficiently interested to address them full particulars of the device, together with prices.

Scroll Band Sawing Machine.

A machine which has just been brought out, and is made from a new and greatly improved set of patterns, is shown in Fig. 9 of the illustrations. It is manufactured by the Frank H. Clement Company of 331 Lyell avenue, Rochester, N. Y., and is intended for the heavier grades of scroll sawing, such as chair backs, plow beams, wagon work, millwright work, &c., but is equally suitable for light sawing, using blades from $\frac{3}{16}$ inch upward. The cored frame is cast in one piece, and there are extra heavy steel shafts, long bearings and large pulleys The table may be of iron or wood, according to preference, and is secured to a strong segmental bar by means of which it can be tilted to an angle for beveled sawing. The upper guide is known as Wright's patent, made from the company's patterns, while the lower guide has a self-adjusting back plate and wooden side guides. The guide spindle is of steel, square in section and counterbalanced. The wheels are 42 inches in diameter and have $2\frac{1}{4}$-inch face, the lower one being heavy, while the upper one is rather light. They are covered with rubber, are ground true, and perfectly balanced. The upper wheel has a kiln dried wood rim built up of thin veneers. A feature of the machine is the company's patent straining lever. A wide splitting gauge and pressure roll are furnished as an extra when ordered for resawing by hand feed. The shafts of the machine are of extra hammered steel and the backs of both are adjustable for alignment. The sawing space is 42 inches wide and 20 inches deep. The manufacturers refer to this machine as representing workmanship of the first order.

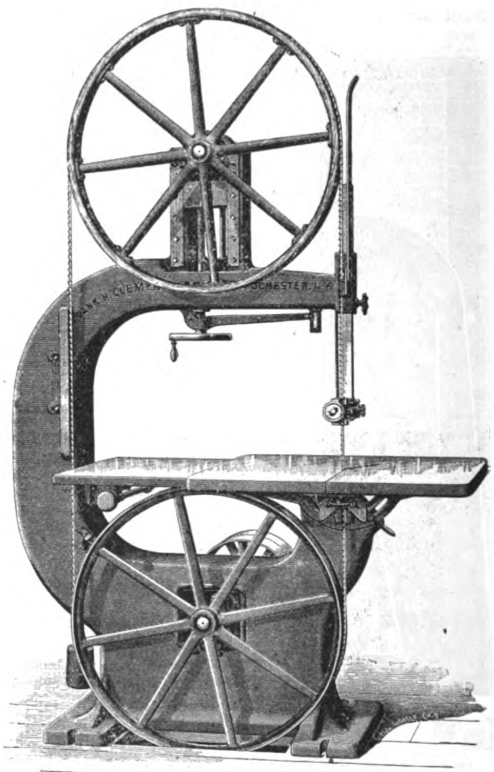
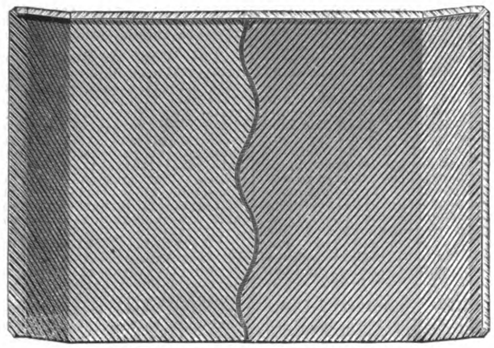


Fig. 9.—Scroll Band Sawing Machine.

Turner's Flexible Flat Seam Metal Roof Plates.

A new style of metal roofing which has just been brought out for use on flat roofs is shown in Fig. 10 of the cuts. The main point aimed at in this roofing was to provide for the expansion and contraction of the metal, which has hitherto been the objectionable feature of a flat seamed tin or copper roof. This roofing consists of plates made from 20 x 28 inch sheets, corrugated, as shown. The small corrugations running diagonally from the outer edges of each sheet to the serpentine center groove take up the tension on the sheets the narrow way, and divert the strain to the long way of the sheet, where ample provision is made for all expansion and contraction by raising the sheets from the plain level and locking on the top of wood strips running longitudinally on the roof. Each plate is shaped at the ends to lie on the strips. The corrugated or crimped sheets are also flexible, each within itself. The serpentine groove in the center, being in harmony with the diagonal corrugations, allows a uniform degree of expansion and contraction in each sheet. The diagonal corrugation and center groove, while imparting a flexible nature to the sheet, also prove a most desirable feature in draining the smaller amounts of water to a common center in the center groove,



Novelties.—Fig. 10.—General View of Turner's Flexible Flat Seam Metal Roof Plate.

thus forming a perfect water course on roofs having a very low pitch. The seams are soldered in the usual manner, the corrugations or crimps relieving them of all strain and preventing buckling, as well as warping and rattling. This roofing is manufactured by John Hamilton, Pittsburgh, Pa., who is represented in the West by W. W. Turner, manufacturers' agent, 177 Lake street, Chicago, Ill.

The New Arcade Door Bell.

The New Arcade door bell, which has just been put on the market by the Arcade Mfg. Company, Freeport, Ill., is a turn bell, intended to be fastened on a door or jamb. Fig. 11 is a perspective view, showing the bell in position for use. There are only two working parts. The crank, which passes through the center, turns the notched wheel freely either way. The notches strike lugs on the end of the hammer, causing it to move on a pivot and strike the bell on one side and then on the other. There are no springs or

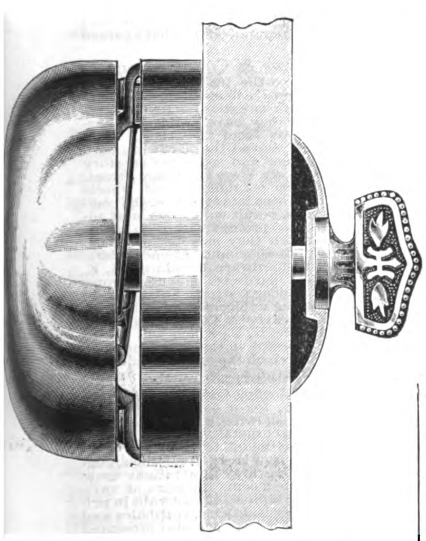


Fig. 11.—The New Arcade Door Bell.

small parts to work loose, and the manufacturers warrant it not to get out of order. Its size is 3½ inches.

The Yale Transom Lifter.

In Fig. 12 of the cuts is represented a transom lifter being introduced by the Yale & Towne Mfg. Company, 84-86 Chambers street, New York, with works at Stamford, Conn. One of the novel features of the transom lifter is the locking device, which consists of an automatic grip, made of two in-

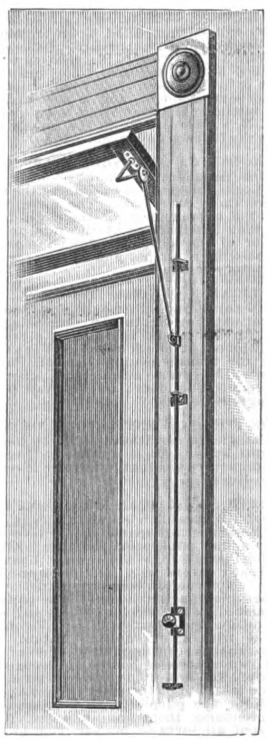


Fig. 12.—The Yale Transom Lifter.

clined steel grip plates contained in a neat box, each plate having a hole through which the operating rod passes. Rotating the thumb knob, shown in Fig. 12, to the left, causes a cam in its inner end to lift the steel plates to a parallel position, thus releasing the grip on the rod and leaving the latter free to slide up or down. On letting go the knob the plates automatically return to their original position, thereby again instantly and securely, it is remarked, locking the rod. The device is referred to as small and neat in appearance, simple in construction, automatic in action and absolutely positive. The lifters are furnished in bronzed steel, plated steel, solid bronze and solid brass. Finishes as follows: Bronze, brass and nickel plate oxidized silver, old copper, old brass and Bower-Barff. In size they run from a rod of ¼ to ⅜ inch in diameter, and from 3 to 8 feet in length, as ordered. All prices and sizes are given in detail in the catalogue, which will be sent on application to the manufacturers.

TRADE NOTES.

THE S. A. Woods Machine Company, with office at 172 High street, Boston, Mass., and works located at South Boston, Mass., send us a copy of a handsome catalogue illustrating the leading lines of wood working machinery which they manufacture. The opening pages show a bird's eye view of the company's works, an excellent likeness of S. A. Woods, a comprehensive index arranged alphabetically, and an introduction to the trade, in which reference is made to many interesting facts in connection with the company's large and growing business. The statement is made that while many of the older patterns have been omitted from the new catalogue, they have been replaced with new machines designed to meet the best models of mill practice, containing the latest advances and improvements, together with all desirable features which long trial has demonstrated to be most efficient and durable. Since issuing their last catalogue the company have largely increased their facilities and added many special and improved tools for the rapid and accurate production of their work, enabling them to execute orders with greater promptness than ever before. The assortment of goods shown embraces about everything in the wood working line, and the matter is arranged in such a way that the volume cannot fail to prove interesting and valuable to all those having to do with work in which machines of this kind are required. The illustrations are of liberal size, clearly showing the essential features of construction, while the accompanying text is full and explicit. The catalogue is bound in heavy paper covers and bears date of April 1 of the present year.

"FLY STOPPERS" is the unique title of a 56-page pamphlet of pocket size, which has recently been issued from the press by the Willer Mfg. Company of Milwaukee, Wis. This is the popular edition of their Catalogue B, No. 14, and in it attention is given to the extensive line of specialties turned out by this enterprising concern. Reference is made to Willer's spring balance sliding screens, for use on the inside or outside of windows; Willer's drop sliding screens for use on the outside of windows; Willer's inside folding screens for French casement windows; Willer's outside stationary or hanging window screens; Willer's combination guard and screen for cellar windows and Willer's plain open panel and ornamental made to order screen doors. The numerous illustrations are arranged in a careful manner, accompanied by ample descriptive letterpress, which renders perfectly clear and comprehensible the various points claimed for the specialties described. This little pamphlet is intended for free distribution and the company will be glad to furnish a copy to any one who may be sufficiently interested to apply for it.

A DESCRIPTIVE CIRCULAR AND PRICE-LIST of the Anderson patent coupling for all kinds of lead pipe connections reaches us from Bell & Anderson, Portland, Conn. The coupling is variously illustrated, the engravings being accompanied by tables showing the different sizes made, the weight per foot and the price per dozen. The statement is made that in connecting two lead pipes the couplings make a combination of union and joint. They are easily and quickly adjusted and can be coupled or uncoupled again when necessary. The coupling is supplied in the rough, brass finished or nickel plated, as may be desired. The manufacturers state that the use of the coupling necessitates no special tools nor detailed instructions, as all the work can be readily done with the ordinary turn pin and wrench.

THE MONTROSE METAL SHINGLE COMPANY of Camden, N. J., issue a card, which, were it not for the fact that it is printed on both sides, would remind one of a blotting pad. It bears the statement that the best method of applying metal to a roof is in the form of a shingle, and on the side of the card bearing the postage stamp and superscription is a colored engraving of a bay window and bulkhead covered with the company's Gothic tiles. The opposite side of the card carries advertising matter relative to Octagon and Eastlake shingles, as well as Gothic and Diamond tiles. The printing is in colors and the card is well calculated to serve the purpose for which it is sent out.

THE FRANK H. CLEMENT COMPANY, 330-340 Lyell avenue, Rochester, N. Y., send us a copy of a new 80-page catalogue which marks the first quarter of a century in their history as a manufacturing establishment. In size it is 9 x 12 inches, neatly printed on a good quality of paper and bound in flexible covers, the front of which is embellished with numerous cuts of patent improved wood working machinery manufactured by the company. A feature of the opening pages is an index, which refers especially to the new designs and improvements which have been brought out. These include double surfacers, furniture planer, band saws, benches, shapers, sanding machines, borers, bending press, seat shaper, independent dovetailing machine, &c. The line of wood working machinery shown is a varied and extensive one, covering the entire field, the illustrations being accompanied by ample descriptive particulars. Reference is made to a number of miscellaneous machines of which cuts are not given, and there is also a miscellaneous price list. The catalogue is neatly arranged and cannot fail to prove interesting and valuable to all engaged in the wood working line.

E. C. STEARNS, senior member of the well-known hardware and bicycle manufacturing firm of E. C. Stearns & Co., Syracuse, N. Y., will shortly retire from active connection with the concern. Mr. Stearns' business career extends over a period of 20 years, during which time, owing to his splendid enterprise and energy, the house of which he is the head has taken a prominent position among those in its field. H. E. Maslin, who has long been connected with the firm and who is recognized as very well qualified for the position, will succeed Mr. Stearns.

GRADUALLY but surely the use of spring hinges for automatically closing doors has increased, and as they either adorn or mar the entrances of our houses, where elegance and beauty of appearance as well as utility are essential and desirable, it becomes of importance to the carpenter and builder to use good judgment when buying them, because there is no other part of a house which receives such close and continuous scrutiny as the entrance. Then, too, the ladies of the house know from experience the convenience of a door swinging both ways between the dining room and the kitchen, a simple push with the foot being the "open sesame" of admission from either room when the hands are occupied in carrying, provided a light moving spring hinge is used. On the contrary, if a spring hinge with an abrupt and heavy movement is recommended, dissatisfaction is invariably created, and resentment against the carpenter who suggested it is aroused, because the door is continually used and its defects are brought to mind and repeated day after day.

E. T. BARNUM, Detroit, Mich., makes a fine display in his show room of ornamental wire, brass and iron work. Handsome urns for lawn decoration, wire lawn chains, flower stands and other summer goods are now made a feature of the display. The offices and show room are divided by samples of their wire and iron railings and grills finished in various colors and different shades of bronze. Some fine examples of elevator inclosure work are shown with stair scrolls and posts. The line manufactured is varied, and enables an exhibition that is unique and elegant. Vanes, finials and ornamental cresting is of a sufficient variety to make one large elaborate exhibit. Those who use bank railings and office screens will find much to interest them in the handsome catalogue used to represent the product of the house.

W. J. BURTON & CO., with office and works at 106 Larned street, West Detroit, Mich., announce to the trade that although they make a specialty of the manufacture and sale of the Eastlake metallic shingle, they are also in the market with a complete line of iron and steel roofing, tinners' supplies and roofing sundries.

WE ARE INDEBTED to J. H. Eller & Co., Canton, Ohio, for a copy of the Architects' Edition of their 88-page catalogue of stamped metal work for interior and exterior decoration. The publication is oblong in shape, measures 12 x 9 inches, is bound in tinted paper and fastened at the back with a silk cord. The front cover is handsomely embossed in an architectural design, gilt and colored. The first pages relate to stamped metal ceilings and show a variety of artistic paneling in all sorts of combinations and with various center pieces and borders. Among the pages devoted to ceilings are similar ones relating to moldings, borders and covers. Next to this division come side wall finishes, center pieces, &c. The next subject taken up is galvanized cornices, which are made also in copper, some ten pages being devoted to these goods, which are illustrated and of which dimensions are given. Crown and belt moldings follow; then copper and iron bays, galvanized and copper fronts in a variety of designs. Finials and weather vanes are shown in many different styles. Then come ornamental roof crestings and finials, galvanized cresting blocks, pinnacles, gable ornaments, stamped letters and figures, ornamental galvanized iron ridging, chimney caps and barn ventilators. Skylights are shown in various styles, and iron crestings and finials follow. Window guards and railings are noted, and then tin roofing, with illustrations showing its application; also galvanized steel roofing. Various styles of metal shingles are illustrated and briefly described. At the close reference is made to roof gutters, rock face stone and corrugated awning roofs.

THE AMERICAN TOOL CHEST COMPANY, with factory and salesroom at 200 West Houston street, New York City, show in a catalogue which they have issued an interesting line of tool sheets which they manufacture. These are of various sizes and adapted to meet different requirements, ranging from those of the small boy who likes to tinker with tools up to the fully equipped carpenters' chest. The company also offer machinists' empty tool chests, pipe fitters' tool chests, and those adapted to machinists, blacksmiths, &c. The catalogue is made up of 45 pages of letter press, profusely illustrated, and in connection with each of the chests is given its dimensions and a list of tools with which it is equipped. The nature of the publication is such as to prove interesting to carpenters, builders and mechanics generally.

J. A. FAY & CO., Cincinnati, Ohio, recently received a large order for wood working machinery from Yokohama, Japan. During the recent contest with the Chinese the Japanese saw a large railroad shop fitted out by J. A. Fay & Co. many years ago. The Chinese had made very little use of it, but the Japanese, instead of taking the old plant down and transporting it to Japan, came to the United States and bought a somewhat similar though more nearly complete outfit for their own Government railroad shops. This is the largest order ever given by them for an outfit of wood working machinery, and it has attracted much attention, as these shops are intended to be the finest in the East, if not in the world.

BUILDERS, contractors and house owners will be interested in an announcement presented in another part of this issue by Giblin & Co., Utica, N. Y., relating to the Standard hot air furnace. The heater is shown in broken view, clearly indicating the interior arrangement, and is accompanied by a testimonial letter from a builder in Utica, N. Y., who refers to the satisfaction which the furnace has given.

SARGENT & CO., New York, have issued a pamphlet entitled "About House Door Locks," devoted to explaining the features of their easy locks. The form is unusual, the arrangement of the pages being such that illustrations of the interior and exterior of the lock, with descriptions, are presented in a unique and very clear and satisfactory manner.

WILLIAM CONNORS, Troy, N. Y., manufacturer of the American seal paints and cements, owing to the increasing demand for his goods, has opened a branch establishment at 9 Peck slip, New York City, under the management of James C. Fagan, where will be carried a full line of American seal products, builders', roofers' and painters' supplies.

THE ITHACA VENTILATOR COMPANY have been formed at Ithaca, N. Y., by George W. Frost, Fred C. Evans and James Mitchell, to manufacture a patent ventilator invented by Mr. Evans.

HEATH & MILLIGAN MFG. COMPANY, 170 and 172 Randolph street, Chicago, Ill., manufacturers of prepared paint, have just issued a fine publication entitled "Album of Color Plans." It is handsomely bound in pasteboard covers with cloth back and contains 12 color studies, being reproductions of photographs of actual houses. The pictures are finished by a new color process and were made solely to show a few of the color effects possible with the company's paints. The photographs were chosen from over a hundred photographs of houses in Chicago and vicinity. The set of 12 plates shown in this volume is said to be the most elaborate ever issued for the purpose. All who see them will pronounce them unusually fine. They represent all sorts of houses from modest cottages to palatial establishments.

THE BOSTWICK & BURGESS MFG. COMPANY of Norwalk, Ohio, manufacture what is known as the Victorian blinds, using thin wood slats, 2 inches wide, hung on linen tape, the slats all opening or closing at one time by one motion of a cord at the side. A strengthening bolt goes from the top slat to the head piece, for which advantages are claimed. The slats can be so turned, it is explained, as to keep out the sun, yet admitting light and air, or tightly closed to darken a room, or part of the slats can be closed and the others left open.

W. F. & JOHN BARNES COMPANY of Rockford, Ill., issue an illustrated catalogue relating to iron working machinery, such as lathes, both foot and hand power, upright drills, emery tool grinders, &c. Another pamphlet is devoted to wood working machinery, such as foot and hand power circular saws, scroll saws, mortising, tenoning and molding machines, lathes, &c. The company state that they are supplying iron working machines, such as drills and lathes, to the bicycle manufacturing and repair trade.

L. V. SANFORD, 113 Beekman street, New York City, local agent for the Kelsey Furnace Company, Syracuse, N. Y., has recently received a contract for two No. 30 Kelsey generators for heating the residence of Dr. Craig of Jersey City. The house has 28 rooms, and the estimate accepted was $950.

THE Wood & Bishop Company, 41-42 West Market Square, Bangor, Maine, send us a copy of a catalogue illustrating their improved Monitor wood furnace, which is made both direct and indirect draft. It is offered in two sizes for brick or galvanized cases, is referred to as easy and simple to manage, and so constructed as to admit it into cellars through any door of ordinary width. The catalogue contains directions for setting up the furnace, besides a long list of testimonial letters from those who have used it with evident satisfaction.

FARWELL, OZMUN, KIRK & CO., St. Paul, Minn., favor us with a copy of the Architect's Edition of their illustrated catalogue of builders' hardware which they have issued from the press. It is a handsome volume of 462 pages, profusely illustrated, and containing a great deal of information of interest to architects, carpenters, builders and contractors. It will be found of especial assistance in making estimates and writing specifications. It is stated that the tables and other information given have been obtained from reliable authorities and carefully compiled. The prices named are list, from which a discount is given to dealers, and can be safely used in making estimates, although the concern suggest that when practical it would be well to confer as to prices with the nearest dealer handling their line of goods. The assortment covered is a very extensive one, embracing about everything in the line of locks and builders' hardware likely to be required. The makers state that they are prepared to show in their sample room, in addition to the styles described in the catalogue, special designs of the Yale & Towne Mfg. Company of the very finest and most artistic goods in the builders' and cabinet hardware line, and especially suitable for public buildings, flats and high class residences.

THE Kansas City Metal Roofing & Corrugating Company, Kansas City, Mo., advise us that since taking up the sale of P. & B. Ruberoid roofing, they have had unparalleled success with it. They state that it is giving the very highest satisfaction, and that it is taking the place of gravel and cheap tin roofs, and express the opinion that with one coat of P. & B. paint, the Ruberoid will last 25 years. Their trade in other specialties, such as corrugated iron, metal shingles, wire fencing, roof cresting, &c., is very satisfactory, and their collections are fully up to the average.

J. A. FAY & EGAN COMPANY of Cincinnati, Ohio, have received, in the face of strong European and American competition, a large order for locomotive and railway car shop tools for Russia. This order, amounting to over $10,000, is especially gratifying, inasmuch as it is the second received during the course of a few years, it shows the high esteem in which the machines are held and the splendid reputation they have gained in foreign lands.

E. C. STEARNS & Co of Syracuse, N. Y., annouce to the trade at large that owing to the extensive demand for their bicycles as well as their extensive line of hardware specialties they have decided to separate one business from the other. They have accordingly moved the hardware business into their new and spacious four-story building located on West Onondaga street. In conducting the manufacture of wheels and hardware in separate factories, the company feel that the result will prove most advantageous in the prompt execution of all orders with which they may be intrusted. They suggest that all comunications, orders, &c., relating to hardware be addressed, E. C. Stearns & Co., hardware manufacturers, 224-232 West Onondaga street, Syracuse, N. Y., and all relating to bicycles be plainly addressed, E. C. Stearns & Co., bicycle manufaturers, Syracuse, N. Y., which will insure their prompt receipt in the department of the business for which they are intended.

WE ARE INDEBTED to the Penn Metal Ceiling & Roofing Company, Limited, Philadelphia, Pa., for a copy of a supplemental catalogue showing a number of their late designs in sheet metal work and the application of sheet metal to interiors. The pamphlet, which is of large dimensions, contains 24 pages. The first illustrations show metal ceilings; then come interiors of various stores; then samples of side walls in private residences for bedrooms, vestibules and dining rooms. Diagrams are also presented illustrating the application of the embossed metal to ceilings. Later on cuts are shown of the Empire ceiling plates. A number of full page engravings show the application of the sheet metal of this concern to the interior finish of *cafés*, billiard rooms, &c. The illustrations are remarkably fine, being half-tone engravings which, printed on fine coated paper, bring out every detail with beautiful precision.

CARPENTRY AND BUILDING

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
96-102 READE STREET, NEW YORK.

AUGUST, 1896.

A Mammoth Hotel.

It would seem even to the casual observer that the metropolis was already sufficiently supplied with hotels to meet all requirements, but that there are those who do not hold this view is evident from the fact that plans have just been filed for a structure which it is intended shall rank when completed among the finest palace hotels in existence. The enterprise grows out of the long cherished desire of the late Walter Hobart, a California millionaire, to build and own a hotel in New York City which should be the equal at least of any in the world. To this end he began several years ago securing lot by lot the land for the purpose, selecting as a site the property at Broadway and Thirty-seventh and Thirty eighth streets, the plot fronting 130½ feet on the first named thoroughfare. The hotel will be of steel frame construction, 15 stories in hight and contain 600 rooms. In style of architecture it will be free Renaissance and will cost in the neighborhood of $2,000,000, exclusive of excavations. The first three stories will be of granite and the remainder of light brick and terra cotta. There will be two entrances, that on the Broadway side having a portico with granite pillars, while the one on the Thirty-seventh street side will be arched. There will be five high speed modern passenger elevators, and each separate guest room and *suite* will have an independent bathroom. The kitchen, bakery, laundry, storerooms, &c., will be located in the basement and will have white enamel brick walls and marble floors. The work of construction will be commenced as soon as the tenants can be induced to surrender their leases, and the architects, Harding & Gooch, hope to have the building ready for occupancy by September 1, 1898. The roof of the building will be flat and 280 feet above the curb line.

Better Houses for Wage Earners.

One encouraging result of the recent agitation of the subject of better housing conditions for the poorer classes in cities is the establishment in New York City of a company with a capital of $1,000,000 for the purpose of building improved houses for wage workers. The City & Suburban Homes Company, which were chartered at Albany recently, have among their incorporators such well-known capitalists and practical philanthropists as Samuel D. Babcock, Cornelius Vanderbilt, W. Bayard Cutting, R. Fulton Cutting, D. Ogden Mills, Prof. E. R. L. Gould of Columbia University, Isaac N. Seligman and Adrian Iselin, Jr. These persons propose to lose no time in setting about their work. The company start under the leadership of Professor Gould, who has given much study to the subject of model dwellings for the working classes and who has been chosen president of the corporation. Plans for improved houses are to be called for immediately and arrangements made for purchasing sites and awarding contracts for the new buildings. R. Fulton Cutting, well known to many of our readers in connection with the New York Trade School and other beneficent work, has been elected chairman of the Board of Directors of the company, and Arthur W. Milbury, the executive head of the Industrial Christian Alliance of New York City, its secretary. The character and standing of the individuals interested in the new corporation is a sufficient guarantee of its soundness and a promise that its mission will be well carried out. The opportunity will, it is stated, be given to the public to invest in shares in the new enterprise.

House and Home Exposition.

An exhibition which is likely to prove of interest to all connected with the building trades is to be held in this city during the coming winter, for the benefit of a local charity. It will be known as the Greater New York Exposition of the House and Home, and will have for its object a display of the progress and improvements made in the construction, interior decorations and furnishing of the house and home, to which the exhibits will be exclusively confined. Commencing with architects' plans, models, &c., the exhibits will embrace all materials employed in the construction of a house and will cover every branch of the work. The arrangement of the exhibits will be under the head of four classes, the first of which relates to architecture, the second to builders' materials, the third to interior decorations and the fourth to furniture. The builders' materials will be divided into ten groups, the first of which will embrace asphalt, cement, plaster, asbestos, &c.; the second, marble, onyx, stone, terra cotta, brick, slate, artificial stone, &c.; the third, iron and brass work, art metal work, &c.; the fourth, dressed woods of all kinds, blinds, doors, sash, &c.; the fifth, mantels, grates and fenders; the sixth, paints, oil and varnish; the seventh, furnaces, ranges, ventilating, &c.; the eight, bathtubs, plumbing, &c.; the ninth, builders' hardware, and the tenth, kalsomining, decorative wall molding, fresco work and ornamental plastering.

Fire Losses.

Insurance statistics recently issued place the value of property lost by fire in the United States last year at the enormous sum of $142,110,233. This is a startling showing, especially as 1895, from a fire insurance point of view, was a comparatively favorable year. Moreover, the average promises to be fully maintained in the first half of the current year, as the fire losses for the five months ending May 31 reached a total of over $58,000,000. During the past 21 years the insurance tables have chronicled losses by fire in this country amounting to no less than $2,219,500,490. This represents at least $100,000,000 of property absolutely wiped out every year by the destroying element. The losses, too, show a gradual increase year by year larger than the growth of population, and this in spite of the improvements in fire fighting appliances and the increased efficiency of fire organizations which are generally believed to have been introduced in the past two decades. The insurance companies place the blame in this matter mainly on the public at large, who, they say, would rather lose their property than take effectual steps to preserve it. There is doubtless much truth in the accusation. The subject, at any rate, calls for serious practical consideration, especially in view of the fact that the fire losses in our large cities are proportionately far greater than those in cities of similar size abroad, while the amount spent on our city fire departments is as a rule infinitely larger. For example, Paris, with a population of nearly 2,450,000, had

1104 fires in 1894, with a loss of $1,083,672, while in the same year New York City, with a population of under 2,000,000, had 4075 fires, causing a loss of $4,208,553. The total cost of the Paris fire department in 1894 was only $521,729, while that of New York was $2,268,742 in that year. A similar comparison would hold good, also, with most of the great European centers of population. There seems to be a lamentable failure somewhere.

Free State Aid to Workers.

Much interest attaches to an experiment in the line of State aid for workers which has just been inaugurated in New York City. The last State Legislature appropriated the sum of $5000 to equip a free employment office under the direction of the State Bureau of Labor Statistics. This office was opened the latter part of July at 331 East Fourteenth street, under the charge of a resident superintendent and two assistants. Its purpose is to secure employment for any resident of the State who is out of work and anxious to obtain employment. The office is open every week day from 9 a.m. to 2 p.m., during which time applicants are registered. Each week a list will be sent to every town supervisor in the State and thus it is believed many persons will be put in the way of getting work. On the first day the office was open 600 persons availed themselves of its aid and each day since has seen an almost equally large number of applicants. Employers will be asked to keep the office informed as to the behavior of help thus obtained, and upon their reports will largely depend the continuance of the institution after its experimental year has expired. Employers of labor are giving it their hearty support and a large number of applications for various classes of help have already been received. The only persons who have shown active opposition to the scheme have been the proprietors of employment agencies, whose gains the free bureau is likely to curtail. Similar institutions, we understand, are being operated with success by the State authorities of Ohio in the cities of Cleveland and Cincinnati.

Points on Plastering.

The first essential of good plastering is good preparation to receive it. For plastering on brick or terra cotta, have the work straight and true and the joints rough, says a writer in the *Canadian Architect and Builder*. Don't use dry press brick, nor terra cotta with smooth face. If the walls are not straight don't expect to get a straight wall in two-coat work—lime mortar cannot be made that is equally good when used ½ inch thick and 2 inches thick in the same wall.

Don't plaster with cement made from gypsum or similar compounds, such as acme, royal, agatite, &c , on Columbian fire proofing, or on Portland cement, unless they are dry enough to prevent sweating or condensation. Portland or native cement or even lime mortar is preferable in such work. Don't allow mortar to go on thicker than ¾ inch at one time, and have the brick and cement free from dust or dirt. Don't plaster on smoked bricks or old bricks from chimneys ; they will stain badly.

In preparing for lathing have the joist trimmers, &c., heavy enough to prevent vibration, and strap all large ceilings, using 2 x 2 inch strapping, on 16-inch centers. If you don't strap, at least have all joisting and studding sized ; very much crooked work would be avoided by enforcing this rule. Have all angles made solid. See to this yourself and don't rely on lathers who work by the piece to inform you of the carpenter's defects, and have trouble with him in consequence.

Use white pine lath, seasoned but not too dry. 1⅜ x ⅜ inch lath are light enough ; 1 x ⅜ inch lath are only fit for use on joisting or studding at 12-inch centers. Eighteen-inch breaks are frequent enough, but don't allow lath to break at door posts. The slamming of door or even the nailing of trim will cause a crack here. Don't blame the plasterer for this when you have allowed the carpenter to center his work so as to cause waste of time and lath to avoid it.

Lath stains cannot be avoided in two-coat work, and are even more liable to appear when patent plasters are used, as the first coat is put on much thinner to save cost. Two-coat work is also liable to have every lath and joist show through when work gets old—you can count them through the plaster.

Lime mortar properly made produces good work, but you can't make a poor plasterer do it. Mortar made and used at once will get as hard if not harder than that which is allowed to age. There is, of course, more danger from lime pitting; there is also a greater danger from the shorter nature of the material that the key will fall from all wall work. These objections are enough to condemn its use, but it is both unnecessary and impracticable to ask that it be made two or three weeks before using. Very sharp sand is not best for ordinary mortar ; a good clean sand of sharp grain or a mixture of soft and sharp is better ; it requires the strength of cement to bind coarse sharp sand.

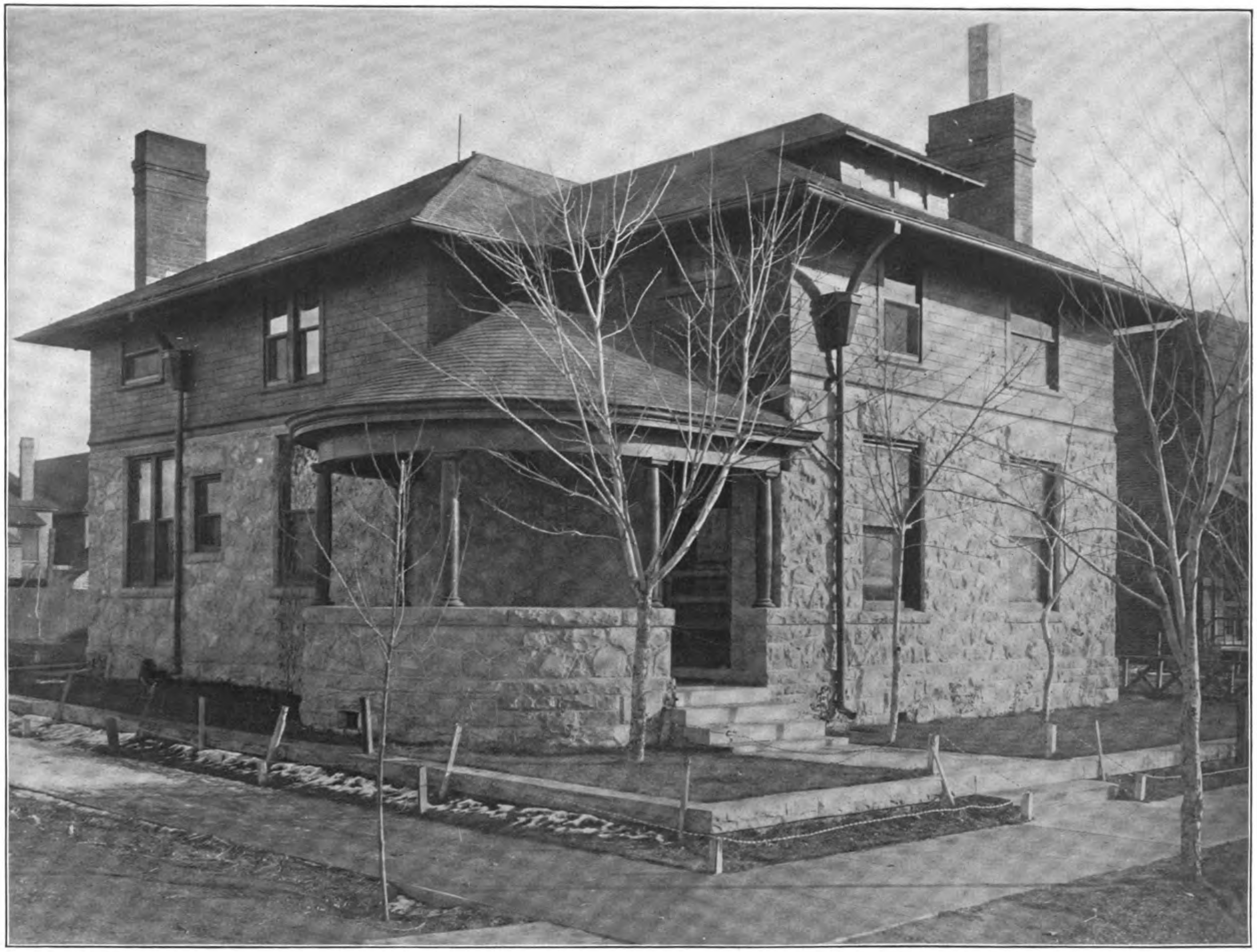
Don't allow mortar on lath to be used too soft, as you will have no key. Don't have it too rich with lime for the same reason. See that it is of proper consistency to require some force to apply it. If too poor (too much sand) key will fall off on wall work. Mortar of proper consistency for good work will crack badly in very hot weather, or if dried too quickly. For second coat on lath or for brick work one-third more sand may be used.

The term "hard white finish" is a misnomer ; the hardest lime finish is made with sand. If enough sand is employed to avoid use of calcined plaster, work will be uneven in color when dry. Don't allow finishing before base coats are dry, as there is great danger of lath stains, cracks, lime pits, &c.

Keeping the Cellar Dry.

A method frequently employed in various parts of the country for keeping the surface water away from the cellar walls of a building so as to insure a dry cellar is thus described by one of our contemporaries: About 1 foot or 16 inches below the finished grade line a space all around the building is paved with a layer of concrete, which is pitched outward from the walls. A heavy coat of tar, or natural asphalt, is applied to this surface and carried upon the outside face of the house walls to the grade. The earth is then filled in so as to allow planting up to the walls of the building. Any water which works itself down on the outside walls would be carried away from the building by the underground paving, and there would be little opportunity for the water to work through the walls. Being under ground, the construction would be protected from the action of the elements to a certain extent, and would be likely to endure a much longer time than a paving or stone work laid level with the ground. It is somewhat surprising that this construction is not more generally used, as it would seem to have many very manifest advantages.

A REFRIGERATING house has been built in Michigan which will serve as a useful model for small country communities which desire the advantages of cold storage at a low cost. The walls of the house are built of cedar blocks, laid up with lime mortar like masonry, save that the mortar is laid under each of the headers, 18 inches long, of which the wall is chiefly composed, leaving a 6 inch air space in each joint. The outside of the wall has a coat of cement, and the inside is heavily coated with quicklime plaster, against which dressed sheathing was nailed while the mortar was still soft. The floor is paved with cedar blocks, and the loft over the storage room is filled with straw The windows have five sashes, with successive 4-inch air spaces. The cost of the building, with cold room 24 x 30 feet and 8 feet high, is given at something over $600. The building is cooled by natural ice, stored during the winter, and ripe fruits are kept in it a month without injury.



REMODELED STONE AND SHINGLED RESIDENCE OF W. E. ALEXANDER, DENVER, COL.

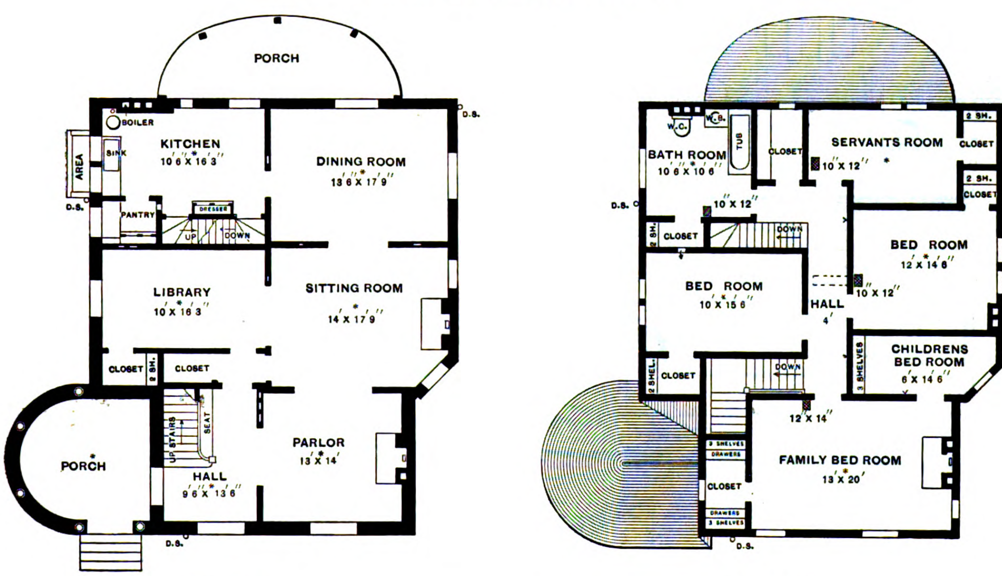
JOHN J. HUDDART, Architect.

SUPPLEMENT CARPENTRY AND BUILDING, AUGUST, 1896.

REMODELED STONE AND SHINGLED RESIDENCE.

As many of our readers have had experience, or at least have noted the remodeling of an old building, the architectural subject of this month's supplemental plate will be of special interest. The plate, plans, elevations and constructive details relate to the remodeled residence of W. E. Alexander of Denver, Col. We very much regret that we have not the plans and elevations of the old building that they might be presented herewith, and thus show the changes and give the reader the full study of the alterations. To the architect, John J. Huddart of Denver, Col., and to the valuable suggestions offered by Mrs. Alexander, much credit is due for the successful solution of the problem they had in hand.

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

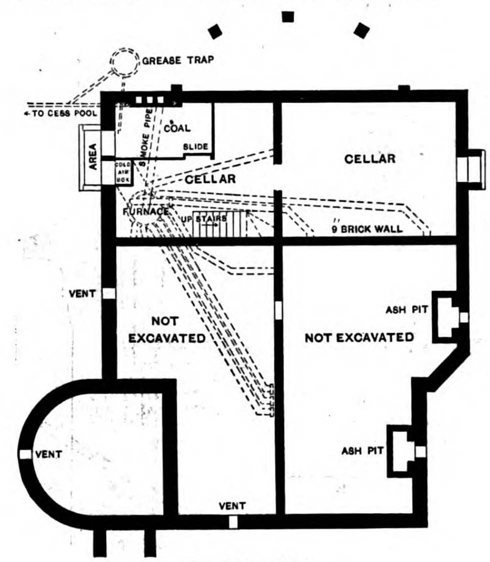


First Floor. Second Floor.

Scale, 1-16 Inch to the Foot.

Remodeled Stone and Shingled Residence.—John J. Huddart, Architect, Denver, Colorado

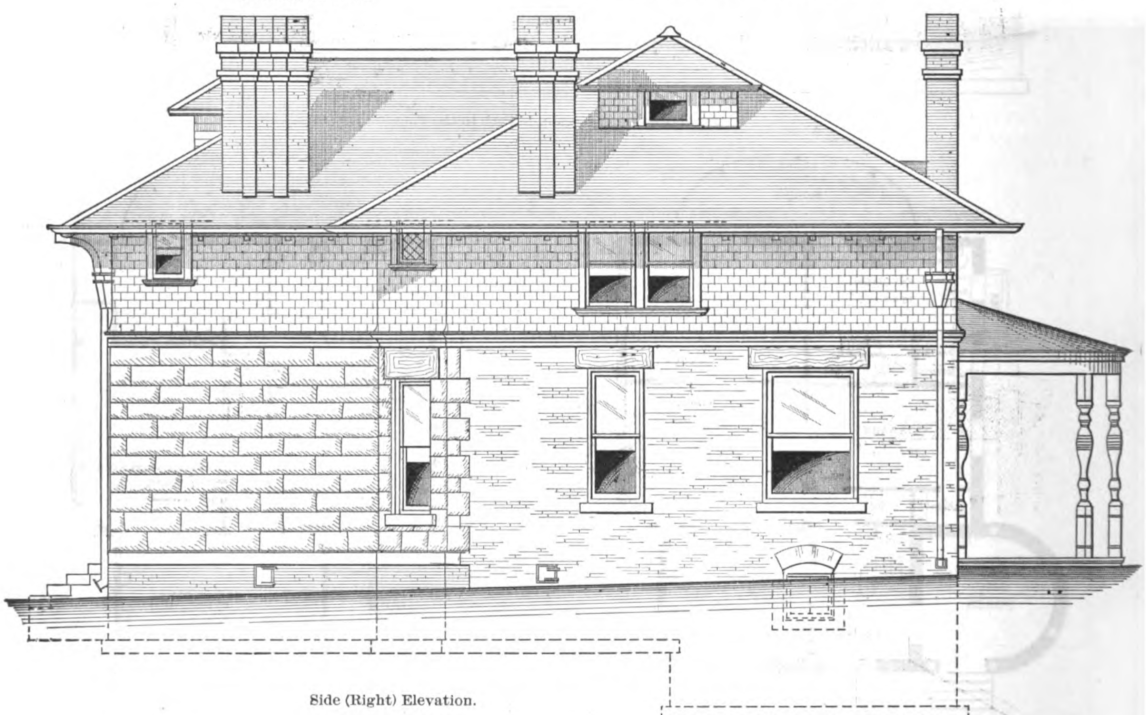
The old residence was a brick cottage with 9-inch walls and having 13-inch foundation walls. The problem was to provide a two-story building with first story on the street sides of stone and second story of wood. This construction permitted the use of the old brick walls where practical and gave the additional story with the least amount of extra weight on the old foundations. The rear and side old brick walls were used in the reconstruction and all old material as far as practical. The house being situated on a corner, it was desired to have the street fronts and a portion of the side appear in stone. This has been well carried out and the stone work and brick meet at the side projection of the sitting room. The stone walls are 12 inches thick, laid up with a light lava stone in white mortar. The stones are laid in irregular or random bond without any preparation and left in rock face. All sills, caps, coping and water table are also finished rock face. A large circular porch at the corner inclosed with a stone railing gives a pleasing effect.



Foundation Plan.

give an attractive appearance. The first and second floor joists are 2 x 10 inches and the studding and rafters 2 x 4 inches, all being placed 16 inches on centers.

As one enters the house a thought of cheerfulness is suggested as the view of a spacious hall with appropriate oak staircase and a long inviting seat is contemplated. As one looks through the broad openings draped and finished with open grilles, one realizes that there is a spaciousness not anticipated when viewing the exterior. The view from the parlor through the openings beyond and into the dining room has a most pleasing effect when the morning sun is shining against the stained glass window in the rear wall of this room. The stained glass window is placed with sill about 6 feet 6 inches above the floor, leaving room for a long oak sideboard. The floor plans show a good arrangement, with a front hall closet for coats, hats, &c. A closet for the library makes this a convenient sleeping apartment should a bedroom be desired on the first floor, while a china closet might have been provided, but at the expense of a reduced size to the dining room. This omission has been compensated for in the more desirable dining room and the cost of an extra large and convenient oak sideboard. The kitchen has every convenience, including hot and cold water, a sink well lighted, a place below the small window, which is placed high from the floor, giving room for a kitchen table, a convenient kitchen dresser and a pantry, which, while not large, is provided with two flour bins, drawers, shelves and hooks. From the kitchen there are stairs leading to the cellar and to second story. The second story gives an unusually large family sleeping room, with a convenient closet and a child's room. Two



Side (Right) Elevation.

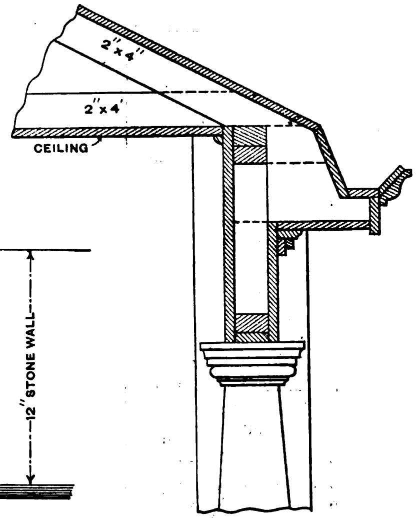
Remodeled Stone and Shingled Residence.—Plan.—Scale, 1-16 Inch to the Foot.—Elevation. Scale, ⅛ Inch to the Foot.

The second story is built in the usual way of frame construction with 2 x 6 inch studding, boarded and shingled on the outside and lathed and plastered on the inside. The low pitched roof and broad projecting cornice with false rafters give a homelike appearance to the building, and the front and side dormers add to the exterior and serve as ventilation to the attic. The circular rear porch was the original front porch of the old house. The second story shingled walls and roof shingles are stained in a warm olive, and with the light lava stone

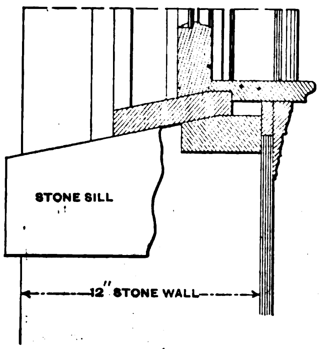
other good bedrooms are provided, also a room for the servant, a large linen closet and a bathroom with the different fixtures. This room, as well as all sleeping rooms, is provided with a closet.

The first story main hall has narrow oak flooring, the hall, parlor, sitting room and dining room being finished in pine and oak grained; the library is finished in pine and stained in cherry; the kitchen is wainscoted and finished in natural pine and the second story in pine and painted. In the parlor and sitting room is a fire place and each has a fine oak mantel with bevel plate mirrors and embossed tiling.

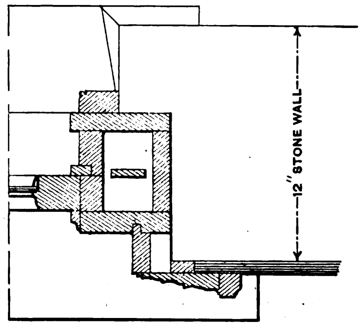
The house is piped for gas, is wired for electricity, and has an annunciator in the kitchen to announce calls at front door, dining room and other points through the house. The heating is by an extra large hot air furnace and all horizontal runs are wrapped with asbestos paper. The furnace, while placed at an inconvenient location, has warmed the house satisfactorily, inasmuch as an extra size was used.



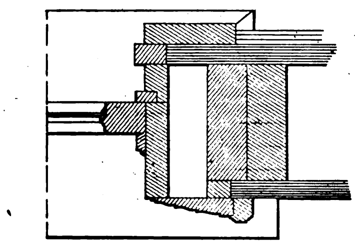
Detail of Porch Cornice.—Scale, ¾ Inch to the Foot.



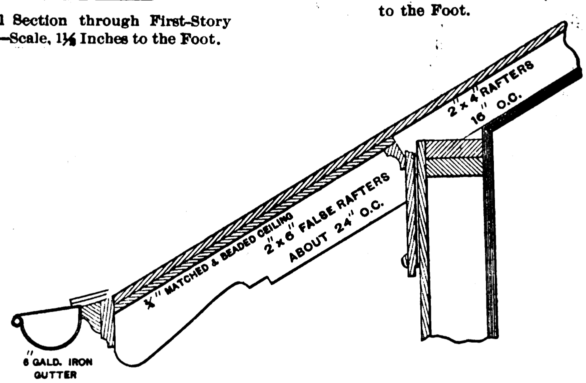
Vertical Section through First-Story Window.—Scale, 1½ Inches to the Foot.



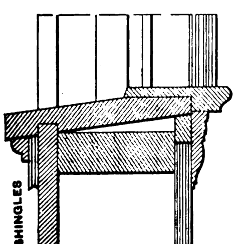
Horizontal Section through First-Story Window.—Scale, 1½ Inches to the Foot.



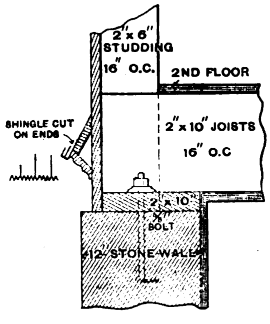
Horizontal Section through Second-Story Window.—Scale, 1½ Inches to the Foot.



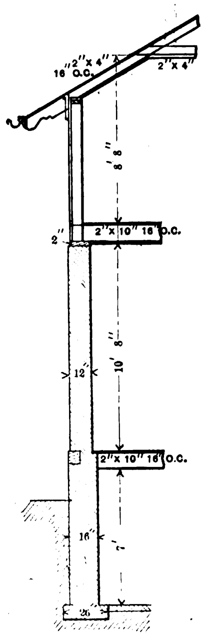
Detail of Main Cornice.—Scale, ¾ Inch to the Foot.



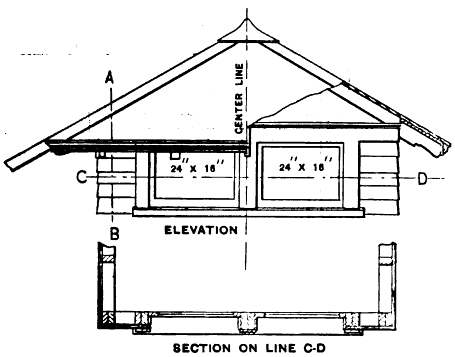
Vertical Section through Second-Story Window.—Scale, 1½ Inches to the Foot.



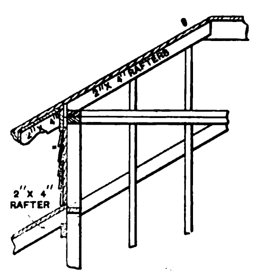
Detail of Second-Story Belt Course.—Scale, ¾ Inch to the Foot.



Section through Main Wall.—Scale, ⅛ Inch to the Foot.

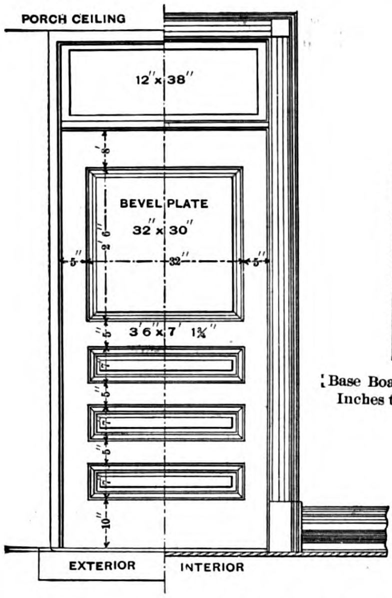


Detail of Front Dormer.—Scale, ¼ Inch to the Foot.



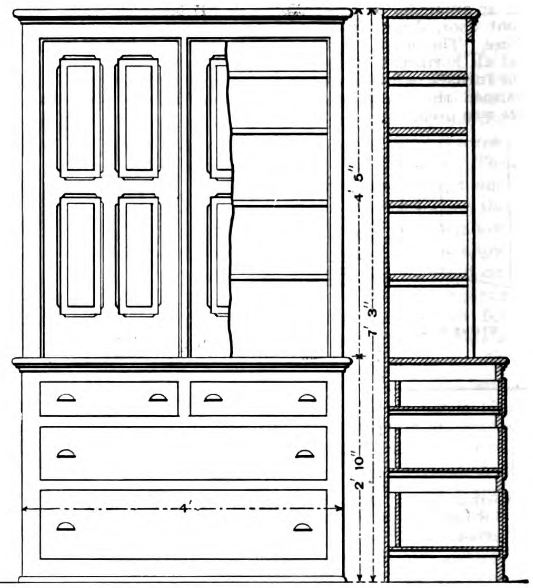
Section of Front Dormer on Line A B.—Scale, ¼ Inch to the Foot.

Miscellaneous Details of Remodeled Stone and Shingled Residence.

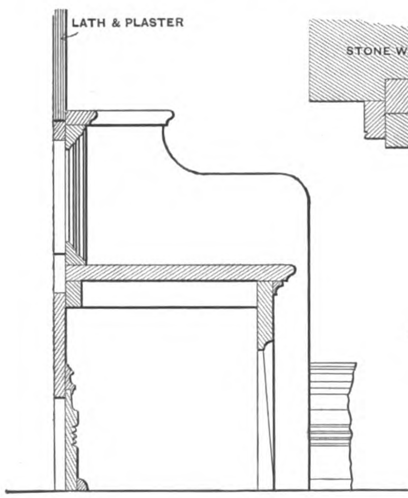


Detail of Front Door.—Scale, ⅜ Inch to the Foot.

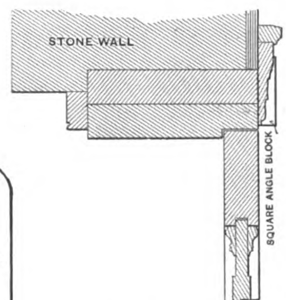
Base Board.—Scale, 1½ Inches to the Foot.



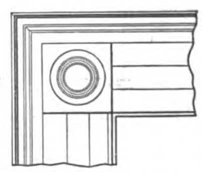
Elevation and Section of Kitchen Dresser.—Scale, ⅛ Inch to the Foot.



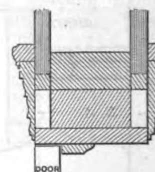
Section through Hall Seat.—Scale, 1 Inch to the Foot.



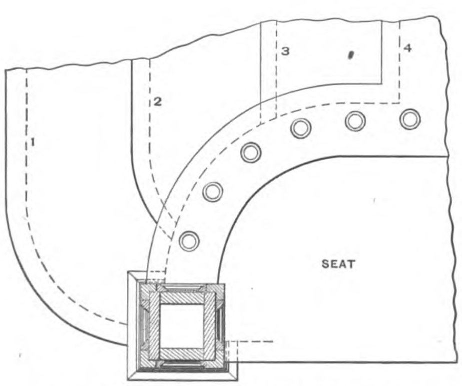
Section of Front Door and Frame.—Scale, 1½ Inches to the Foot.



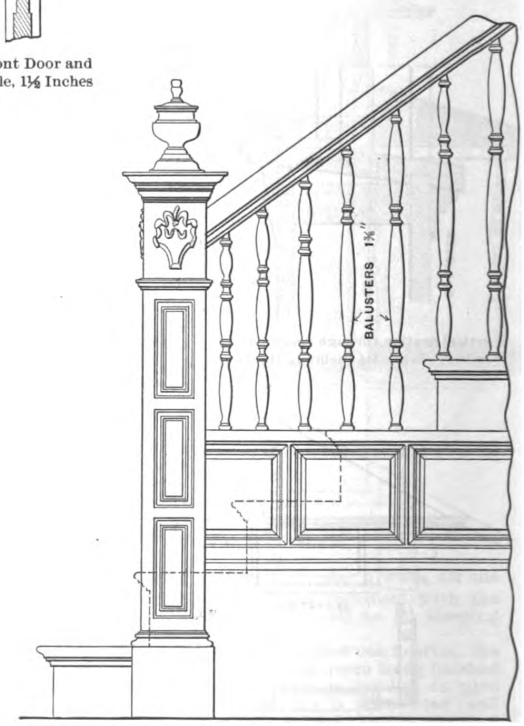
Corner Block on Casings.—Scale, 1½ Inches to the Foot.



Detail of Door Trim.—Scale, 1½ Inches to the Foot.



Plan of Stairs at Newel.—Scale, 1 Inch to the Foot.



Detail of Main Stairs, Hall Side.—Scale, ¾ Inch to the Foot.

Miscellaneous Details of Remodeled Stone and Shingled Residence.

USE OF BRICK IN ARCHITECTURE.

THE following article on the use of brick in architecture was contributed by R. Clifton Sturgis to a recent number of the *Brickbuilder* : Since the days when the Israelites made their unbaked brick of clay and straw for the Pharaohs of Egypt, and probably long before the time of authentic history, brick have been the most largely used and most important of all building materials.

In every part of the civilized world the materials for their manufacture are found ; they are easy to make, and when well made of the best description they are unequaled for durability. It is little wonder that in all ages and all places the art of brick making should have been extensively carried on. Egypt, Assyria, Persia, Greece all made more or less perfect burnt brick, and brought the finer branches of terra cotta to a perfection which has never been exceeded. From a constructional point of view it was left to the Romans, with the general introduction of the arch and the vault, to carry the use of the brick to still higher possibilities.

Romanesque Forms.

During the darker mediæval ages which followed upon the dismemberment of the Roman Empire brick seems to have somewhat lapsed into disuse; at all events, it had no longer the prestige it enjoyed in Rome, where the great baths, aqueducts and public buildings of the empire had their arches and vaults of brick, whether used as a constructive material to be faced with marble and mosaic, or themselves both the construction and decoration.

There was in the decline of the empire a lapse from a debased civilization to a more barbarous but perhaps more healthy atmosphere.

The classicism of Rome received a new and semi-barbarous life in the Romanesque forms, and stone largely replaced brick and marble. Northern Europe was overrun with barbarous hordes, England was in the throes of giving birth to a new and great kingdom. In all the then civilized world, men felt that they were working out new problems, apart and cut loose from all that had preceded them. The civilization, the knowledge, the culture of Greece and Rome, their art and their learning, could not appeal to the only learned class, who were priests of a new order of things, to whom Greece and Rome—the old Rome—but typified all that was evil and harmful, and to the rest of mankind it appealed not, for they knew naught of it. They were sufficiently engrossed in holding their own place in the world, in defending their home or their lord's home, or their king's land. So building, which has always kept pace with civilization, had a seeming setback.

From this great upheaval of the world, as from upheavals that occur in the lives of individuals, came, nevertheless, a truer and stronger growth. The vigorous life and development of Romanesque indicated how strong and true was the new artistic impetus in the south, while in the north Gothic gradually grew to finer and fuller perfection until there were erected all over Europe the magnificent cathedrals, now, as then, marvels of constructive art and of decorative ability, the highest combination of decorative construction and constructive decoration, of utility and beauty.

It was not until all this had been fairly achieved that the world turned again to its past from which, during all these years, it had only unconsciously drawn, to see what could be learned from that which had gone before, and, with the swing of the pendulum, all the world was on fire with the Renaissance. Greek art and Greek literature, classic forms and classic tongues were the only interests.

Violent as was this reaction to the study of the long neglected classic, it brought with it greater benefits, for much that was grand and good in the older civilization and which had run the risk of being entirely lost to the world was now recovered ; and printing gave the assurance that all the accumulated knowledge of the world would now be permanently preserved.

With the Renaissance, brick work again came into prominence. It was used extensively in Holland, in Tudor England, in France and in Tuscany, in North Germany and in Lombardy, and in all these countries, with the constructive common sense which makes their brick work beautiful, and noble examples for all times. In this country, though taught originally by good Dutch and English masons, we have so carefully avoided the principles of construction as to have made our brick work—with the best of materials—the most wretched artistically.

The Joint.

The keynote of all brick work is the joint. The wall is composed of small pieces. The true builder, the true artist, will never attempt to disguise this, but will rather make it serve his purpose by showing it as clearly as possible and bringing beauty out of the materials with which he has to work. The one knows that on the quality of his joint and the careful bedding of his brick depends the stability of his wall, and the other is fully aware that what is necessary in construction ought to make an element in the beauty of the whole.

This principle was thoroughly recognized among all the people whose brick work stands to-day as examples indicating the direction in which alone true advance can be made. There are various methods of striking the joint, of which the best simple one is that which cuts back the upper portion of the joint and makes an even splay out to the ashlar, thus making each course to form a drip over the joint, giving the joint itself an inclination which allows the water to run freely off it. This can be done by a good mason with his trowel, but it can be more perfectly done with a tool. It has the disadvantage of shadowing part of the joint, and so losing the value of its width.

Another joint is made by flattening the protruding mortar to the face of the ashlar with trowel, and then with straight edge and knife cutting off both edges to a true line. This, if the mortar is of the best, will stand well and is very effective. It is a joint used frequently in Holland, where the brick are often more or less irregular, and, by this means, using a very wide mortar joint, they are able to get perfectly true horizontal lines even where the brick themselves are warped or crooked.

There are also the concave and convex joint, both formed with tool and generally used only on fine work, where the brick form a true line.

All have their special uses and special advantages, and the various merits of each should be carefully considered by the architect in connection with each piece of brick work which is undertaken. In all cases, it is important that the horizontal joint should be absolutely true and the perpendicular joints accurately plumbed over each other.

Another Important Point.

The second point of importance is the necessity of so laying the small pieces of material as to make the wall a homogeneous whole, and this gives us the various forms of bond, which, being the necessity of the builder, are made the opportunity of the architect to obtain beauty.

Let us run over shortly the various methods of the builder for obtaining the homogeneous wall and see what the architect has evolved from his data. The chief bonds are as follows : Alternate rows of headers and stretchers which may be arranged with the joints of each course of stretchers perpendicularly over the similar course below, or with the stretcher rows laid to break joint with each other. These give: 1, the so-called English bond (in most common use in England for ordinary work), and, 2, the cross bond, which is that most used in Belgium and Holland.

The latter, while equally perfect in bond, is far handsomer in appearance, and has just that touch of refinement which one would expect to find in an artistic people like the Dutch as contrasted with the more matter of fact English, who, having found the best bond from a constructional point of view, are content to let the matter rest there. The palace at Mechlin by Keldermans and the outlying buildings of the castle at Aertselaer are beautiful examples of the artistic effect to be obtained by carefully laying this bond even without variety of color. It will be seen that the changes in the position of the header joint give a diagonal line of vertical joints, where the English emphasizes only the vertical and horizontal lines.

(To be continued.)

BUILDING A FREIGHT SCOW.

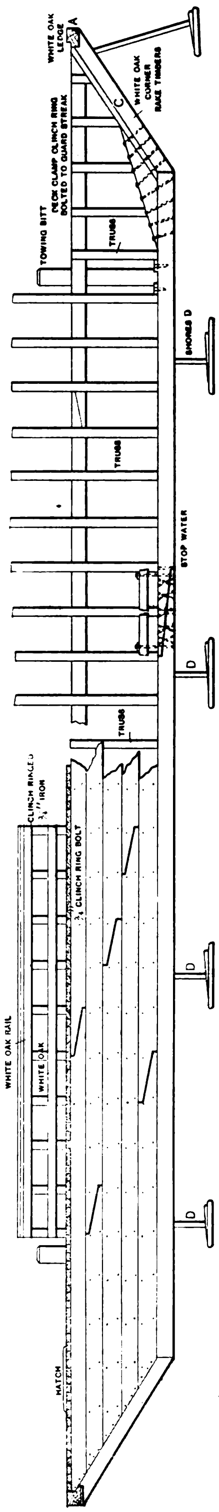
BY A CARPENTER.

PERHAPS some of the readers will be interested in the subject of scow building, although, as it is not strictly in the line of ship carpentry, it requires principally only a knowledge of the different connections, the size and usage of timbering employed and fastening or bolting the same. In work of this kind all scarfs and fitting of timbers require well made joints to give the necessary solidity and stanchness. The jointing of longitudinal timbers requires proper distribution, as the clustering of them on a transverse line would tend to make that point weak, as it is readily seen that the longitudinal stanchness of the craft depends, to a great extent, on the timbering being well built, and sufficiently bolted vertically to withstand the straining which all craft of this class show more or less on ageing. This is called a "hogging" strain, and is caused by the ends sagging, thus leaving the deck crowning amidships. The decks, bottom and cross timbering give the required transverse stanchness.

The quality of material employed forms an important feature in the durabiltity of these craft. The bolting, whether galvanized or black; the timber, whether heart or not, and even the time it is felled and sawed, are matters to be considered. By some it is claimed important to have all timber seasoned, and that a craft built of seasoned heart pine will be far more durable than one of the same grade constructed of green timber. The preservation of interior timbering depends to a great extent on the construction and care of the decks. They should be formed of as narrow timbers as practicable, as the shrinkage is less than when the planks are of greater width. Again, the question of ventilation must be considered, as it forms quite a feature in the preservation of the interior. Some builders claim good effects in preserving the interior timbering by applying a wash composed of lime and water, and it is well understood that salting is a great preventive of decay, as the moisture permeates the entire side surface, preventing what is termed "dry rot," which is apt to start above the load line.

To give the reader some idea of the materials and method employed in the construction of these craft, suppose it is desired to build one, say 26 x 100 feet, a size in general use for freight transportation. As long leaf pine is conceded to be one of the best materials for this work, we will order the same to be cut between December and March. This we stack from wind and weather until, say, September, as the wind is very destructive in checking timber while curing. We start with, say, 12 carpenters and six laborers for breaking out and getting the sticks in position to frame. We then make a full size draft, something after the style of Fig. 1, to get the cut of the rake and keelson timbers, also the anchor stocks and rabbet in the ledge log. These can be framed by a mold or pattern, Fig. 10, which will assist in keeping the rabbet true. The floor beams, rib timbers, keelsons and fore and aft deck beams can also be framed. In framing the latter two, it is well to leave one end of each line of timber to be cut after placing in position, as the kerfing and fitting of scarfs very often shorten these lines considerably. The siding, decking and bottom can now be "out gauged," which consists in planing the edge of the timber ⅛ inch or less to the depth of calking, 1½ inches, as shown in Fig. 9. This is generally worked on the bark or rind side, as it is claimed timber in this position better excludes the weather. The bulkhead timber must be brought to a parallel width also.

In setting the blocking on which to build we give an incline according to the nature of the ground and room desired for handling and spiking the bottom, this being 2 feet in the present case. After setting two of the corner piles, the others can be regulated true to incline and out of wind by stretching lines. On completion of this we get the outer or bilge keelsons in position square on the worked ends and parallel. After kerfing and fitting the scarfs we clamp them tight for boring and bolting or "fastening off," using augers $\frac{1}{16}$ inch less than the size of



Building a Freight Scow.—Fig. 1.—Side Elevation, Shoring Method of Framing and Planking.—Scale, 3/32 Inch to the Foot.

round iron and the same size for square iron. On "fastening off" these lines five or six pieces of bottom can be spiked to hold these and support the other keelsons, setting the shores D, Fig. 1, to support their weight. When all these lines are fastened off we get a line across to cut the ends left in framing. The ribs can be located and mortises worked, as shown in Fig. 8. The rake timbers are best placed in position by first setting the corner ones, keeping them square with the floor out of wind and supported as shown on wedges. The mold, Fig. 10, will assist us on these corners. The others can be set by line, one bolt being sufficient to hold them. As we start the anchor stocks these will require some scribing and fitting, and being clamped tight for boring and fastening, we will fasten with a washer, called a " clinch ring."

The ends of the rake timbers will require working to receive the ledge logs, the operation being called a " bird bill " cut, Fig. 4. The corner ones allow of sizing the ledge, as shown in Fig. 2. This is to resist a side thrust at this point. The floor beams can be placed in position, requiring worm augers to allow of centering, otherwise some of the bolts will drive in such a way that the head will tear and bruise the wood, making a nice harbor for sea worms, which apparently prefer entering bruised or end wood.

The ledge logs are now secured, and allowance made for keeping the sides of parallel depth and giving the deck the required crown. The clamp strakes, transverse deck beams and knees being secured, the deck and bottom can be fastened, four or five of the former of which can be laid and the whole clamped in position. In planking the bottom the timbers require locating, and in leaving them until now we can locate clear of all, spiking seams, &c., the out gauged sides having been marked to prevent mistakes. This work will require close inspection to detect any leaking, defects, loose knots, checks, wind shakes, &c. Sometimes a piece of timber may be defective, and in pieces of the dimension of this side planking some may have sap corners. When this extends to the depth of

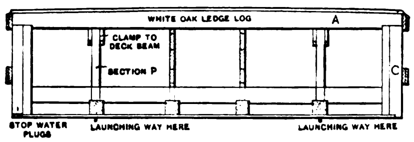


Fig. 2.—Cross Section, Showing End Construction. —Scale, 3-32 Inch to the Foot.

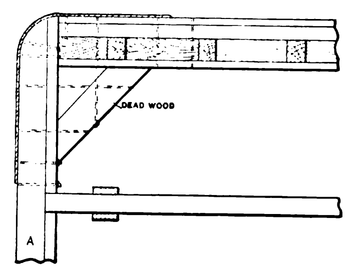


Fig. 5.—Section Showing Construction of Corner.—Scale, 3-16 Inch to the Foot.

Fig. 9.—Section of Decking or Siding that Has Been " Out Gauged."

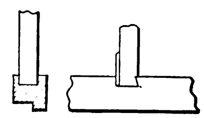


Fig. 8.—Method of Working Mortises.

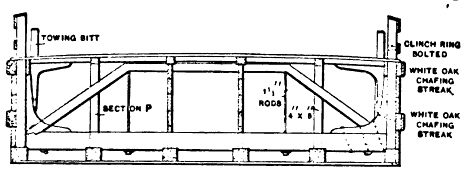


Fig. 3.—Cross Section, Showing Trussing and Knees.— Scale, 3-32 Inch to the Foot.

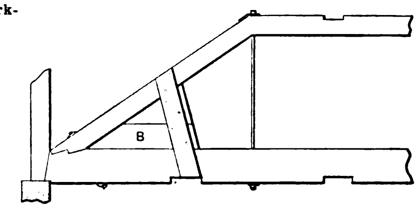


Fig. 6.—Detail of Truss, Showing Method of Stiffening as at B.—Scale, 3-16 Inch to the Foot.

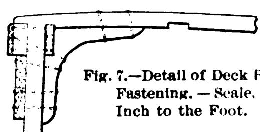


Fig. 7.—Detail of Deck Beam Fastening.—Scale, 3-16 Inch to the Foot.

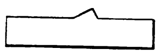


Fig. 10.—Mold for Use in Framing and Working.

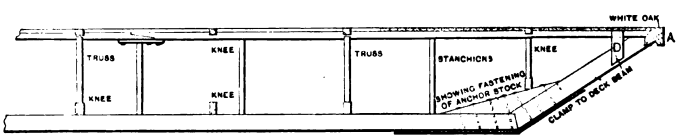


Fig. 4.—Longitudinal Section, Showing Deck Beams and Method of Securing as at D.—Scale, 3-32 Inch to the Foot.

Building a Freight Scow.—Miscellaneous Sections and Details of Construction.

to be well bolted to keelsons, using clinch rings again. Some bolt chains can be taken on and the bulkheads started, fastening with ⅞ x 30 inch drift bolts, say every 3 feet. Places not showing a tight seam should be clamped with chain and wedges, this work keeping the strakes of parallel width, seams tight and the bolts well distributed, making the sixth streak of a width to give the required crown to deck.

Ribs can now be set and the planking started, bolting the first strakes securely to keelsons, the work being done after the same method employed with bulkheads, keeping the seams straight and tight by clamping during the vertical bolting before fastening to ribs. Here we can use a tool called a " dog " to set the seams tight. This is driven into the ribs to allow of setting a wedge. The best pieces of timber have meanwhile been picked for this planking while being out gauged. The bolts prepared for fastening require boring for the head, this necessitating the use of calking, and it is not desirable to reject the piece, this sap should be worked out and sound wood inserted. The piece inserted is called a " graven bit." This is often used to remedy loose knots or other leaky defects, as the case may be. Towing bitts, hatches and rail can be finished, and while the calking, which should be three-strand work, is going on we can get the launching ways in position, giving them 1 inch in 16 fall. Fill the spaces between the ways and bottom with substantial packing and set the wedges, which should be of hard pine or oak, nearly 2 feet apart. When it is desired to launch, it is only necessary to set up the wedges, take out the building blocking and saw off. The sawing off spots can be graduated to allow of the sawyers working in unison. The finishing touches, fastening the corner straps, &c., can be done behind the calkers after launching, and as all seams under this iron require calking, all dubbing of decks, &c., should be done ahead of calking.

Chicago Building Trades Club.

On July 13 the managers of the Chicago Building Trades Club submitted their second quarterly report. The club was shown to be in excellent condition and has clearly demonstrated the wisdom of the movement which resulted in its establishment. The total membership at present is 108, composed of the representative men among the builders of the city.

The financial report showed nearly $4500 to the good. The affairs of the club have been liberally administered during its existence and it is becoming more firmly established every day as one of Chicago's influential business and social organizations. The report stated that an average attendance of about 25 for noonday lunch had prevailed since the establishment of the club, and that many of the members have availed themselves of the privilege of inviting their business and social acquaintances to the rooms. It is noticed with satisfaction that architects of Chicago and other cities have been in frequent attendance, and have freely expressed their surprise and pleasure at the evidence of financial ability and good taste shown by the builders who were responsible for the club and its beautiful rooms. Ladies' day, which function included a lunch for the members and their lady guests, followed by an excellent musical entertainment, drew an attendance of 64 in spite of the unusual heat.

The management made special acknowledgment of the liberality and kindly feeling shown by friends and members of the club in presenting it with pictures and works of art. Mention was specially made of the presentation by John S. Stevens of Philadelphia, ex-president of the National Association of Builders, of a beautiful engraving ; of a framed photograph of the Washington Arch by Stephen M. Wright, secretary of the Building Trades Club of New York, and of a picture of W. H. Sayward, secretary of the National Association of Builders, by D. V. Purington. Acknowledgment was also made to the George A. Fuller Company, the American Terra Cotta Company and others. The club is in a most prosperous condition and provides an unexceptionable home for the building interests of the city.

Enameled Marble.

The chemical glossing or enameling of marble is of very recent origin, and bids fair to supersede the former method of giving marble a lustrous appearance by mechanical means. The old method precluded its application upon any but smooth surfaces, while the new method is applicable to rough hewn, rock faced and carved work, as well as to smooth surfaces, is equally readily applied to any form of work, and is of a much more lasting nature.

This improvement should open a new field for architectural designers, as there is a tendency shown generally when erecting large structures to embody new and more artistic features than heretofore. And now, when marble can be embellished with a luster which will insure its remaining clean and bright, regardless of the carving and open work thereon, it will certainly become the choice of building materials in the future for all high-class structures

A residence constructed of marble thus enameled, the base of rough hewn stone, and the remainder of rock faced and embellished work, would make a magnificent structure.

Marble mantels, elaborately carved and enameled, would also be a work of art not heretofore possible.

THE Lincoln apartment house, which is in process of erection on Penn avenue, Pittsburgh, Pa., is, we understand, the first venture of that kind in that city. It is being built on plans similar to those governing the construction of apartment houses or flats in New York and other Eastern cities, will be nine stories high and contain about 116 rooms. It is being put up by a number of well known capitalists of Pittsburgh who have taken stock in the enterprise and who believe it will be a profitable investment. Rasner & Dinger of the city named have secured the contract for the copper work and skylights, while Henry Shenk has secured the contract for the construction of the building. The architects are Rutan & Russell of Pittsburgh, Pa., and it is expected to have the building completed by the first of April of next year.

The Philadelphia Mechanical Trade School.

The closing exercises of the sixth term of the Philadelphia Master Builders' Mechanical Trade School were held the first week of July at the Builders' Exchange in Philadelphia, Pa. President George Watson presided, and there was a large attendance of pupils and their friends as well as others interested in the school. In his address President Watson reviewed the history of the school and referred to the appropriation for its support lately obtained from the State Legislature. Speaking of the training given to the students, he said that it was impossible to teach a trade completely during a short period of nine months' study, but a practical knowledge of the handling of tools was given and the fundamental principles of the mechanical arts carefully taught.

Addresses were also made to the students by Amos Bonsall and by Superintendent Crawford of the Williamson School of Mechanical Trades, Media, Pa., after which President Watson presented certificates to 55 graduating students of the various trade classes, as follows: Plumbing, 34; Carpentry, 8; Bricklaying, 8; Stone Cutting, 3; Painting, 2. As usual, the plumbing class was the most numerously represented, claiming a total of 34 students among the graduates. Of these, 21 were apprentices already working at the trade and 13 were intending apprentices. Premiums for the highest degree of efficiency were won by R. W. Barr among the intending apprentices and C. T. Saxer among the apprentices.

Aluminum Roofing.

A San Francisco, Cal., paper reports that Frank Weitman, a skilled metal worker of that city, recently sailed for Guatemala City to fulfill a contract with the Guatemalan Government to cover the roof of the Houses of Congress with aluminum. The work will be unique of its kind, both on account of the novel application of aluminum to roofing purposes and the scale on which the experiment is to be made. It is said that the lightness of aluminum was the main reason why that metal was chosen for the Guatemalan Capitol, as the roof is immense and the spans of more than ordinary extent. It is estimated that it will take a large force of men from eight months to a year to complete the covering. In reference to the above item of news, President Hunt of the Pittsburgh Reduction Company advises us that they have, through their San Francisco agency, recently shipped some sheet aluminum to Guatemala, presumably for the purpose named.

The outcome of this experiment will be awaited with interest. Although the suitability of the metal for roofing purposes has been suggested, we do not know that any practical steps have been taken in this country to test its advantages in this connection. Two obstacles seem to stand in the way of any extended adoption of aluminum in roofing construction at present. These are its cost—which is slightly greater than that of sheet copper, gauge for gauge—and the absence of any really efficient and reliable aluminum solder. It is likely, however, that both these drawbacks will be overcome in the course of time.

THE great roof beams of Winchester Cathedral, England, are being renewed, and the wood used is oak from Stettin, Germany, cut in 42½-foot lengths, the other dimensions being 14 x 18 inches.

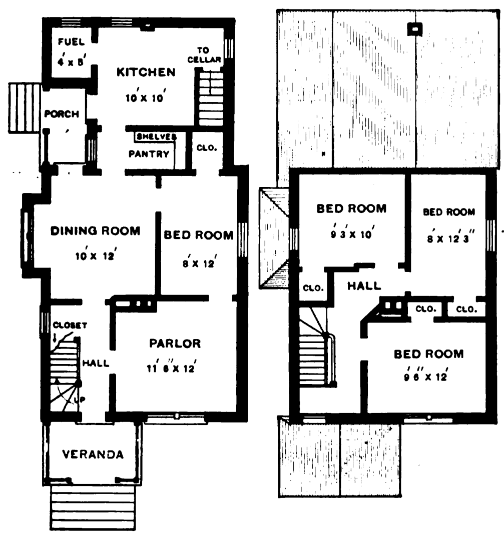
CORRESPONDENCE.

Construction of Silos.

From H. H., *Superior, Wis.*—In answer to "H. S. L.," East Pharsalia, N. Y., whose letter appeared in the May number of the paper, I would say that he can obtain very complete plans and information that is up-to-date in regard to silos by addressing the Secretary of Agriculture, Washington, D. C., and asking for a copy of Farmer's Bulletin No. 32, entitled "Silos and Silage." This can be obtained gratis.

Elevations for Workingman's House.

From C. A. B., *Brandon, Manitoba.*—I send herewith the first and second story plans of a cheap workingman's



Elevations for Workman's House—First and Second Floor Plans, Submitted by "C. A. B."

house, for which I hope some of the practical readers will furnish attractive elevations. With the exception of a bathroom, which could easily be provided either up or down stairs, the house is provided with all modern conveniences. On the first floor are parlor, dining room, kitchen and a sleeping room, while on the second floor are three sleeping rooms with closets.

Lessons in Perspective Drawing.

From I. P. HICKS, *Omaha, Neb.*—In reply to "Young Chip" of Montreal, Canada, I will say that nearly all the inquiries received relating to drawing are for architectural drawings, and how to make the perspective views of buildings is the principal point on which a general knowledge of the work is wanted by many.

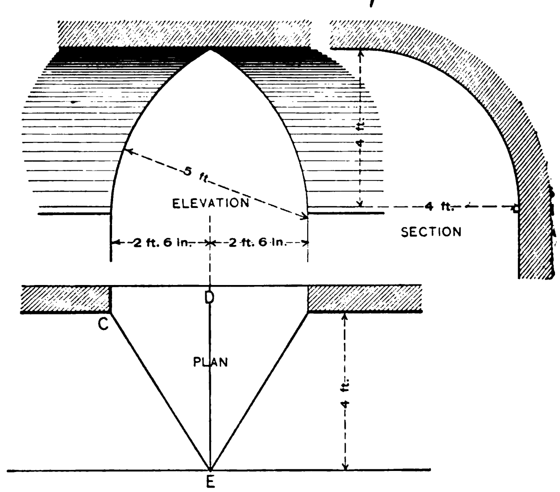
To make a perspective drawing it requires that the same general principles be carried out, whether it is the side of a house or the side of a piece of furniture, and when the art of making perspectives is once acquired, then the learner can practice on any paticular branch of it for which his business or pleasure may seem to call. The lines put on the drawings are to indicate the method of proceeding with the work, and show how to locate the important points which always have a place in perspectives. The lines are not what I should call imaginary, as the most of them, when traced, lead to some point in the object to be drawn, and many of them form the outlines of the object. The extension of these lines to the vanishing points is, I presume, what my young friend thinks the imaginary part. This has been done to show the direction of the lines and why they are so directed. After the work is thoroughly understood it will only be necessary to locate the proper points and draw only such portions of the lines as required in the permanent part of the work. The work should first be sketched, and when finishing only those lines which are confined within the outlines of the object need be permanently drawn.

Materials for Moving Buildings.

From SEQUIN, *Hammonton, N. J.*—I take the liberty of aiding the correspondent from Germantown, N. Y., who in the May issue of the paper presents under the name of "Carpenter" an inquiry regarding materials employed for moving buildings. I would say that rolls 3½ feet long and 8 inches in diameter are sufficient for any common building. In the section in which the correspondent resides yellow birch can be found, I think, and as it is a tough, close grained wood, it will answer the purpose admirably. An open grain wood is not desirable, as it will "broom up" too easily. Now about jacks, I would say that I have never yet seen the thread on either 3-16 or ¼ inch stripped, but the 3-16 inch thread is commonly cut on jacks, or Jenny Lind screws, as they are sometimes called. If "Carpenter" wants a screw which will raise five times a much as any he ever saw, I would suggest that he write to C. A. Hooker of Bath, Maine, as I think he can put him on the track of something that will lift. The screw is a device that he got up himself, and I think it is manufactured by the Fairbanks Scale Company of St. Johnsbury, Vt. If there is any further information bearing on the question of moving buildings that I can give I shall be glad to offer my mite upon request. Maple planks 4 x 8 inches and 5 feet long, or 4 feet long, will prove the thing for shoes. As no mention is made of tackle, I take it for granted that "Carpenter" is familiar with the method of arranging for any purchase he may desire to use. It is a great help to the carpenter who has any heavy timber or heavy weight to raise to properly understand the handling of blocks and falls. It is distressing to see some people tangle themselves up with ropes trying to do something and making hard work of a very simple matter, because they have never learned the why and wherefore.

Groin Between Window and Ceiling.

From W. P., *Omaha, Neb.*—I would like to have a solution of the problem indicated by the sketches inclosed. The case is that of a Gothic window in a coved cornice, having a 4-foot rise and 4-foot run. I would like to know how to lay off the hip or groin formed on the line C E, as



Groin Between Window and Ceiling.—Sketches Accompanying Letter of "W. P."

the window has only 2 feet 6 inches run, but the same 4 feet rise as the cornice. I would like to know what size of material to use to obtain a nice 2-inch wide hip the entire length. If the practical readers of the paper will give this matter attention they will not only assist me but probably serve others as well.

Starting in Business.

From W. J. C., *Virginia*.—I desire to say to the correspondent signing himself "A Reader," whose letter appeared in the July number, that unless he is in a large city and can work up a local trade in the lines he mentions he had much better keep his money or invest it in something else. In order for a man to make a success in the lines named three very special requisites are necessary—namely, considerable skill, money and, what is greatest of all, a name. Without these a man is handicapped almost beyond the hope of success.

Framing an Ogee Tower.

From W. J. McC., *White Plains, N. Y.* — The correspondent "M. L." of Warren, Ohio, asks in a recent issue of *Carpentry and Building* for a plan showing the manner of framing the rafters for the roof of an ogee tower and putting on the sheeting. In compliance with his request and for the benefit of those who may be interested, I inclose drawings for the same. Supposing now that 1 2 3 4 5 6 7 8 of Fig. 1 represents the plan or plate line of the roof and N P the rise of the roof, it can be laid out as follows: Proceed to strike the plan 1 2 3, &c., either full size or to scale. In the present instance it is to a scale of ¼ inch to the foot. It is always better, however, to lay out full size if possible. For striking the circle draw lines for the rafters 1 5, 2 6, 3 7 and 4 8. Directly above the plan draw any straight line, as for example K O, the same length as 3 7, which is the line of the plate. Raise the center line N P, which is the hight of the roof. Next produce the shape of the rafters and join O P, R P, N P, M P and K P, which will be the lengths of the rafters. If the roof is to be boarded vertically horizontal strips or sweeps will be required. To do this divide the hight N P into any number of equal parts and draw the lines A B C D, shown on the plan of Fig. 1. This will give the sweep and cut for each nailing piece to fit against the rafters, as shown. One pattern will do for each sweep and the remaining 24 can be marked from each pattern. In regard to the style of framing employed, I would say that the ribs or the shapes of the rafters are sawed out of 2-inch pine nailed to a 2 x 4, as shown, which makes a stronger and better job than if they are sawed in one piece, as is very often done. The elevation in Fig. 1 shows the rafters, sweeps or nailing pieces, plates, &c., in their respective positions and gives a general idea of the construction. In order to find the exact shape and bevel for the covering boards the following method is employed: Divide the curve B F of Fig. 2 into any number of equal parts, as 1 2 3–18, and draw lines parallel to the plate A B. Plumb down from these lines where they strike the curve B F to the line C D and describe the dotted lines as shown on the plan. Continue indefinitely the line C D Next take the distances B 1, 1 2, 2 3, 3 4, &c., of the elevation and lay

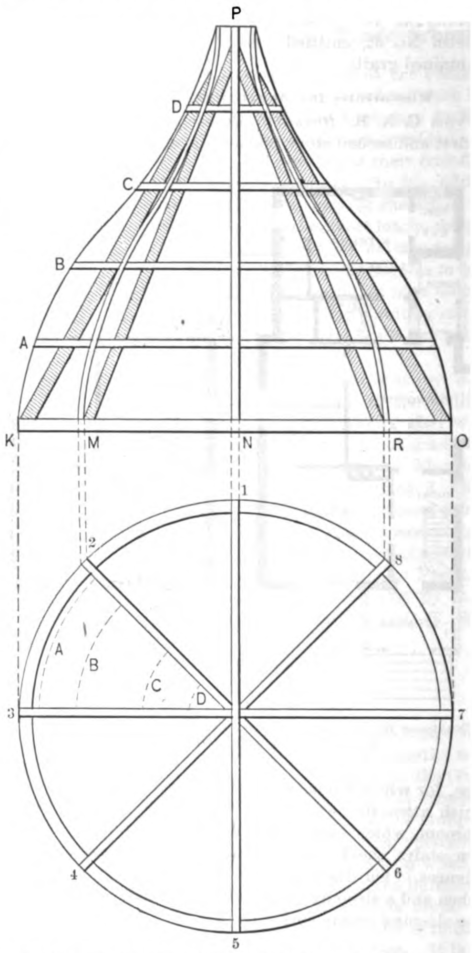


Fig. 1.—Plan and Elevation, Showing Shape of the Rafters, &c.

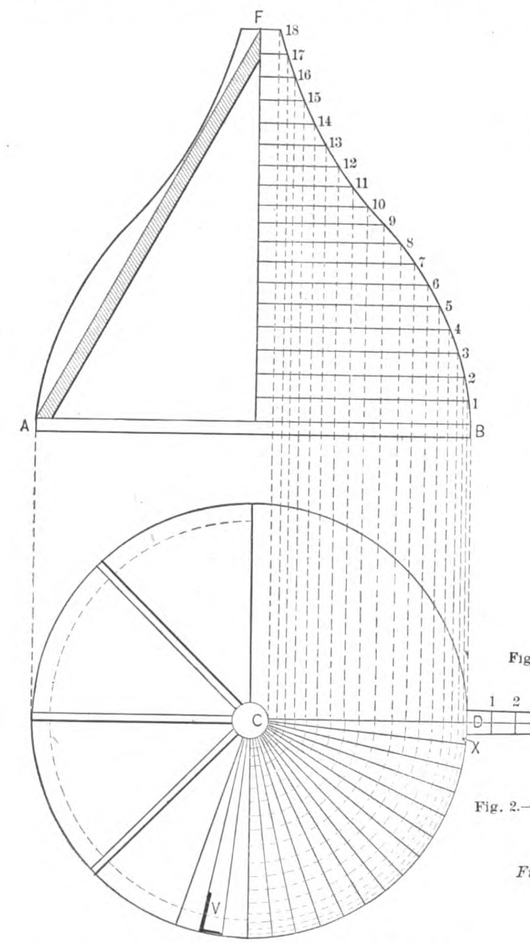


Fig. 2.—Showing Method of Developing the Shape and Bevel of the Covering Boards.

Framing an Ogee Tower.—Scale, ¼ Inch to the Foot them off on D E square across, as shown. Next take the distances on each line from X to C and lay them off on the center line D E—one-half on each side, the line D E being the center line of the board. Join these points and the exact lengths and shapes of the covering boards will be given. The number of boards required to cover this roof will be 56, as one-quarter will require 14 boards, as indicated in the plan, Fig. 2. The bevel V on the plan, Fig. 2, will be the bevel of the jointed edges of the boards.

Cornice for Roofs of Different Pitches.

From W. H. F., *Ashland, Ohio.*—In reply to "M. M. M." of Gravelton, Mo., who asks with regard to planceer joints where roofs are joined for different degrees of pitch, the plate being the same hight throughout, I would say that I have a method which I think is very good and which I submit for publication. In Fig. 1 is a diagram of a 12-foot span, one-half of which is joined to a span of 18 feet of one-third pitch, the two parts being joined at right angles. F A B C are the outside plate lines and the inner planceer lines G H and H D are the ridge lines of the two parts. A I is a common rafter of one-half pitch; C J is a common rafter of one-third pitch; B H is the valley line where the two roofs join; *c a* and *a b* represent the outer edge of the planceer. Extend I A to *c*. Set off with the dividers the distance A *c* to *e* and draw *e g* and *g* B. Extend J C to *b* and with the dividers set off C *b* to *d*. Draw *d f* and *f* B. Connect *a f* and *a g*. Set bevels at the angles *g* and *f* as shown. These will give the miter for each side of the planceer. In order to obtain the down cut draw the quarter arc A B, Fig. 2. Draw B D indefinitely; then draw from A at an angle of 45 degrees a line intersecting B D, which establishes the point E. Draw C *a* one-half pitch and C *b* one-third pitch. Square cut from *a* and *b* to the line A C, establishing the points *c* and *d*. Connect *c* E and *d* E; set bevels at the angles *c* and *d*, which will give the down cuts for the planceer and all molds and fascia set square with the rafters.

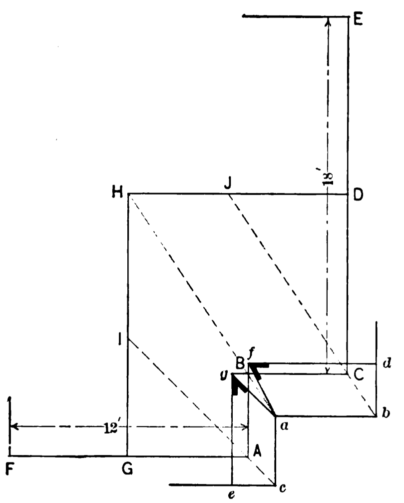


Fig. 1.—Diagram Showing the two Roofs.

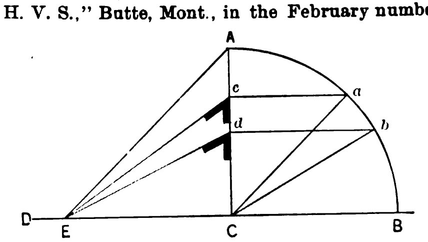


Fig. 2.—Diagram for Obtaining the Down Cut.

Cornice for Roofs of Different Pitches.—Diagrams Accompanying Letter of "W. H. F.," Ashland, Ohio.

Walnut and Rosewood Stains.

From W. J. S., *Parker, S. D.*—I would like to have some one give me a receipt for walnut and rosewood stains without varnish.

Answer.—Our correspondent does not state what kind of wood he desires to treat to imitate walnut and rosewood, but we offer a few receipts taken from the "Hardwood Finisher," which, while more especially applicable to pine, may be used in connection with other woods. In order to imitate walnut, mix together by stirring 1 quart spirits of turpentine, 1 pint asphaltum varnish, 1 pint japan, 1 pound dry burnt umber and 1 pound dry venetian red. The mixture is applied with a brush and gives a transparent stain which allows the grain of the wood to show through. Another receipt is to boil 1½ ounces washing soda and ¼ ounce bichromate of potash in 1 quart of water, adding 2¼ ounces of vandyke brown. This stain may be used either hot or cold. Still another recipe is to dissolve by boiling one part each of epsom salt and permanganate of potash in about 25 parts of water. The stain may be improved by the addition of eosine and works best when applied hot.

In order to imitate rosewood, boil 1 pound of logwood in 1 gallon of water, adding a double handful of walnut shells; boil the whole again, strain the liquor and add to it 1 pint of the best veneer. Apply it boiling hot and when the wood is dry form red veins in imitation of the grain of rosewood with a brush dipped in a solution composed of 1 pint of nitric acid, 1 ounce of metallic tin and 1 ounce of sal ammoniac. Mix and set aside to dissolve, occasionally shaking. If carefully executed it will give the appearance of dark rosewood.

For surface stains the following recipes are sometimes used, the colors being mixed with very thin glue size, laid on warm with a soft woolen material and the wood wiped dry after application. All the colors used in staining should be well pulverized, and before using the liquid should be strained. To imitate walnut take burnt umber and yellow ocher, mixed in proportions to give the desired shade. To imitate rose wood, take venetian red darkened with lamp black to the required shade. It is possible that readers of the paper may employ other recipes to imitate the woods named, and we shall be glad to have them write us in regard thereto.

Top and Down Cuts of Purlins.

From A. P. S., *Butte, Mont*—In reply to the inquiry of "H. V. S.," Butte, Mont., in the February number of the paper, I send figures by which the correspondent can obtain with the steel square the bevels of the roofs in question; also of the purlin plates lying on and at right angles to the principal rafters and joining another roof of the same width and pitch. For the top and down bevels of purlins in a roof which rise 16 inches in 12 inches run use the following figures: For the side bevels take 16 inches on the tongue and 20 inches on the blade of the square and the tongue will give the bevel required. For the top bevel take 12 inches on the tongue and 20 inches on the blade of the square and the tongue will give the required bevel. The bevels for 8-inch rise and 12-inch run are as follows: For the top side take 12 inches on the tongue and 14⅜ inches on the blade of the square and the tongue will give the required bevel. For the side bevel take 8 inches on the tongue and 14⅜ inches on the blade of the square and the tongue will give the required bevel.

From Tramp, *Colorado.*—In answer to "H. V. S." of Butte, Mont., allow me to offer the following: In connection with a roof of two-thirds pitch or 16 inches rise per foot run, take for the top cut 16⅔ inches on the blade and 10 inches on the tongue and cut by the tongue. For the down cut for a miter joint at the valley, take 12½ inches on the blade and 10 inches on the tongue and cut by the tongue. For the down cut for a butt joint at the valley, take 22½ inches on the blade and 10 inches on the tongue and cut by the tongue. In the case of a roof of one-third pitch, take for the top cut 12 inches on the blade and 10 inches on the tongue and cut by the tongue. The down cut for a miter joint is found by taking 18 inches on the blade and 10 on the tongue and cutting by the tongue. The down cut for a butt joint is found by taking 8 inches on the blade and 10 inches on the tongue and cutting by the tongue.

From D. W. R., *Asbury Park, N. J.*—In reply to "H. V. S." of Butte, Mont., who asks with regard to finding the top and down cuts of purlins by means of a steel square, I would say that for the top bevel take 20

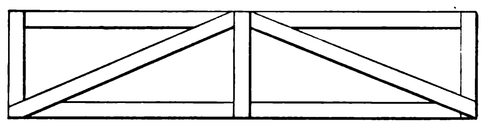


Fig. 1—A Good Method of Bracing.

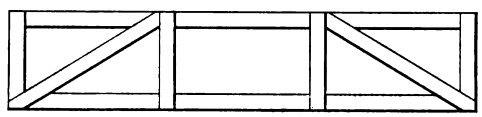


Fig. 2.—A Better Plan.

Method of Roof Bracing.—Sketches Furnished by "A. E. P."

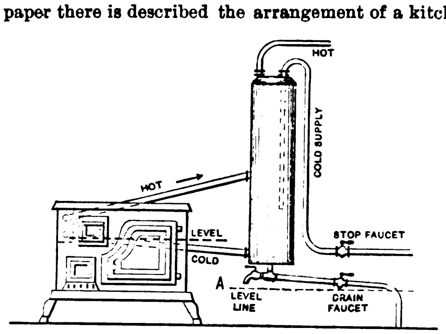
inches on the blade and 12 inches on the tongue and the tongue will give the bevel required. For a roof of 16 inches rise to 12 inches run take for the down bevel 20 inches on the blade and 16 inches on the tongue and the tongue will give the bevel. For a roof of 8 inches rise to 12 inches run take 14 7-16 on the blade and 12 on the tongue and the bevel down the tongue will give the cut for the top purlin. For the down bevel take 14 7-16 on the blade and 8 on the tongue and the tongue will give the bevel required.

Method of Roof Bracing.

From A. E. P., *Sparta, Wis.*—In looking over some of the back numbers of the paper I notice that the inquiry of "C. S.," Wayland, Iowa, which appeared on page 230 of the issue for last year, has not been taken up by any of my brother chips. I therefore offer two sketches which may prove of interest to the correspondent named. Fig. 1, which I send, represents the correct method, in my estimation, of bracing a roof, although the sketch shown in Fig. 2 is what I consider a much better plan to be employed. The sketches show so clearly what I mean that no further description would seem to be necessary.

Arrangement of Kitchen Boiler.

From H. M., *St. Louis, Mo.*—In a recent number of the paper there is described the arrangement of a kitchen



Arrangement of Kitchen Boiler, as Suggested by "H. M."

boiler, and as I am interested in the matter permit me to offer my experience. When the cold supply from the boiler of the range is level the sediment in the water will settle within the coil in the range and considerable hammering will be the consequence, besides expensive cleaning by the plumber. It is best, therefore, to let this pipe fall toward the boiler so that the accumulation of sediment may be drained by a 1½-inch pipe, or through a special faucet, A. There is a boiler made with a mud drum beneath. St. Louis water requires a boiler to be cleaned about once a month by simply turning the drain faucet and allowing the water to run about 15 minutes.

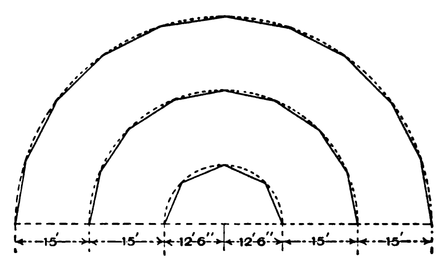
Filing a Hand Saw.

From BOWNLOW, *Colorado.*—In filing a hand saw to-day I discovered after the work was done that the teeth on one side were much longer than on the other, and I cannot get them just right. I have never had this thing occur before, as I have been in the habit of having the saws fixed by people who do nothing else. I am not much of a hand at sharpening a saw, but here in the West I am obliged to do the work myself. I find it very hard and any help from my brother chips will be greatly appreciated.

Note.—The letter of our correspondent raises a question which can easily form the basis of a very interesting discussion of the subject of saw filing, and we trust the practical readers will take it up and tell their way of overcoming the difficulty mentioned.

Camber for Conical Roof Bearings.

From O. J., *Los Angeles, Cal.*—I inclose a half plan of a roof which is conical in shape, having a diameter of 85 feet and a pitch of 4 feet. The bearings, as shown in the sketch, are made of 6 x 12 timbers in straight pieces, disposed about the circles as indicated. What I want to know is, how I can secure the proper amount of camber for each section of the bearings. The rafters must be straight from peak to eaves and lie in one plane around the entire roof. The outer line of bearings is divided



Camber for Conical Roof Bearings

into 20 sections, the second line into 16 sections and the third line into 8 sections. I hope that some of the practical readers will discuss this question for the benefit of others as well as myself.

Carving for Bedstead.

From CHARLES J. WOODSEND.—I notice the inquiry in a recent issue of "C. T. F.," Virgilinear, Va., relative to carving suitable for a bedstead. As soon as I can find the time, I will endeavor to reply specifically to his request and give him a design suitable for the purpose. Before doing this, however, I would like to know the size of the design desired, the style, whether the correspondent desires to do all the work himself, and whether or not the bedstead is already made. It is important I have this information before I can intelligently proceed with a reply to his request.

Recipe for Staining Oak a Green Color.

From H. H., *Superior, Wis.*—I am in need of a recipe for staining oak a green color, bright green preferred. I do not want the ammonia process, as that is too expensive and not suitable for bulky articles. I notice that some receipt books give verdigris and nitric acid mixed together. I have tried the mixture, but it is a total failure. I would also like the question of "Young Chip" in the May number answered. I think it would interest a great many to have an article or two on wood turning published in the paper.

WHAT BUILDERS ARE DOING.

DURING the past month the general attitude of the builders throughout the country toward the condition of affairs in their several cities seems to have crystallized into a feeling of discouragement, the East alone presenting conditions that are reasonably satisfactory. Conditions south of the Potomac River and west of the Mississippi are particularly discouraging, the outlook being practically hopeless for a reasonable activity during the balance of the year. The situation in the Northwest is reported as being very dull, very many of the builders being without employment. On the Pacific Coast, except in isolated cases, little building of any significance is being carried on. Up to the present time there has been a hopeful tendency among builders generally to look forward to increased work as the season advanced, but developments have been so unsatisfactory that the actuality of the situation is more freely admitted than at any time during the year, and the general feeling seems to be one of despondency.

Comparatively few labor disturbances of a serious character have occurred during the past month, the large cities especially having been unusually free from strikes or lockouts. Such differences between employers and workmen as have been allowed to reach the stage of open breach have been inefficient in almost all cases because of the willingness of idle workmen to take employment of any kind wherever it might be found. The small amount of work on hand has made aggressive action by the workmen of little importance to employers, and in few cases has work been retarded by the action of the unions. There seems to be an increasing tendency of the workmen to avoid resort to strikes for the accomplishment of their ends, and a corresponding increase of effort to produce desirable conditions through legislation.

Boston, Mass.

The amount of work on hand among the builders of Boston continues about the same as that reported last month. Comparatively little new work is projected. The strike of hoisting engineers has not been officially declared off and the workmen are making strenuous efforts to secure the concessions from the employers for which they are striking. The Central Labor Union has taken up the matter and is endeavoring to secure legislative action which shall make laws governing the employment of hoisting engineers more stringent than they have been heretofore. The carpenters are still actively at work attempting to secure united action by all of the unions on the eight-hour question, and it is stated that as soon as a date satisfactory to all for the establishment of eight hours can be reached the matter will be put to test and prosecuted by strikes if necessary.

Buffalo, N. Y.

The building business in Buffalo is reported as very dull, the amount of work on hand being much less than is usual at this time of the year. Present indications give little promise of an improvement during the remainder of the season, and the contractors are of the impression that there will probably be less to do in the near future than there is at present. The union carpenters are still making an effort to secure the establishment of an eight-hour day, and claim the existence of a strike; but in view of the fact that there is so little work on hand the employers state that the trouble in no way retards the progress of work. In some cases union men have been locked out by the employers, but no difficulty in finding workmen is reported. The workmen, however, feel very sanguine of the success of the movement and predict a universal establishment of the eight-hour day throughout the city before the end of the year.

The Builders' Association Exchange, through its Committee on Entertainment, has outlined a very attractive programme for entertaining the delegates and visitors to the coming convention of the National Association of Builders. The programme has been arranged with particular reference to the business of the convention, and none of its features will be permitted to interfere with the real purpose of the gathering. The programme as outlined by the committee appears on the Builders' Exchange page of this issue

Chicago, Ill.

Chicago builders and dealers in building supplies seem to be unanimous in the opinion that there is less work on hand and less work projected at this time than at any previous period in the recent history of the city. There seems to be little prospect of any improvement during the remainder of the season, and the total of work done for the year, it is expected, will fall far below the general average of later years. The number of serious labor disturbances occurring in the city seems to be steadily growing less, there being a manifest desire on the part of all concerned to adjust differences as far as possible without resort to strikes or lockouts. What gave promise of developing into a general strike of the hoisting engineers and the stonecutters on account of the cut stone contractors' refusal to pay the 45 cents an hour scale of the former has been happily averted at a conference by a committee from the Hoisting Engineers' Union with the Cut Stone Contractors' Association. The agreement entered into is a compromise. The engineers regard it as a victory, for they secure a slight advance in wages, though they asked for more than the compromise scale, and every stone yard in the city is under a strictly union yard rule. The agreement is as follows: Engineers shall be paid 30 cents an hour for eight hours' work, 45 cents an hour for work during the noon hour and overtime, and 60 cents an hour for Sunday work. Though on this basis an engineer will earn but $14.40 per week for work on the eight-hour limit, assurance is given that no engineer shall be paid less than $20 per week.

That the Building Trades Council is becoming more conservative in its methods of adjusting the grievances that arise in the relations between employees and employers in the building trades was made evident when the council's board of walking delegates revised the by-laws governing its procedure. The most important change made was the revision of the clause regulating the calling of strikes. The new rule limits the power of the delegates, who must make a detailed investigation of the job concerned, and if the efforts to settle the grievance with the contractor, the owner, and finally with the architect of the building, prove futile, the business agent must call on the board of walking delegates for the desired assistance. Each trade represented on the board is to have but one vote in ordering a strike. In urgent cases, where quick action is necessary, the delegate has discretionary power to act.

The Building Trades Council, through its Committee on Arbitration, is seeking to establish a better understanding throughout the building trades between employers and workmen, and has begun this work by seeking to enlist the assistance of the Mason Builders' Association, between which and the bricklayers' unions an arbitration agreement already exists. Both employers and workmen favor the establishment of arbitration agreements throughout the entire building trades, and both employers and workmen have expressed the hope that this movement will be successful.

The south side contractors, builders and building material dealers have opened headquarters on the northwest corner of Sixty-third and Halsted streets, to be known as the South Side Builders and Traders' Exchange. The annual dues will be $18. The exchange is receiving the support of the leading contractors and material men on the south side. A feature of the exchange will be the exhibit of building materials and modern appliances and catalogues of leading houses interested in the building lines.

Harrisburg, Pa.

A considerable amount of building has been in progress during the past year, and contractors and architects continue to find plenty of work. There have been no labor disturbances to interfere with building operations, and the result is a steady forward movement. One of the largest building concerns in the city has taken out permits for more than 100 houses, all of which will be high priced structures. Another builder has taken out permits for between 40 and 50 houses of attractive design. A number of large store buildings are now in process of erection, together with four brick school buildings, club houses, churches, &c. The number of building permits issued during the month of June aggregated an estimated valuation of $133,681, but it is thought that the record for the current month will far exceed this total.

Building Inspector Schuddemage recently appeared before the Joint Committee of Councils on City Property and discussed a proposed ordinance for the guidance of the building inspector. In presenting his reasons for requesting contractors to furnish the cost of materials, he stated it was to save expense and annoyance to both the contractor and builder, and at the same time enable the inspector to more readily determine whether or not to issue a permit. He cited an instance where, if the building inspector had not been informed as to the material to be used in the construction of a certain building, the contractor might order and have delivered materials which, upon inspection, would be found entirely inadequate for the purpose.

Kansas City, Mo.

At the present time the building interests of Kansas City are dull, with but little prospect of improvement during the remainder of the season. The amount of work done during 1895 was a decided improvement over the two or three preceding years, and early in the present spring business seemed to start off with a rush. During the first three months more than twice as much work was done as was done during a similar period in 1895; but about April 1, that being election time, business seemed to flatten out and has not yet recovered. Builders seem to be unable to account for this condition of affairs, and the general stagnation prevailing throughout the West seems to have settled down upon the building interests of Kansas City. The Builders and Traders' Exchange is making a strong fight in behalf of better conditions generally among the builders. There has been little or no disturbance among the labor unions, and work being scarce, there is little likelihood of any unpleasant complications during the year.

Lowell, Mass.

On June 25 the members of the Builders' Exchange of Lowell indulged in their annual outing at Mountain Rock Grove. The affair was a most enjoyable one, the members entering heartily into the spirit of the occasion. Baseball and football were the principal features of the day, which, together with ample refreshment of a character usual to such gatherings, made the event one long to be remembered by all in attendance.

At the request of the Manual Training School of Lowell, a committee from the Builders' Exchange was recently appointed to investigate its methods of operation and the results produced. The committee reported very favorably, stating that its work seemed to be eminently practical, and that the pupils were being efficiently and practically instructed in the several branches of the building trades in which instruction is given. The exhibit of work done by the pupils was especially satisfactory, as indicating the thoroughness of instruction and the general ability of the pupils.

The amount of building on hand at the present time is considerably less than that of preceding years, and, while many of the prominent contractors are busy, there is a large number doing practically nothing. It is estimated that the amount of work on hand being done by members of the exchange will not exceed $100,000 at this time, and that the total amount of work for 1896 will fall 20 per cent. below that of 1895, and in the vicinity of 70 per cent. below that of the banner year, 1892.

There is comparatively little disturbance among the workmen, the only action of importance that has been taken recently being an attempt by the masons to control the work being done in favor of union men. The Plasterers' Union has also taken action in opposition to non-union men, and has stated that no plastering will be done on laths that have not been put on by members of the Lathers' Union.

The Building Exchange is reported as being in excellent condition, and is generally more efficient at the present time than ever. The members feel that the exchange has arrived at a stage of its usefulness where they recognize the benefits to be derived from its existence so thoroughly that it would be exceedingly difficult to dispense with it. It is an unusual thing not to find some name posted for admission, and the committee having membership in charge discriminates carefully in favor of men who will benefit the organization, no person of questionable business habits being allowed to gain admission.

Los Angeles, Cal.

Word comes from Los Angeles that during the past month the prospect for the remainder of the season among the builders has been greatly improved. The amount of new work projected is unusual for this season of the year, and builders are hopeful that the increase may continue until the amount of work done reaches the figures established by more prosperous years. There has been little or no disturbance among the workmen during the season, and from the present prospect there is little likelihood that anything will occur to disturb or restrict the new work coming into market.

Milwaukee, Wis.

The building business in Milwaukee still continues very dull, although the outlook seems to be more encouraging than it did at the opening of the season. Several contracts for work outside of the city have recently been captured by Milwaukee builders, and such new work as is going on in the city keeps many of the contractors busy, although a large number are idle. Thomas R. Bentley, one of the prominent members of the Builders and Traders' Exchange, has just secured a contract for the new State Library at Madison to be erected for the Historical Society. The exchange is reported as holding its own, in spite of the adverse conditions of business, and the members are considering the advisability of extending the benefits of organization throughout the State by the establishment of a State association, as recommended by the National Association.

New York City, N. Y.

The condition of building business in New York City has not changed materially from that reported last month, the amount of work on hand being about the same. There has been an unusually small number of strikes or other labor disturbances during the past month; those that have occurred being of minor importance. It is reported that the Housesmiths and Bridgemen's Union is contemplating another fight against the employers forming the Iron League for the establishment of the union working rules and wages. These demands include an eight-hour day and a minimum wage of 31¼ cents per hour. The attempt being made by the special committees of the Board of Walking Delegates and the Mason Builders' Association to bring to an end all general sympathetic strikes in the building trade is causing much interest among workingmen and contractors. Hardly any other subject has been considered by the Board of Delegates at its last six or seven meetings, but, although a number of conferences have been held, the plan of arbitration is still hanging fire.

It is announced that the negotiations looking to the erection of the 15-story Herald Square Hotel on the north side of Thirty-sixth street, between Broadway and Sixth avenue, which have been in progress for about two years, have at last been closed. The money which the building will cost, estimated at $1,200,000, is said to have been secured from an insurance company, and a contract for the construction of the proposed hotel has been let to the Charles S. Kendall Company.

Philadelphia, Pa.

The report of the Bureau of Building Inspection of Philadelphia for the first half of the current year shows a total of 3672 permits issued, including 7685 operations, the estimated value of which was $14,895,510. Despite expectations based on the great falling off of work during the month of June, this is an increase over the first half of last year, during which there were 3501 permits issued, including 7006 operations, the estimated value of which was $14,840,820.

During this period also there was $4,712,625 worth of two-story dwellings, $4,084,275 worth of three-story dwellings, $154,000 worth of four-story dwellings and $536,325 worth of two-story and three-story stores and dwellings combined undertaken, the greater portion of which have been finished.

Secretary Harkness of the Master Builders' Exchange reports that no action of unusual importance has been taken among the workmen's unions during the current year, everything being in a reasonably harmonious condition. He states that the exchange is in its usual excellent and efficient condition, and that it has recently secured the passage of an ordinance protecting sub-contractors and dealers in building materials on public work where no lien could be filed. The ordinance is based upon a similar statute enacted for the protection of sub-contractors and men doing work on Government buildings. The new ordinance seems to work to the satisfaction of all concerned.

Rochester, N. Y.

Secretary Grant of the Builders' Exchange of Rochester reports the condition in the building business in that city as being less prosperous than during 1895. The amount of work estimated on for the first six months of the year is approximately 25 per cent. less than the amount for the same period of last year. Wages paid to the workmen are about the same as during 1896, though slightly lower to laborers. No change has been made in the wages of skilled workmen. All contracts taken during the present year have been taken at a very close margin. In some cases the competition has been so keen that actual loss to the contractor seems inevitable. There have been few failures among the builders, but deferred hope of a change for the better makes the present condition of affairs especially discouraging. The present prospect for work during the remainder of the year seems, however, to offer some improvement over that of the first six months. The relations between the unions and the employers are entirely friendly, and the co-operation of the employers' organizations with the unions in work along lines agreed upon by committees of arbitration has been sincere and earnest. The exchange is reported as being in good condition, and active in participating in the affairs of the city and State.

The exchange has recently been requested by the city authorities to assist at the revision of the building ordinance, and to appoint a committee to work jointly with the committee of the Common Council having the matter in charge. One of the members of the exchange has recently been elected to the Executive Board by a large majority. During the past session of the Legislature the exchange has been called upon by representatives at Albany several times for opinions in regard to measures introduced into the Senate and Assembly affecting the interests of the building fraternity. The influence of the exchange in city affairs has been distinctly felt by the failure of obnoxious legislation to materialize in opposition to the wishes and efforts of the organization. Most of the members of the exchange feel that it is a potential power to aid good measures and to oppose bad ones, and that this characteristic is one of the most valuable adjuncts of organization, even if few actual calls are made upon it for decisive action. The exchange is looking forward to the national convention at Buffalo, and is making preparations to send as large a delegation as possible to represent it at that time.

San Francisco, Cal.

The building business of San Francisco is reported as being still unusually dull. Comparatively little work has been figured recently, and there is little of importance in the hands of the architects at the present time. Several months ago the Painters' Union ordered a general strike for $3 as a minimum wage for a day of eight hours, and for the official recognition of the union by the employers. After a hotly contested fight the workmen claimed a victory, but from present indications there seems to be a likelihood of further trouble. The small amount of work on hand has created so many idle men that no action taken at the present time would seem to be decisive, and the contractors therefore claim that while the union men in many instances have refused to work until their demands were conceded, the progress of work is being, in reality, little obstructed by the action of the workmen. The members of the Builders' Exchange recently held a picnic at Sunset Park in the Santa Cruz Mountains. The affair was most delightful, and all those who participated were loud in their praise of the delights of the occasion. All sorts of sport was indulged in, from foot races to a tug-of-war. The picnic was attended by members and their families, and it is reported that the presence of the ladies and children added materially to the pleasure of the day. The exchange is reported as being in excellent condition, and extending its influence as one of the sound business institutions of the city.

St. Louis, Mo.

The present condition of the building business of St. Louis does not fulfill the excellent promise of the earlier season. The amount of work projected at the outset for the year was very hopeful, and although builders are now reasonably busy, the amount of work on hand is smaller than was expected at that time. During the past month indications have arisen which point to a further decrease in work during the balance of the season, in spite of the large amount of work that it was expected would follow the destruction caused by the cyclone.

During the past month there has been little activity on the part of the labor unions, and everything at present seems to be reasonably harmonious. There is a strong probability that St. Louis will have in the near future a new set of building laws, formed in accordance with the necessities and conditions of to-day, and modeled after the best laws existing in other cities. The present laws, which are proverbial for their inadequacy, were formed years ago, before the steel construction became an established feature, and when fire proofing and slow burning construction, as used to-day, were practically unknown. The weakness of these laws has long been recognized by architects and builders, but until now no active steps toward their improvement have been taken.

Notes.

The builders of Augusta, Ga., have established a builders' exchange, modeled on the general lines advocated by the National Association of Builders.

The bricklayers of Ottawa, Ont., are seeking the establishment of an eight-hour day and a minimum wage of $3. The contractors are willing to concede the shorter day, but decline to increase the wages.

The Carpenters and Joiners' Union of Pawtucket, R. I., are endeavoring to secure an eight-hour day without reduction of wages.

Butte City, Mont., reports a building boom, with permits for June amounting to about $100,000. It is expected that the total work done for the year will reach the vicinity of $500,000. The total for 1895 was $320,000. Bloomington, Ill., builders report trade as being in a reasonably satisfactory condition, several large contracts being on hand.

Peoria builders report building as being very dull in their city, with little prospect of improvement.

The recently established Builders' Exchange of Galesburg, Ill., is reported as struggling hard for success, with a doubtful prospect.

CONSTRUCTION OF CONCRETE WALLS.

So much has lately been said about the use of concrete for walls in building construction that a brief description of one of the various methods employed for doing the work may not be without interest to many of our readers. According to an English writer who has given the subject more or less attention, the principal parts of all building frames for concrete walls are the "standards" and the "shutters," or movable panels. The standards are usually of wood, sometimes of iron, and are of any convenient length. The standards S S, shown in Figs. 1 and 2, are bolted together in pairs, the space between them being the thickness of the intended wall. These are then set perpendicular, at distances of from 6 to 12 feet, according to the length of the wall. The standards at the angles of the building must be bolted together diagonally. All the pairs of standards are kept in position by means of stays nailed to stakes in the ground, or in some other manner, and also by means of pieces of wood, such as slaters' laths, nailed from pair to pair, on each side of the wall. Great care should be taken that the standards are perfectly perpendicular and in line, as on them the straightness of the future wall depends.

Sometimes the standards are omitted altogether and the walls formed by means of panels only, but this is a practice not to be commended, as it enhances the difficulty of constructing the walls quite straight and vertical.

The "shutters," or movable panels, P P, are usually made of 1-inch or 1¼-inch boards nailed to ledges along the back and smoothly planed on the face. Sometimes thin sheet iron is nailed on the face of the boards to protect them from the wet concrete, but this is scarcely necessary, as it increases the cost without corresponding benefit, and renders the panels more difficult to shorten or alter in any way. To prevent the adhesion of the concrete the faces of the panels are frequently covered with a coat of oil or soft soap.

The panels are, like the standards, bolted together in pairs by means of wrought iron bolts, B B, passing through turned hardwood cores or distance pieces, C C, which regulate the thickness of the wall. These cores are made to taper slightly, in order that they may be the more easily driven out when the concrete has set. The width of the panels is usually such as to allow a layer 18 inches deep to be deposited at one operation.

When the standards are all in position the panels are laid between them, and secured by means of fillets, F F, nailed to the standards. Panels should be provided sufficient to inclose the whole length of walling intended to be formed in one day, as otherwise the concrete will be strained by the removal of the panels in less than 24 hours. When some of the panels have been fixed in position the concrete may be mixed, deposited within the frames to the full depth and rammed, and so on, until the day's allotted task is complete. When the circuit of the building has been made work is recommenced at the same pair of panels as on the first day. These are removed by withdrawing the bolts, their faces are scraped clean of all cement, &c., and the panels are refixed on a higher level, the lower row of bolts in the panels now passing through the cores of the higher row in the previous layer. As the work proceeds other panels are taken down and refixed until the second layer is complete. No panel ought to be removed in less than 24 hours for Portland cement concrete. The holes left after the cores are withdrawn must be completely filled with cement mortar.

The openings of windows and doors, including the necessary reveals, must be formed with rough wood framing, which must be kept from bulging inward by suitable struts. The temporary lintels must be supported on props, the props resting on wedges by which their removal is facilitated. The head of the openings may be chamfered by means of a triangular fillet, nailed to the outer lintel L, as shown in Fig. 3. Permanent lintels, either of wood, iron or stone, or brick or stone arches, are unnecessary, although one authority recommends the insertion of wrought iron bars (calked at each end) a few inches over all openings, as these "help to prevent the unsightly cracks which sometimes occur in concrete walls."

The insertion of wood bricks or bond timber into concrete walls cannot be recommended, as they are sure to swell with the moisture and may afterward become loose, or eventually rot. To prevent the ends of wood joists, purlins, blocks, &c., where such are used, from becoming loose after the concrete has dried, they are usually set with large nails, which are left projecting an inch or more, and so get a hold in the concrete. It is always better, however, to insert fixing blocks, made from Portland cement and coke breeze, which hold the nails as well as wood, and are not liable to swelling or decay, or to damage by fire. Joists and purlins of wood can usually be superseded by rolled iron or steel, while for the floors of rooms up to 14 or 15 feet square joists may be dispensed with altogether and solid concrete floors laid instead. Where, for the sake of economy or any other reason, ordinary joisted and boarded floors are required, the ends of the joists can be built into earthenware or stoneware joist boxes, which are embedded in the concrete. Or soft bricks can be built into concrete where required to receive the joists, and when the concrete has set and the panels have been removed the bricks can be cut out and the joists inserted. In many cases the upper walls are thinner than those below and the joists can rest on the ledges thus formed. When solid concrete floors are desired they should be laid right over all walls when these are at the proper hight and not left to be added after the walls are finished.

Flues for smoke and ventilation may be formed by wooden cores, which are made collapsible in order that they may be easily withdrawn. But it is always far better to form the smoke flues by means of earthenware or stoneware pipes. These may be ordinary circular drain pipes, socketed or unsocketed, or may be special flue pipes of circular, elliptical or oblong form, the oblong form having

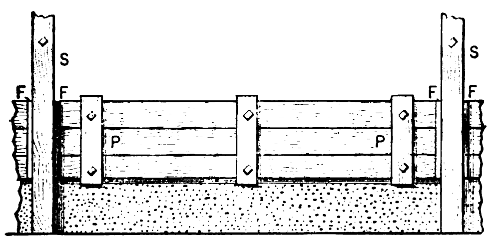


Fig. 1.—Elevation Showing "Standards" and Movable Panel or "Shutter"

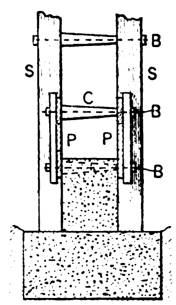


Fig. 2.—Vertical Cross Section.

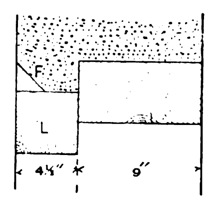


Fig. 3.—Section Showing Method of Constructing Openings for Doors or Windows.

Construction of Concrete Walls.

rounded corners. Combined smoke and air flues of various sections can be obtained from several makers and these are well adapted for building into concrete chimney breasts.

Absorbence and Porosity.

Good concrete is much less absorbent than ordinary bricks, while in brick work there is the further disadvantage that the joints (if of lime mortar) are easily penetrated by water. Bad concrete, however, cracks and admits driving rain easily. In 1876 Alexander Payne read a paper on "Concrete as a Building Material," before the Royal Institute of British Architects, and he summed up the discussion which followed by saying: "Some five speakers have averred that concrete is wet, condenses water, shrinks, cracks and contracts, while ten declare that it does not condense water, does not shrink, nor crack, nor take up damp." Mr. Payne wrote to a number of persons who had had a large experience in concrete building, and their testimony was to the effect: 1, That concrete houses are warmer and drier than brick or stone ones, and can be sooner occupied; 2, that concrete does condense moisture (so also do brick and stone), but that plaster rendering inside overcomes the objection; and, 3, that concrete made with good air slaked Portland cement does not shrink. (Apparently contraction during setting and hardening is here referred to; this must not be confounded with the contraction and expansion due to changes of temperature.)

An instance of concrete building was given by Colonel Lumsden in the same discussion. The walls of certain additions to his own house, an old Aberdeenshire Castle, were built of concrete, 15 inches thick up to the first floor, and 12 inches above; at one corner a hanging turret, about 6 feet in diameter, was constructed, with walls 9 inches thick, the supports under it being removed at the end of a week. The concrete was composed of one part Portland cement and six parts gravel, varying in size from a pea to a hen's egg, and was afterward skimmed outside with a coat of cement mortar, ⅛ inch thick (3 cement to 5 sand).

Hollow concrete walls have frequently been built in order that the internal face of the walls may be perfectly dry and of more uniform temperature. With good concrete in ordinary situations, and for ordinary buildings, the precaution is unnecessary, but where hollow walls are considered advisable they may be formed by inserting in the required position between the shutters a 3-inch plank tapering slightly in thickness from the top edge to the bottom; the taper facilitates the removal of the plank. When the plank has been withdrawn metal ties are laid across the cavity, as in hollow brick walls, and on these ties the plank rests during the formation of the next layer.

Proportion of Ingredients.

The regulations issued by the Metropolitan Board of Works in 1886 required that 1 part of Portland cement should be used with not more than 8 parts of aggregate (containing sand). It was not stipulated that the sand should be measured separately. This precaution ought, however, to be adopted, and the concrete might be specified to be composed of 1 part Portland cement, 2 parts sand and from 4 to 6 parts screened gravel, broken stone or other material. The aggregate for walls should be strong, dense and durable.

There is no doubt that good concrete walls are stronger than good brick walls; but such is the danger of concrete being scamped that the regulations of the Metropolitan Board of Works require the thickness of concrete walls "to be equal, at least, to the thicknesses for brick work prescribed in the Building act."

LAW IN THE BUILDING TRADES.

CONTRACT TO CONTINUE AFTER DEFAULT A NEW UNDERTAKING.

In an action to recover the value of work, labor and materials, it appeared that a party had contracted with a third person to do certain work in another's residence; that the contract was partly performed when it was violated by such third person, in omitting to make payments; that the first party refused to proceed, when the owner requested him to finish the work and that he would pay him. The court held that this was a new promise, and not the promise to pay the debt of another, which would have been in the statute of frauds, and should have been in writing.—Schultz *vs.* Cohen, 34 N. Y. S. Rep., 927.

COMPENSATION FOR CONSTRUCTION OF PARTY WALLS.

An agreement between A and B that A should erect a party wall on the line between their lots, and that B should have the right to use it at any time, on paying A one-half the cost, is personal to both parties, and A is entitled to recover the amount agreed to be paid by B, though the party wall was first used by B's grantee, and though A had also conveyed his lot to the same grantee.—Frohman *vs.* Dickinson, Superior Court N. Y. City, 31 N. Y. S. Rep., 851.

ACCEPTANCE OF BUILDING.

Where an owner accepts a building the contractor is entitled to its value as constructed, though not in all respects as contracted for, and the owner is entitled to the difference between the value of the house as built and as contracted for. To recover the purchase under a building contract, only a substantial, and not a literal, compliance with the contract must be shown.—Jennings *vs.* Willer, Ct. Civ. App. Texas, 32 S. W. Rep., 24.

PREMIUM FOR DESIGNS BY ARCHITECTS.

The United States Circuit Court of Appeals holds that where, pursuant to authority given by an act of Legislature, a board of commissioners advertised for plans for a building to be erected in behalf of their city, and the advertisement stated that the plans offered would be submitted to a committee of architects, who would select the best six plans; that the designer of the one adjudged to be the best would be appointed architect of the building, and the designers of the other five would each receive a premium of $2000, and various plans having been submitted, the committee of architects reported; but before a decision was made by the board of commissioners the act authorizing the building was repealed, none of those who submitted plans could recover against the city for services in preparing plans, as there was no evidence that any one had been selected, either as the first, or that he was among the next five best.—Audsley *vs.* City of New York, 74 Federal Reporter, 274.

LIABILITY OF SURETIES ON CONTRACTOR'S BOND.

A slight departure from the plans and specifications of the work, without the knowledge of the sureties upon a contractor's bond, where the alterations are authorized by the contract the performance of which the bond was given to secure, will not relieve the sureties from liability upon the bond. Nor will the fact that the principal procured the signature of the surety on the promise that he would afterward obtain the signatures of others, which was not done, relieve the surety from his obligation on a bond delivered, approved and filed.—Risse *vs.* Hopkins Planing Mill Company, Supreme Court Kan., 40 Pacific Reporter, 904.

PERSONAL LIABILITY UNDER BUILDING CONTRACT.

Where, in a building contract, "the parties of the first part herewith promise and agree for themselves, their heirs, executors, administrators, to pay," &c., they are individually liable, though the contract recite that it is "by and between the trustees and building committee" of a church and the party of the second part. Agents may bind themselves by their contracts, notwithstanding it may be known to both parties it is not for their benefit directly, but is for the benefit of another. Having done so, they cannot evade their clearly expressed liability under the contract by showing that they were agents. It is a fair inference that the very reason the contract was so made was to avoid disputes arising out of the disagreement of the committee, or their successors, as to the performance of the work.—Landyskewsi *vs.* Lark, Supreme Court Mich., 66 N. W. Reporter, 371.

BURDEN OF PROOF OF NEGLIGENCE IN DANGEROUS PREMISES.

Where a building falls without any apparent cause, in the absence of explanatory circumstances, negligence will be presumed, and the burden is upon the owner to show that he exercised ordinary care to keep it in a safe condition; but where it appears from such explanatory circumstances that the cause of the fall of the building was a latent defect in its construction, and there is no evidence tending to show such cause was owing to the negligence of the owner, the burden rests upon the party asserting such negligence to show that such cause might have been discovered and removed before the accident by the exercise of ordinary care on the part of the owner.—Ryder *vs.* Kinsey, Supreme Court, Minn., 64 N. W. Rep., 94.

ARCHITECTURAL DRAWING FOR MECHANICS.*

By I. P. HICKS.

IN previous lessons the principles of perspective drawing have been pretty clearly set forth, so that now the mind of the student should be thoroughly imbued with the subject and ready for the introduction of figures which will lead him to the very point he has sought to obtain—the making of perspective elevations. From experience we know this to be the most desired part upon which those interested in drawing are seeking specific instructions, and that it would be very difficult to successfully instruct beginners in the art by means of a few complicated figures only partially explained. Hence the

The first step is to draw the floor plan at the angle it is desired to place the perspective; in this case 45 degrees, as indicated in Fig. 63. After drawing the plan at the angle required, draw the picture plane line, which may be assumed a short distance below the plan. The greater the distance below the plan the greater will be the reduction in the perspective, as will be seen by reference to Fig. 63. Next establish the ground line a sufficient distance below the picture plane line to admit of drawing the perspective between the two lines. We now assume the horizontal line and station point and determine the vanish-

Fig 60.—Floor Plan.

Fig. 61.—Front Elevation.

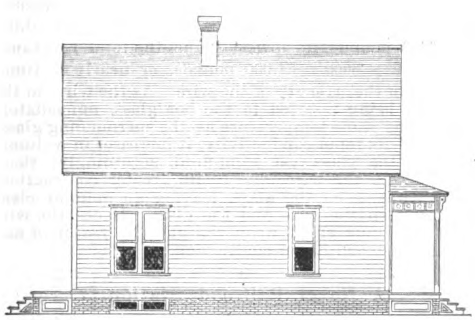


Fig. 62.—Side (Left) Elevation

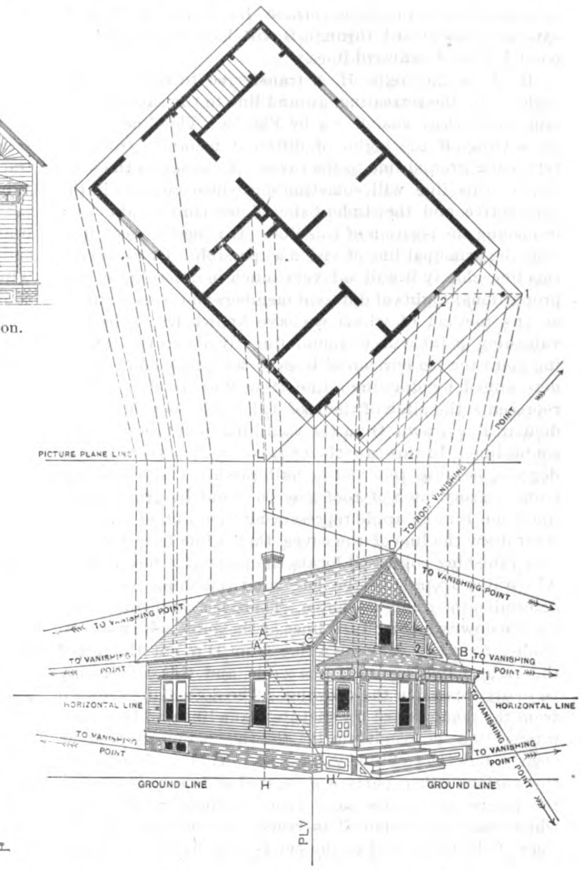


Fig. 63.—Perspective View, showing manner of placing the plan, obtaining the measurements, points and directions of lines.

Architectural Drawing for Mechanics.—Perspective of a House.—Scale, 1-16 Inch to the Foot.

student has been advanced step by step to a point where he can readily grasp the principles of perspective in its most complicated forms and master the work which has been the object of his study.

There remains only a few more points to be explained, and these for the most part will be the methods of locating and finding the vanishing points for roof lines, as it is here the beginner will experience the greatest difficulties. When the roof vanishing points are located they determine the direction of the roof lines, and by observing the scale on the hight line the actual proportions are maintained and the whole work soon becomes as easy as plain geometrical drawing. We will take for an example the making of a perspective elevation from the floor plan, front and side elevations, which are represented in Figs. 60, 61 and 62. These figures are the plain geometrical drawings, and will be readily understood.

ing points for the horizontal lines the same as described in connection with previous figures. In this drawing the horizontal line has been assumed 8 feet above the ground line, and the station point or point of sight has been fixed 56 feet from the horizontal line downward on the line P L V. In this drawing the lines for determining the vanishing points have not been carried out to their full length, as it would make the drawing unnecessarily large; hence we give the above figures, which will enable the learner to readily find the vanishing points without further instructions. The direction of the vanishing points is so plainly indicated that it is hardly possible to mistake their terminations. H L is the hight line, which has been produced the same as described in connection with Figs. 57 and 58. Set off the full hight of the gable on the hight line as taken from Fig. 61, and represented in Fig. 63 by H L'; then a line drawn from L' to the right hand vanishing point will cut the top of the gable in the perspective figure and determine its perspective hight. Just where the point of gable will touch this line may be determined by drawing the dotted line from the center of the gable cornice line toward the station point to the intersection of the picture plane line, thence perpendicularly to D. A line from D to the left vanishing point represents the ridge line. The points of the rear end of gable may be located in the same manner that point D was found. Set off on the hight line the hight from ground line to the eaves, as H A, and a line from A to the right vanishing point will cut the lower corners of the front gable and locate C and B. A line from C extended through D will, on intersecting a perpendicular line from the right vanishing point, determine the vanishing point for the upwardly inclined lines of the gable cornice; likewise a line from D extended downward through B will locate the vanishing point for the downward lines.

H' A' is the hight H A transferred to represent the hight from the retreating ground line to the eaves by the same method as was shown by Fig. 59. This line is used for setting off the hights of different members from the retreating ground line to the eaves. A change in the location of this line will sometimes produce changes in the perspective, and the student should use considerable care in placing the position of this line. It is best to keep it as near the principal line of vision as possible. By observing this line closely it will aid very much in determining the proportional hights of different members and is as accurate as any method of which we have knowledge. The roof vanishing point will be found directly above the vanishing point for the horizontal lines of the gable, and may be determined by drawing a line from B at an angle which represents the pitch of the roof till it intersects a perpendicular line drawn from the vanishing point on the horizontal line. In this case the angle of the line from B is 45 degrees, because the roof is half pitch. The vanishing point for any pitch of roof may be found by drawing the line from B at an angle representing the pitch of the roof. Next draw the line of the eaves, then a line from C to the roof vanishing point will locate the point of gable, as at D. Also a line from D to the left hand vanishing point will determine the ridge, as shown. There is a vanishing point for the downward inclined lines of the gable, which can be readily found by drawing a line from D to cut the top of the right hand corner of the gable, and this corner may be easily located in the drawing. The dotted lines drawn from the plan toward the picture plane line and from this intersection perpendicularly to the perspective show clearly how the chimney, door and window frames and the various other parts are located and proportioned in the perspective elevation. There is another little point which may be explained in regard to obtaining the hip lines of the porch roof in the perspective figure. The line 1 1 1 locates the outside corner of hip, then line 1 2 on the plan represents the plan of hip, and following the line 2 2 2 locate the termination of the hip against the building in the perspective figure, as shown.

(To be continued.)

Wire Glass.

Speaking of wire glass, Francis Schumann said before the Philadelphia Engineers' Club: This material consists essentially of inserting woven wire, of larger or smaller mesh, as may be desired, in the middle of sheets of glass, when in process of manufacture. The woven wire, or "wire cloth," so inserted, binds the glass and thus prevents the sheet from separating when broken, and consequently removes the danger from broken pieces to people underneath. The older method of lessening this danger, when ordinary glass is used in roofs or floors, is to stretch wire cloth immediately underneath the glass; this is expensive and seriously interferes with the cleaning of the glass. In its manufacture there were difficulties at first in anealing, but they have now been overcome. Perfect annealing, by the way, is of vital importance in glass, and especially so in wire glass. Wire glass is now made most successfully, both in England and Belgium, under the Philadelphia patents, the manufacturers there readily overcoming the difficulties of annealing. By reason of imperfect annealing, in some of the glass made in this country and placed in buildings cracks soon appeared and justly caused complaint. Notwithstanding the cracks it is a remarkable fact, noted by those using it, that the glass does not leak, although used but slightly inclined to the horizon. The well-known resistance of glass to heat and its non-conducting properties will make wire glass an important factor for window openings in buildings exposed to fire from adjacent structures. It is not safe to bed heavy glass directly on iron. There should be some soft or yielding medium, such as wood, rubber or rope, laid upon the iron frame for the glass to rest upon. A prolific cause of fracture is when the outer edges of the glass bear upon the iron, or when there is a lack of clearance between the edges of the glass and the standing ribs of the surrounding frame. Fracture is induced by any hard substance, such as iron, tending to abrade the corners of the edges, where the glass is most vulnerable, the action causing abrasion being from expansion and contraction between the glass and the supporting frame. When glass is laid directly upon the iron care should be taken to insure ample clearance at the edges and that the bearing is within, alongside of the edge, aiming to free the edge from contact with the iron. That fracture in wire glass is not due to any variations of expansion or contraction of the glass and wire is evident from the following: The usual size of sheets is about 36 inches wide by 72 inches long and ¼ inch thick. The most closely woven wire cloth used is of No. 28 wire, with meshes ½ inch square, making, say, 72 wires running longitudinally with the sheet. The No. 28 wire is 0.014 inch dimeter, equal to 0.00019 square inch area, having an ultimate strength of 180,000 pounds per square inch. The total ultimate resistance of the wires to tearing would be: $0.00019 \times 72 \times 180{,}000 = 2462$ pounds. The sectional area of the glass that resists this pull of 2462 pounds, were the variations such as to cause fracture, is $36 \times \frac{1}{4} = 9$ square inches. Assuming the resistance of the glass to crushing to be 6000 pounds, its lowest value, the total resistance would be $9 \times 6000 = 54{,}000$ pounds, or nearly 22 times greater than the strength of the wire. As the wire, in the process of being inserted in the hot glass, immediately acquires the same temperature as the surrounding glass, because of its rapid conductivity, it increases in volume, expanding the glass, yet semi-fluid, accordingly; then, when cooling, the wire, due to its greater contraction, shrinks away from the glass, leaving an annular clear space between the wire and the glass. Hence the wire cannot have any effect upon the glass by reason of any variation in expansion or contraction.

A Novel Railroad Station.

Work has begun on the station of the Illinois Central, Railroad located on the Lake Front Park, Chicago, Ill., the plans for the building having been drawn by John F. Wallace, chief engineer of the road and the work will be done under his personal supervision. The structure will be novel in many respects. It will be entirely underground, with the exception of the ventilating shafts, and will resemble the underground depots of London, with the addition of many conveniences. In the agreement between the railroad and the city a space 50 x 300 feet was reserved west of the tracks, at the foot of Van Buren street, for the accommodation of this station. A viaduct will be built over the station and across the right of way of the railroad. It will be 65 feet wide and will be of an ornamental design. The station proper will cost $75,000. The main waiting rooms on both sides of a central hall will be 34 x 107 feet, and will have a total seating capacity of 700. Large smoking rooms and ladies' rooms will be provided. The train platform will be 800 feet long, built of concrete carried on steel beams. The floor of the station will be of fancy tile and the wall decorations will be of a specially attractive design. In the plans particular attention has been given to the heating and ventilating appliances. When completed it will be in every respect one of the finest stations in the country for the accommodation of suburban travel.

COVERING A TOWER WITH COPPER.

THE use of sheet metal in building construction is so universal at the present day that a brief description of the method of covering a tower with copper cannot fail to prove interesting even to those who may never be called upon to do a piece of work of this character. In cornice, which is L shaped at the top, as indicated by S. Over this is formed the flashing A, which prevents the water from getting inside the building. The flashing is placed around the entire tower, the corners and cross seams being soldered water tight. It will be noticed that the flashing extends down the inside, as shown at S, and is slightly bent downward, as at B. The corners and cross seams being soldered, no other fastenings are required, as the flashing is bent so as to spring lightly over the terra cotta. The columns shown on the front elevation, Fig. 1, were then set, and fastened at the bottom by soldering to the copper flashing at the bottom and fastened at the top by screwing to the wooden brackets which are bolted to the T irons shown on the ground plan, Fig. 1. The cornice shown on the front elevation was then set over the columns and secured by means of copper wire and bands to the iron frame work of the tower. The next step was the setting of the circular windows shown on the front elevation, which, as will be noticed, are inclosed in a square panel. Fig. 5 shows the method of fastening these windows, which is as follows: A represents the terra cotta, B the flashing over the terra cotta and L the drip which is formed to the bottoms of the windows and soldered to the flashing B at D. The flange C in Fig. 5 extends around the other three sides of the window, and with copper rivets is riveted to the flange of the columns and cornice. All braces are fastened by means of brass bolts and copper rivets. After this work was completed the roof was covered with Spanish tile, which were nailed to the porous terra cotta blocks. Over these tiles the copper flag pole base was set, as will be noticed by referring to the front elevation. The lower part of the base is square, the middle part a transition from square to octagon and the upper part round. A sectional view of the flag pole is shown at V in Fig. 6 and there is also indicated the method of obtaining a water tight joint at the top. In this figure V represents the circular molding placed around the top, with a space of 1 to 2 inches from the top of the molding A to the side of the pole. This space is allowed so that in stormy weather, when the pole

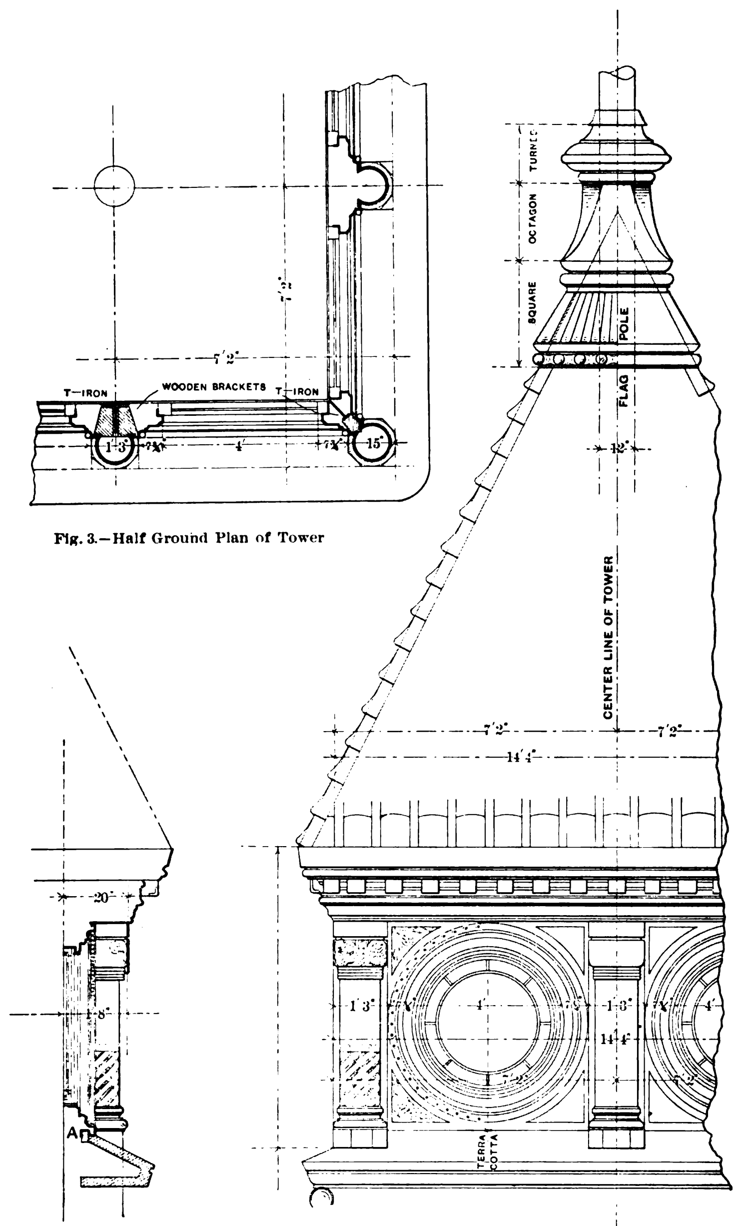


Fig. 3.—Half Ground Plan of Tower

Fig. 2.—Section through Tower.

Fig. 1.—Front Elevation of Tower

Covering a Tower with Copper

the execution of the job here illustrated 16-ounce cold rolled copper was employed, the foundation for it being terra cotta. One of the peculiar features of the work in connection with the job is the manner in which the copper is fastened to the building, this being clearly shown in the various detailed drawings presented herewith. Fig. 1 represents the front elvation of the tower, Fig. 2 a section and Fig. 3 a half ground plan. Referring to Fig. 4 of the engravings, T C represents the terra cotta begins to sway, it will not injure the molding or cause leaks. The funnel or collar B is placed over this molding, the collar having a space of 1 to 2 inches around the top of the molding A, and is nailed closely in white lead against the pole. To be perfectly sure of a water tight joint, another collar, shown at C, is placed over the funnel B, leaving a space between the two funnels, and is nailed in white lead to the flag pole. A hook edge is bent at A as shown, so as to catch the snow when blowing under.

This method of construction around the flag pole also gives ventilation under the tower roof, as shown by the arrows in Fig. 6. In many cases where the molding A is nailed direct to the flag pole it has been broken when the flag pole began to sway, causing leaks ; and it is an expensive matter to stop leaks in such a place, owing to the difficulty of reaching the pole.

Brick Efflorescence.

This unsightly attribute of many brick walls appears to have no real remedy. Muriatic acid will remove it, but the cause remains: Paint won't hold it back. The Standard Oil Company spent hundreds of dollars with paint, trying to stop efflorescence on their large building in New York City, but without avail. It is said that the salts will work out of the bricks in five years, but there appears to be no proof of this. Dampness is an exciting cause, as efflorescence seldom, if ever, appears on dry, warmly situated walls. Northerly and easterly exposures are bad. It has been recommended to heat the surface with a gasoline burner, says A. A. Kelly, and then apply hot paraffin. This is a good plan, but the trouble is the expense and difficulty involved.

Usually efflorescence appear near the foundation walls, or under window sills, while other parts are entirely free from the evil. This shows that water is at the bottom of the trouble. The rain, doubtless, gets into the wall at such places, and works its way out, carrying saltpeter, &c., with it.

A Chicago firm of brick makers is said to have offered $10,000 for a remedy for brick efflorescence. The cure will lie in the preparation of the clay. Somebody says that this cure may be found in the adding of precipitated chloride of barium to the clay, or to the mortar used in laying the wall. A master painter has advised the use of coal oil on the surface of a brick wall. It will darken the bricks somewhat, but will not deface them. Apply it liberally, he says, and it will soak in and neutralize the salts. But it is a doubtful cure. It has failed in New England, I know, as has also linseed oil. There is considerable salt in the brick clay taken from near the sea coasts, and sand used in mortar and taken from the seashore is full of it. Professor Leffman attributes efflorescence to sulphur from smoke being carried into the bricks on wet days In some parts of the country brick efflorescence is unknown. In Peoria, Ill., for instance, it is not seen, though it is prevalent in Cincinnati.

Bricks should be well soaked before being laid. This will dissolve most of the salts. A new brick has been put into cold water, and the lime it contained cracked it open, and caused the water to increase 5 degrees in temperature. Efflorescence is worse now, since coal is used in the burning, than years ago, when wood was employed. Analyses of efflorescence show magnesia or epsom salt, sulphate of lime and sulphate of soda. In conclusion it may be said that efflorescence may be prevented, but not cured. Secure bricks that are made away from the seaboard parts ; soak them before laying, make all joinings around windows, roofs, &c., tight, and avoid dampness from the foundation walls.

The first stage in the lofty tower at Wembly, England, is at last opened to the public. It is 1 acre in extent at 155 feet from the summit of the hill on which it stands, which itself is 250 feet above sea level. It is reached by four lifts, each taking 55 persons at a time. At each angle of the platform there is a large square shelter room, and a gallery well caged in runs parallel along each side, forming a promenade.

Wood Pulp Moldings.

The use of wood fiber or pulp in the shape of moldings is now rendered peculiarly available for some of the artistic processes in furniture decoration. The patterns for the purpose are designed and then hollow molds made from them—that is, the wood pulp, while in a soft gelatinous condition, is forced into the molds and the moisture slowly driven out by compressed air, while the meshes of a fine netting hold the pulp in place. In this way, says the *Upholsterer*, the articles can be readily turned out in single pieces, and are completed without further manipulation except to trim and finish off the surface. So pecul-

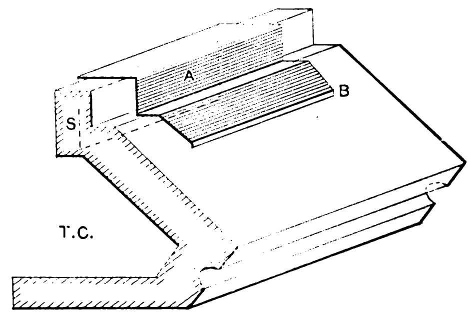


Fig. 4.—Copper Flashing Over Terra Cotta.

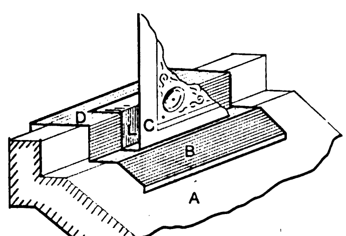


Fig. 5.—Method of Fastening Circular Windows at Bottom.

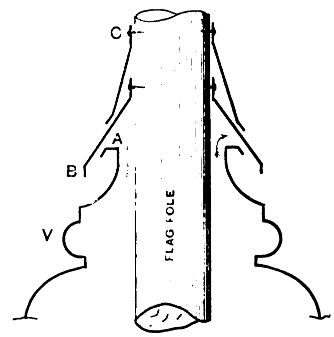


Fig. 6.—Section Showing Water Tight Joint at Flag Pole.

Covering a Tower with Copper.

iarly adapted is this method to the art in question that delicate scrolls, flowers and all conventional patterns carved out of wood for furniture and cabinets are thus satisfactorily and rapidly produced. With a little glue these ornamental pieces are fixed securely in the desired positions and almost perfectly resemble the finest specimens of carved wood work.

A Foul Air Indicator.

At the Industrial Exposition at Zurich, Switzerland, there is exhibited an air tester, which is designed to show whether and in what degree the air in a workshop or other inhabited room is contaminated. The apparatus is described as consisting of an air tight closed glass vessel filled with a red fluid. Through a glass tube that dips into the liquid and is bent at the top a drop falls every 100 seconds on a cord that hangs beneath and that is somewhat stretched by a weight. The fluid from which the drop comes has the property of changing its color by the action of carbonic acid. The more carbonic acid there is in the air the quicker this change in color takes place. If the air is very foul the drop becomes white at the upper end of the cord, while the change of color corresponding to a slight proportion of carbonic acid does not take place till the drop has run further along the cord. The exact condition of the air can be ascertained by observing a scale that is placed alongside the cord and divided into convenient parts, bearing the designations, "extremely bad," "very bad," "passable," "pure."

The Builders' Exchange

Directory and Official Announcements of the National Association of Builders.

Officers for 1896.

President,
Charles A. Rupp of Buffalo.
First Vice-President,
H. J. Sullivan of Milwaukee.
Secretary,
William H. Sayward of Boston.
Treasurer,
George Tapper of Chicago.

Directors.

Noble H. Creager	Baltimore.
E. Noyes Whitcomb	Boston.
John Feist	Buffalo.
William Grace	Chicago.
Richard Helson	Detroit.
Frank L. Weaver	Lowell.
Louis A. Clas	Milwaukee.
Stephen M. Wright	New York.
Stacy Reeves	Philadelphia.
Thomas B. Ross	Providence.
Justus Herbert Grant	Rochester.
Thomas J. Ward	St. Louis.
George J. Grant	St Paul.
A. S. Reed	Wilmington.
George H. Cutting	Worcester.

Entertainment at the Convention.

The following announcement of the entertainment to be tendered the delegates and visitors to the Tenth Annual Convention of the National Association of Builders is made by the secretary of the Buffalo Builders' Association Exchange on behalf of the committee having the matter in charge:

The Tenth Annual Convention of the National Association of Builders will convene in Buffalo, N. Y., September 15, 1896.

The General Committee in charge of the entertainment beg leave to anounce their programme as follows: Tuesday evening, a theater party; Wednesday, carriage ride; Thursday, an all day trip to Niagara Falls, arranged to give the most complete view possible of the picturesque scenery of the upper and lower rapids, falls and whirlpool, from both the Canadian and American sides. Dinner will be served during the trip, after which, by special invitation, an opportunity will be given to inspect the immense plants of the Niagara Falls Electric Power Company and others; Friday, a banquet for the ladies, and in the evening a reception and smoker for the gentlemen.

The committee, therefore, wish to know at the earliest possible moment the approximate number of delegates, visitors and ladies that will attend this convention from each exchange, giving, if possible, their names.

If you will kindly advise me in regard to the same at an early date, you will confer a favor on the committee.

Further announcement will be made in regard to hotel accommodations, &c. The desires of any of your members in the premises at this time the committee will be pleased to attend to.

J. C. ALMENDINGER, Secretary.

Preliminary Convention Notice.

To all Members of the Filial Bodies of the National Association of Builders:

It is apparent that at the coming tenth annual convention, to be held at Buffalo, N. Y., beginning September 15, a very considerable portion of the time should be devoted to a discussion of the question:

Are organizations of builders, either local or national, desirable? If so, what are the functions of such bodies, and should the value of organization be measured by, or dependent upon, immediate specific results only?

The experience of the association up to the present time demonstrates the fact that as yet builders throughout the country have largely failed to comprehend either the character, latent possibilities, functions, or results of organization.

Such local exchanges as have in any degree applied the true principles of organization which it has been the constant effort of the National Association to define have to that extent demonstrated the wisdom of organization, and, through the operation of such principles, have come to understand in a measure the benefits growing out of concerted endeavor; but in so far as exchanges have failed to apply these principles, they have demonstrated failure to appreciate the results which must inevitably follow their application to the conduct of business affairs.

Correspondence with the national secretary is indicative of the fact that builders have so little knowledge of the benefits of organization that the subject fails to excite their interest unless some pressing need or emergency confronts them. Questions are daily asked, the answers to which were printed by the National Association five years ago, and placed in the hands of all its members individually, as well as in the hands of builders generally throughout the country.

Value of Organization.

In the minds of the majority of builders throughout the country the value of organization is limited, apparently, to combination for the purpose of resisting attack by forces too strong to be controlled by the individual. In operation, builders have largely limited its work to affairs of the moment, and for the enforcement of conclusions in the main obstructive rather than constructive. The power in organization for the correction of evils which daily menace builders, and for defining the principles upon which their business should be conducted, thereby anticipating and obviating the difficulties which are now left for settlement till the friction point has been reached, is practically lost sight of.

The truth of the axiom, "prevention is better than cure," is accepted the world over, and builders should recognize that in organization lies their only hope for the comprehensive and efficient application of this principle. This power, which is applicable to every condition under which the building business is transacted, lies fallow at the present time, because of failure on the part of those most interested to understand the greater importance of preventing evil conditions rather than curing them after they have gained foothold. There is no condition to which the building business is subject which is not capable of beneficial treatment by united action on the part of builders; organization presents the means for united action, and out of the solidity thus obtained beneficial results must inevitably follow.

The main purpose of the National Association of Builders is the education of the individuals of which its constituency is composed to a knowledge of the protective power that lies in organization; and it seems important, under the circumstances, that the coming convention should be devoted in a large measure to a thorough discussion of the primal question, "Is there any necessity for associated effort among and by builders?" A discussion of the various characteristics of organization will naturally follow, comprehending its application to affairs between contractors, between contractors and their workmen, between contractors and owners, between contractors and architects, and to all the relations contingent upon the transaction of the building business.

Preventing Labor Troubles.

Taking the relation between employers and their workmen, for example, we should be able to show through our discussions that by and through organization builders may be enabled to prevent the occurrence of labor disturbances of all kinds, thus avoiding the disastrous results which follow enforced settlement when both sides are unfit for dispassionate judgment, owing to the antagonisms resulting from open warfare. The steady extension of organization on the part of the workmen implies a duty on the part of employers to combine in order that they may not be subjected individually to attack from united bodies of employees. It must be conceded that however improper the action of workmen's organizations at times may be, the object of the average trade union is the betterment of the conditions by which the workmen are surrounded; and it is often because of the failure by the employers to fulfill their share of the duty involved in the relationship that the workmen arrive at unjust and one sided conclusions; but so long as employers fail to present their side, and do their share toward establishing permanently harmonious relations, so long will the conclusions of the workmen continue to be one sided. Notwithstanding the frequency with which strikes continue to occur, there is a manifest desire on the part of the workmen to avoid open breach, and in order to obtain the ends they have failed to secure through strikes they are seeking control through legislation. Employers in their present disorganized state are incapable of influencing legislation, and are virtually at the mercy of the persistent, unremitting efforts on the part of the workmen. This one function of organization, the value of which is beyond computation, is the means whereby employers and workmen in every branch of the building trades can reach amicable agreement, under the existence of which strikes or lockouts or other complications arising out of the relationship will be impossible. What may be done through discussion of this one relation may also be done in all the other relations indicated, and therefore the most important matter at the approaching convention will be to make plain the manner in which organization may be applied to prevent the perpetuation of all those conditions whose damaging effects are so injurious to the welfare of the whole fraternity, and as a natural sequence that organization is imperatively necessary.

Every association of builders in the United States, whether affiliated with the National Association or not, is urged to consider the work of the association and the value of familiarizing themselves with the methods prepared, whereby business can be made safer and therefore more profitable; also the obligation of every such organization to do its share in the effort to better conditions which at present dominate the transaction of the building business in all its branches.

The convention presents unequaled facilities for giving to the builders of the country the fullest and most complete information in regard to the character, use and benefit of organization, and all associations of builders are requested to consider the advisability of attending the Buffalo meeting either as affiliated exchanges or as visitors.

Further information will be issued by the national secretary in due time, and correspondence is solicited from all builders interested in the welfare of the fraternity.

By order of the Executive Committee.

WM. H. SAYWARD, Secretary.

New Publications.

STAFFORD'S SLATE TABLES. With practical instructions to those unacquainted with slate roofing. Size 8 x 5 inches; 107 pages. Published by John Galt & Son. Price $2. For sale by David Williams, 96-102 Reade street, New York.

This book, which has just been issued in its fifth edition, is a valuable work that will appeal not only to the slate roofer, but to the sheet metal worker as well, on account of the information that is contained within its covers. It was primarily designed for the use of slaters, quarrymen, architects and dealers, but gives in addition practical instructions for slate roofing. In addition to what was published in former editions of this work, there have now been added 11 new slate tables, one new tin plate table, a table showing the net price of sheet iron of various gauges in common use at discounts from 65 to 85 per cent., and a table showing the weights of various kinds of slaters' nails required to lay a square of any size of roofing slate; also several illuminated pages showing how the alphabet and numerals may be worked by the use of different colored slate. Although this book is known to many in the roofing trade, it has been chiefly confined to slate roofers. The present edition, with its more varied and valuable contents, appeals however to a wider circle of readers, and the tabulated information will make it serviceable to all those who have much to do with the roofing business.

The first division in the book is a short treatise on slate, telling where it is found, its qualities, &c; next come a few pages of practical instruction on how slate is put on a roof, diagrams showing the method of overlapping the courses and the relative positions of the slates in each course. Rules are given for ascertaining the number of slates in a square and on a roof. Then follow the tables proper: beginning with slates 9 x 7 inches, two pages show the areas, expressed in squares and feet, covered by from 1 to 20,200. The tables advance by units from 1 to 100, then from 100 to 20,200 varying by a hundred each, the amount covered being expressed in squares and feet. By means of such a table it will be readily understood that one can easily figure the number of slates required to cover a roof of any size, for where the exact size is not given it is a very simple matter to refer to the fractions and multiples in the table. Eighty-eight pages are devoted to these slate tables, which are worked out for all sizes of slate from 9 x 7 to 24 x 18 inches. The next table shows the value of slate of the various sizes per thousand at a given rate per square; then comes a table for variation in the lap; then a table of weight of slate; then slaters' nails, and next are several pages showing the number of sheets of tin plates of 10 x 14, 14 x 20 and 20 x 28 sizes for covering roofs of different areas. A folder gives a table, reprinted from *The Metal Worker*, of the net price of galvanized sheet iron at different discounts, and following this are several colored plates showing an alphabet and numerals, and then different methods of ornamental slating. The book is of a convenient size for the pocket and handsomely bound in flexible seal leather.

BUILDING CONSTRUCTION AND SUPERINTENDENCE. By F. E. Kidder, C.E., Ph.D., Architect. Part I.—Mason's Work. Size 7 x 10½ inches; illustrated with 250 engravings; 409 pages; bound in cloth. Published by William T. Comstock. Price $4, postpaid.

This volume is by the well-known author of the "Architects and Builders' Pocket Book," and in its preparation the primary object has been to present to the student, architect and builder a text book and guide to the materials used in architectural masonry and the most approved methods of doing the various kinds of work, as well as, incidentally, pointing out some of the ways in which such work should not be done. The too frequent methods of slighting work are also touched upon. In describing the methods of construction the author has drawn largely from his own observation and experience as a practicing and consulting architect in both the Eastern and Western States, although much assistance has been obtained from prominent architects, as well as from various books and publications to which references are made in the text. The volume is essentially descriptive, only such tables as relate directly to the properties of the materials described being given, while the best methods of using materials are presented in a manner which combines the theoretical with the practical. The work is comprised in 18 chapters, the first and second of which are devoted to soils and foundations and cover the conditions likely to be encountered in actual work. The third chapter is given up to masonry footings and foundation walls, in which shoring and underpinning are included. Following this lime, cements and mortars are taken up; then building stones, cut stone work, brick work, architectural terra cotta, fire proofing, steel construction, involving iron and steel supports for mason work; lathing and plastering and concrete building construction and specifications. The suggestions in regard to superintendence embody those points which essentially require the personal inspection of the architect, while a great many ways in which unscrupulous builders are apt to slight work or attempt to cover up defects are pointed out in a way that should prove of great assistance to the young architect. The appendix embraces a number of tables giving the weight, crushing strength and ratio of absorption of building stones; effect of heat on various stones; list of prominent buildings; safe working loads for masonry; properties of timber, stone, iron and steel, and remarks relative to making cellars water proof.

CONTENTS.

Carpentry and Building

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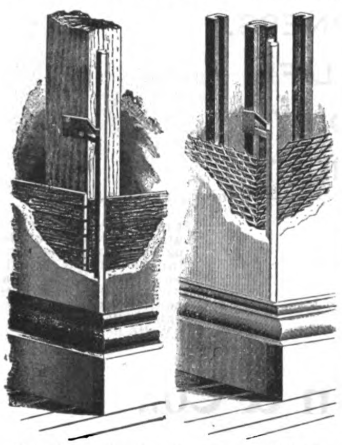
NOVELTIES.

The Marsh Metallic Corner Bead.

A novel method of constructing the corners of rooms is being brought to the attention of architects, builders, contractors and house owners by Edward B. Marsh of 19 Federal street, Boston, Mass., and is illustrated in the accompanying cuts. The construction involves the use of what is known as



Novelties—The Marsh Metallic Corner Bead. Fig. 1—Method of Using Bead with Wood Construction. *Fig 2.—Method of Using Bead with Steel Construction.*

the Marsh metallic corner bead, which is particularly adapted for wood, brick, terra cotta and steel work. The bead consists of a rod of steel held rigidly at any required distance from the corner to be protected, Fig. 1 of the illustrations giving an idea of the manner in which the bead is employed in connection with wooden construction, while Fig. 2 shows it in connection with steel construction. The rod of steel has two recessed sides which receive the mortar and furnish a grip for a metallic holder or clip. The bead also gives the plaster a substantial thickness to its extreme edge, and prevents the crumbling to a feather

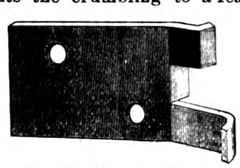


Fig. 3.—Clip for Wood

edge. All parts are galvanized, thus adapting it for use in connection with artificial plasters as well as lime mortar. The corner when finished is said to present a smooth rounded surface for paper or decoration. The different forms of clips enable the bead to be used as readily on the corner of a brick and terra cotta partition, brick walls and of fire proof construction as on wooden studding. Figs. 3 and 4 show the clips for wood and steel respectively. The bead is kept in stock for ¾ and ⅞ inch grounds, and in lengths ranging from 6 to 15 feet. One hundred clips are sent with each 100 feet of rod, although the manufacturer states they need not be placed, in ordinary cases, closer than 18 or 20 inches. With the clips for brick or terra cotta walls 8d. nails are furnished. The maker also states that the clip can be modified for the different patented partitions.

New Combination Air and Water Heater.

The Howard Furnace Company, Syracuse, N. Y., with branch office at 210 Water street, New York City, and 10 and 14 Washington avenue, Chelsea, Mass., have recently added to their already large and complete line of heating apparatus a new hot water boiler to be used in conjunction with their single radiator furnace for combination work. A broken view of the furnace is presented in Fig. 5, showing the application of the boiler. Both the main supply and return pipe, it will be noticed, enter the heater at the top These mains are attached to a disk shaped boiler containing a water way of about ½ inch in thickness, which is exposed on all sides to the direct rays of the fire, and therefore, it is pointed out, becomes an energetic and powerful generator, insuring rapid circulation, which is capable of moving the bulk of the water in the entire system. The channels being vertical perfect freedom is offered for the water to ascend unobstructed by cross currents. The boiler, as shown in the illustration, is suspended in the center of the fire and occupies an independent position with relation to the heating parts of the furnace, and therefore

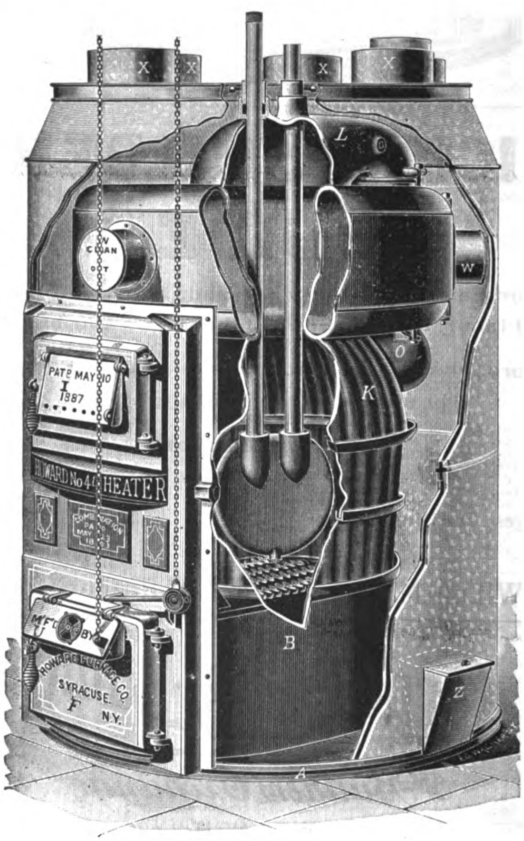


Fig 5—New Combination Air and Water Heater.—Broken View, Showing Furnace with Hot Water Boiler in Position.

does not detract from the power of the furnace to furnish warm air. Furthermore, it is pointed out, the water is always kept hot, on account of the boiler being at all times in the fire. The special feature of the apparatus is the patented device by which the boiler can be raised or lowered to meet the requirements in balancing any system of combination heating, which is an advantage that will be appreciated by the trade. After being once adjusted no more care is required in its management than to run a warm air furnace. The three important requisites

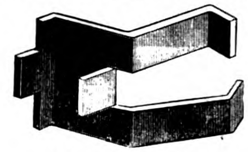


Fig. 4.—Clip for Steel.

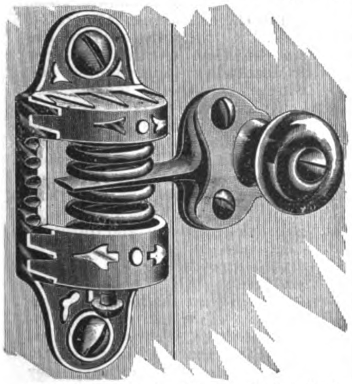
embodied in the device alluded to by the makers are its vertical hight as effecting the result, its position in relation to the fire and the amount of water acted upon.

New Screw Driver.

C. J. Kimball Company, Bennington, N. H., are manufacturing a screw driver, to the high grade of which reference is made. The blades are round except at the point and forged from steel, with triangular shanks for greater holding power where they enter the hard wood beech handles. The ferrules are of spun steel. The handles are round with checkered sides, this feature being useful in withdrawing screws which, when started, can be rapidly twirled out by revolving the handle between the palms of the hands. Both sizes are made in 2 to 8 inch sizes, No. 30 being for light work and No. 96 for heavier use. Allerton-Clarke Company, 97 Chambers street, New York, are agents for the Middle and Southern States.

Paxon's Spring Door Catch.

Parker Mfg. Company, 17 West Washington street, Springfield, Ohio, are introducing the door catch shown in Fig. 6. It consists of a housing containing a spring and a finger with a knob attached. The strength of



Novelties.—Fig. 6.—Paxon's Spring Door Catch.

the spring can be regulated by screwing the tension screw at the bottom in or out, as may be required. The catch is designed for holding any kind of door or gate open and closed, and is referred to as easy and rapid in operation, and adjusting itself to all warps, sags and shrinkages. It is recommended for use on screen doors, cupboards, dressers, closets, bathrooms, refrigerators, show cases, cabinets and on garden and other gates. The catch is made in three sizes and in six styles of finish; supplied with screws complete and separately wrapped, packed one dozen in a pasteboard box.

Improved Band Saw.

No machine used about a carpenters' shop is more important or re-

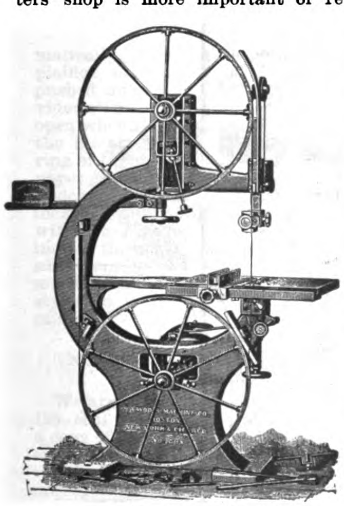


Fig. 7.—The Woods Band Saw.

quires to be more accurate in its operation than a band saw. During the past few years great improvements have been made in this class of machines, and we take pleasure in presenting to our readers one that has recently been placed on the market by S. A. Woods Machine Company of 172 High street, Boston, Mass. This machine, shown in Fig. 7, is built from new patterns of elegant design and embodies substantial improvements. The entire frame is a single casting with cored section, and has a long, broad base to insure perfect steadiness at high rate of speed. The wheels are made with iron hubs and spokes; the rim is without end joints, being made from a thin strip of hardwood, made endless and wound around a form until the proper thickness is attained, then turned perfectly true, and covered with an endless rubber band made especially for the purpose. The upper wheel can be adjusted to lead the saw to or from the guide by a band wheel convenient to the operator, while the machine is running, this being a very valuable feature. The proper tension on the saw is obtained by a compensating weight easily adjusted on the lever by the operator for the different sized saws. The guide bar is square, preventing cramping of the blade in the guide, and is counterbalanced by a weight. Both wheel shafts have large journals running in connected self oiling boxes provided with all necessary adjustments, which has many advantages over the usual way of running the top wheel on a stud pin. The table tips on a bevel and is fitted with a gauge that may be used on either side of the saw for straight work. The opening necessary to admit the blade is firmly held together by a hand clamp at the front edge of the table. The machine is built in two sizes, with 36 and 38 inch wheels that weigh 1400 and 1800 pounds respectively, and wood or iron top will be furnished as ordered.

The Van Dorn Steel Joist Hanger.

The Van Dorn Iron Works, Cleveland, Ohio, are offering the joist hanger shown in Fig. 9 of the cuts. The hanger is forged from rolled steel, having a guaranteed ultimate tensile strength, it is claimed, of 56,000 pounds per square inch. It is also claimed that each hanger will carry four times more than is likely to be required in actual use. The hangeris referred to as easily applied, the hook fitting over the top of the header, and is notched in so as to come level. The hanger is held in place by two heavy wire nails, while the flanges fitting on the sides of the header may be spiked if preferred. The latter, it is remarked, is not essential, but is an improvement, as it holds the hanger solidly in place. The joist may be fastened in the hanger, if preferred, by driving a nail through the hole in the bottom of the hanger. It is remarked that the hanger insures the full strength of the header, and each joist has a hanger made to fit. The company manufacture a 6-inch hanger for a 6-inch joist, 8-inch hanger for an 8-inch joist, &c., to insure uniformity and better appearance when different sized joists are used in the same building. The manufacturers refer to a test in which four of their lightest hangers carried an actual load of 20,000 pounds. They were used with 2 x 10 inch joist, with 3 x 14 inch header, the material being Norway pine. The company state that the headers were not damaged in the least, and that the joist showed very little evidence of crushing in the hanger, but there was evidence of breaking in the center. It is further stated that the loading was done and entire test conducted by competent engineers, who also selected six samples from 20 tons of material in stock, which showed an average strength as follows: Elastic limit, 44,000 pounds per square inch; ultimate limit, 62,000 pounds per square inch, and elongation, 25 per cent.

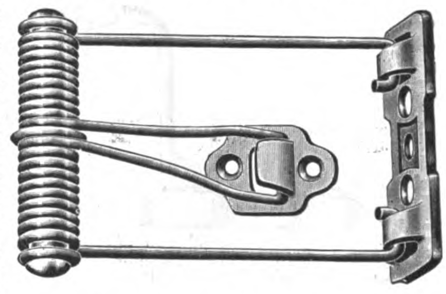


Fig. 8.—The Improved Warner Door Spring.

The Improved Warner Door Spring.

The Arcade Mfg. Company, Freeport, Ill., have lately perfected arrangements with the patentee of the well-known Warner door spring for their manufacture and sale. As now made, it has been considerably improved, as shown in Fig. 8 of the accompanying cuts. The ends of the wire have been locked into the hinge leaf, which effectually prevents them from springing out when in use. As constructed, the spring can be removed from the door without taking out the screws.

On account of their increasing business the Storm Mfg. Company, makers of elevators and dumb waiters, Newark, N. J., have been compelled to seek larger quarters. They have accordingly leased for a term of years the large and commodious five-story building on Front street, foot of Center street, Newark, directly opposite the Center street station of the Pennsylvania Railroad, of which they have just taken possession. With the increased facilities thus secured they hope to be better able to take care of their customers and to enlarge their trade.

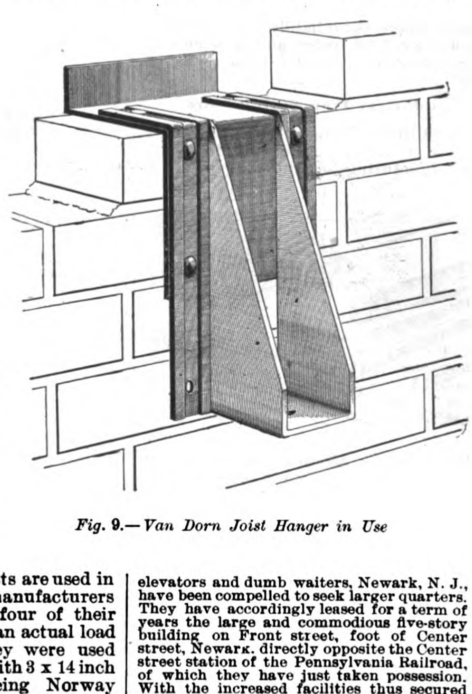
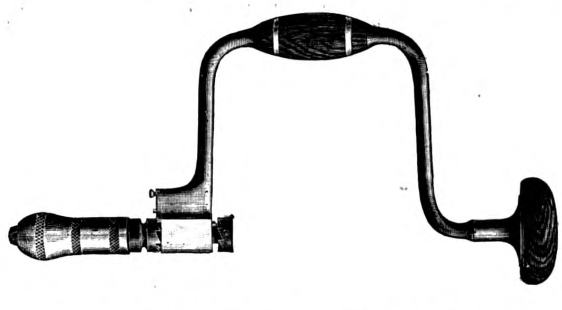


Fig. 9.—Van Dorn Joist Hanger in Use

The Hitch Self Adjusting Ratchet Brace.

The Irwin Auger Bit Company, Wilmington, Ohio, are offering the trade the self adjusting ratchet brace shown in Fig. 10 of the accompanying cuts. The chuck jaws are of steel and an anti-friction washer of vulcanized fiber is



Novelties.—Fig. 10 — The Hitch Self Adjusting Ratchet Brace.

used between the head plate and the sweep. The ratchets, pawls and shaft are made of hardened steel, and the brace is nickel plated, with cocobolo head and handle. It is stated that no adjustment of any levers, rings or buttons is necessary to ratchet the tool either in or out, as the action is entirely automatic. The act of bearing on, it is explained, throws the ratchet and pawls in position so that the brace can be used as an ordinary brace or as a ratchet brace; also that the act of withdrawing brings the ratchet and pawls in position for ratcheting out the bit. It is further explained that it is never necessary to use the slide on the shaft, except in withdrawing a screw from the wood, and this becomes necessary from the fact that the head of the screw and of the screw driver bit are not connected; and therefore the screw must be ratcheted out by bearing on the brace instead of pulling back as in the act of ratcheting out a bit. The makers state that with fair usage there is no liability of the brace getting out of order, and if accidentally broken any part can be replaced.

Odorless Iron Stall Floors.

The Broad Gauge Iron Stall Works of 53 Elm street, Boston, Mass., are manufacturing a form of flooring for

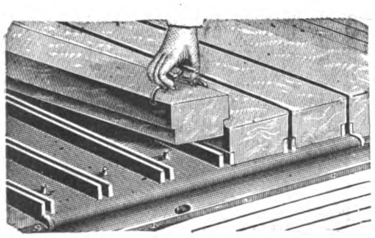


Fig. 11 — View Showing Construction of Odorless Floors for Iron Stalls.

use in horse stalls which embodies a number of interesting features, the construction being indicated in Fig. 11 of the illustrations presented herewith. Each floor is fitted with a wrought iron front flange to hold in place, without the use of screws, the pieces of which the flooring is composed The incline in the channel is 1 inch, which gives the necessary pitch for draining The slats, or pieces, composing the flooring can be had in duplicate sets, so that after using for a while they can be taken out and aired and washed while the other set is in use. The construction is such that the slats can be readily removed from the iron basins and replaced, thus making it possible to keep a stall floor water tight, dry and free from odor. This form of flooring is said to have met with much favor, and is in use in the fire and patrol stables of Boston and neighboring places.

Automatic Hatch Gates for Elevators.

Kimball Brothers of Ninth street and Eleventh avenue, Council Bluffs, Iowa, are directing the attention of the trade to a form of automatic hatch gate which they have brought out, and so made as to open and close with the platform of the rising or descending elevator. The special form of hatch gate shown in Fig. 12 of the engravings is intended for use in connection with power elevators, although it is stated it can be used with hand elevators as well. The automatic gate, as shown in the engraving, is operated by means of a track fastened to the platform, so that as the platform rises or descends in approaching the floor where the gate is located the rollers on the arms strike the track and roll against it, thus opening the gate, and as the elevator leaves the floor the gate gradually closes across the hatchway. The gates are balanced by means of a heavy weight on the end of the arm. The manufacturers claim that the gates are strong and durable, and as they have no gears or ropes to wear out and stretch they are superior to other forms. All the levers and rollers employed are made of iron, but the gates are of wood, and put together with screws, so that they can be easily taken apart. The construction is so simple that any carpenter can put the gates together from the directions which are sent out with each order.

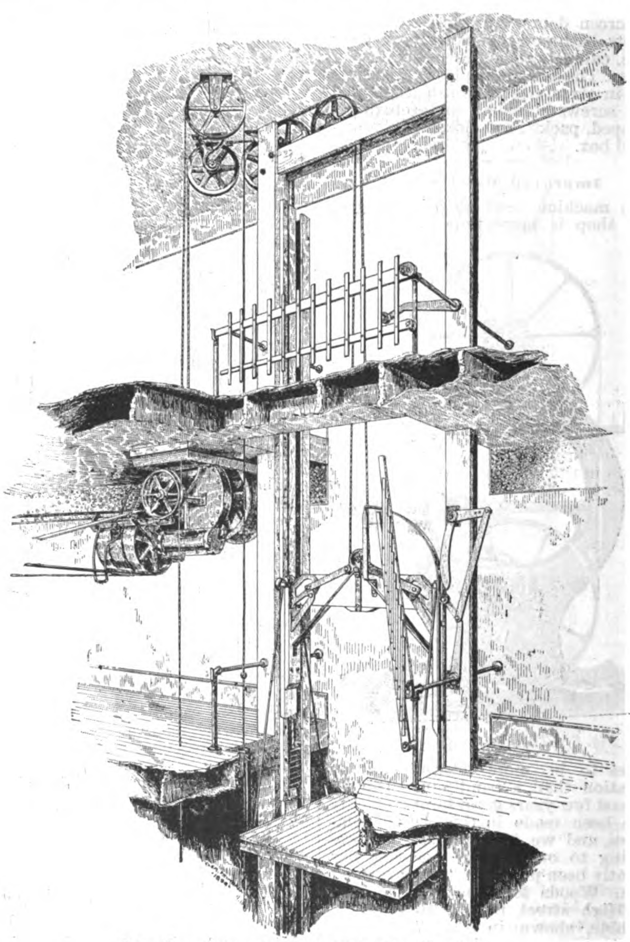
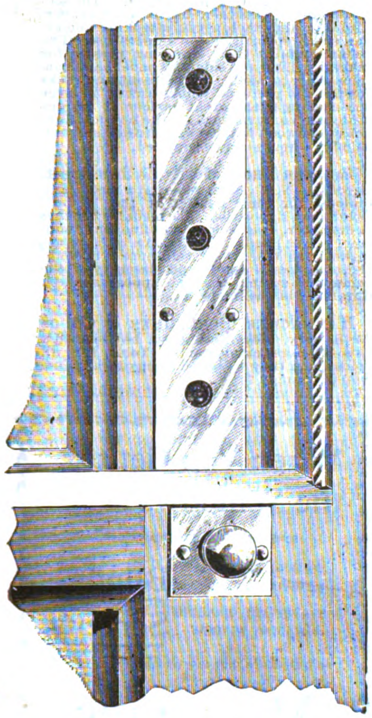


Fig. 12.—Automatic Hatch Gates for Elevators.

THAT THE PEOPLE of the South are hopeful of the future and believe in preparing for the better times coming may be judged from the order just received by J. A. Fay & Co. of Cincinnati, Ohio, for a complete planing mill outfit for Alexandria, La. It consists of a dimension planer, two flooring machines, an inside molder, self feeding ripping saw, cutting off saws, exhaust fans, engine and boiler.

Burglar Proof Ventilating Sash Lock.

The A. L. Linn Company of Cleveland, Ohio, are now offering a new burglar proof ventilating window lock, a cut of which is shown one-half size in Fig. 13. The lock works auto-



Novelties.—Fig. 13.—Burglar Proof Ventilating Sash Lock

matically, locking itself, it is explained, so that the bolt cannot be pushed out from behind, and is provided with a drop head to fasten it open when the sash is raised beyond the metal plate, to prevent the marring of the wood. It is stated that the upper sash can be lowered, or the under sash raised, for ventilation and locked securely against any prying with chisel or jimmy. The bolt is $\frac{5}{16}$ inch in thickness and enters the upper sash from $\frac{3}{4}$ to $\frac{7}{8}$ inch. The lock is made entirely of brass, finished in all styles to match other window trimmings.

New Designs of Warm Air Registers.

We are indebted to Rives & Co. of 193 Mill street, Rochester, N. Y., for a copy of a 20-page catalogue which they have issued, calling attention to some very handsome designs of warm air registers. The text refers to the essential feature of the goods, while numerous tables show the sizes and prices. Directions are given for setting side wall registers, and there is a great deal of other information which cannot fail to interest architects, builders and contractors having to do with house construction. Last year the manufacturers inaugurated the use of colored enamels, ornamented with gold bronze, in finishing side wall registers, and they are prepared to furnish any color which may be ordered, so that the registers will harmonize with the wall paper of the room. Two pages in the center of the pamphlet are printed in colors, showing a design of a floor register with tile border, and also of a wall register with tile flange. The color work brings out the effects produced to good advantage and conveys, in some measure at least, the class of work which Rives & Co. are prepared to execute. The novelty in connection with these goods consists in the use of enameled and embossed colored tile as ornamental features of the floor and wall registers, the border of tile being $2\frac{1}{8}$ inches wide, which gives, on a small scale, an effect similar to hearths and mantels, so far as the color and luster are concerned. The wall register has a face plate with an enlarged flange containing a channel, into which tile are set. The makers state that as this face is all one casting it is in no sense of the word a border frame, and they therefore do not dsignate it by that name. The makers turn out a great variety of rgisters both in color and design, there being eight designs each in any combination of six colors, so that they can supply 48 different effects, in addition to further changes in styles of finish of metal portion, such as nickel, brass or bronze plate.

The Wilcox Trolley Steel Barn Door Hanger.

The Wilcox Mfg Company, Aurora, Ill., are manufacturing a new barn door trolley hanger, which is shown in Fig. 14 of the accompanying cuts. In this device the hanger, track and brackets are all made of steel to guard against all danger of breaking parts. It has a lateral adjustment, enabling it to be applied to doors of any thickness and also to be adjusted to overcome any binding or chafing of the door. It is unnecessary to cut the door in attaching the hanger. The wheels are fitted with the finest cold rolled steel roller bearings, making them run very easily. The track is so constructed as to form a complete cover for the hanger and thus to protect the wheels from snow, ice or any other obstruction. The door, it is remarked, cannot jump the track.

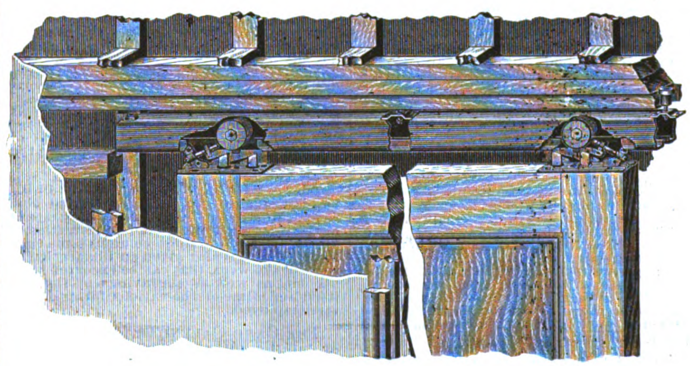


Fig. 14.—The Wilcox Trolley Steel Barn Door Hanger.

TRADE NOTES.

WE ARE INDEBTED to F. R. Comstock of Hartford, Conn., for a copy of an illustrated work which he has recently issued entitled "An Architectural Series," consisting, as its name indicates, of numerous designs of which Mr. Comstock is the author. Many of these have been executed in and about the city of Hartford, while others are scattered through the New England States. The illustrations in many instances are direct reproductions from photographs, and include both interiors and exteriors of private dwellings, stables, office buildings, fire engine stations, churches, hotels, school houses, &c. The collection also includes preliminary studies and competitive designs, all of which make an exceedingly interesting volume for the intending builder. The general make-up is neat and attractive, and interest is further augmented by the many pages of advertisements of material men and contractors identified with the building business. The price of the work is 50 cents.

THE JOSEPH DIXON CRUCIBLE COMPANY, Jersey City, N. J., continue to remember their friends every month with calendar blotters, the last being for July, and decorated with an engraving in which is wrought the Dixon pencil and the Dixon crucible.

BOMMER BROS., makers of the Bommer spring hinges, 351 and 353 Jay street, Brooklyn, N. Y., refer to the advantages of their goods in the following language: "Gradually but surely the use of spring hinges for automatically closing doors has increased, and as they either adorn or mar the entrances of our houses, where elegance and beauty of appearance as well as utility are essential and desirable, it becomes of importance to the carpenter and builder to use good judgment when buying them, because there is no other part of a house which receives such close and continuous scrutiny as the entrance. Then, too, the ladies of the house know from experience the convenience of a door swinging both ways between the dining room and the kitchen, a simple push with the foot being the "open sesame" of admission from either room when the hands are occupied in carrying, provided a light moving spring hinge is used. On the contrary, if a spring hinge with an abrupt and heavy movement is recommended, dissatisfaction is invariably created, and resentment against the carpenter who suggested it is aroused, because the door is continually used and its defects are brought to mind and repeated day after day."

AMONG the fine buildings for which contracts were recently awarded at Detroit, Mich., are the residences for C. J. Whitney and Frank Walker. The roofing contract for each of these buildings was secured by W. J. Burton & Co., manufacturers of Eastlake metallic shingles, &c.. Detroit, Mich.

WE are in receipt of a copy of the new catalogue of the New York Trade School for its sixteenth season, to commence October 19, 1896. It is a work of 36 pages, similar in all respects to its predecessor, and contains full details regarding the various classes, illustrated by half-tone engravings showing views of the different class rooms and departments and examples of work done by the students during the past season. The publication contains few changes from the previous catalogue. The most important addition in the present issue is the announcement of a new class in electrical work, commencing October 19, 1896, and ending on April 8, 1897. The catalogue contains the usual information regarding the day classes in bricklaying, plumbing, house, sign and fresco painting, carpentry, steam and hot water heating and printing, and the evening classes in bricklaying, plastering, plumbing, carpentry, stone cutting, house, sign and fresco painting, blacksmiths' work, sheet metal cornice work and printing, similar to that given in former publications. The total attendance at the New York Trade School in its 15 years of existence has been 5627 young men, who have come from all parts of the United States and British North America.

THE TIME IS NEAR AT HAND when the various schools where young men may acquire a practical knowledge of the trades they have chosen as a means of livelihood will open their doors for another season's work. The advantages of such a course of training as these institutions offer to the youth of the country are becoming more and more widely recognized every year, and the practical results are seen in the intelligent all around mechanic to be found in every trade in which instruction is given. Just how the work is carried on in one institution, at least, may be gathered from a pamphlet recently issued by the Industrial Institute of Springfield, Mass., in which it is stated that the aim is to "ground the student in every branch of his trade, teaching him to think for himself, help him to understand the best and quickest method of doing work and the reasons for it." Instruction is given by competent masters in carpentry and joinery, bricklaying, stone cutting, plastering, pattern making, mechanical drawing, plumbing, wood carving, sign painting, printing, electricity and machine shop work. In addition to what is mentioned in the pamphlet, relative to the courses of carpentry and joinery, the students will complete a model of a frame house, and there will be lectures from time to time by noted builders of Springfield. The course in drawing is six hours per week and is very thorough. The various courses are fully outlined in the pamphlet, mention being made of the different grades of work and the way in which they are to be taken up by the students. There are both day and evening classes, the latter being intended more especially to give young men in the trade an opportunity to improve themselves, and to give those who are earning their living at other occupations a chance to learn a trade. All information that an intending student would require is given in the pamphlet which the institute has issued, this covering the hours of the daily and evening sessions, as well as terms of tuition. The season opens on October 2 of the present year and continues until April 1 of next year.

THOSE OF OUR READERS who are interested in or are in need of economical power for driving wood working machinery are likely to have their attention drawn to an announcement presented in another part of this issue by the Van Duzen Gas & Gasoline Engine Company of Cincinnati, Ohio. They refer to their line of gasoline engines and state that they will forward to any one who may apply a catalogue fully illustrating and describing these goods.

GIBLIN & CO., Utica, N. Y., by way of directing attention to their steam, hot water and combination apparatus, have just published a very neatly illustrated catalogue and price-list of these goods. It is a pamphlet bound in green paper, with the name of the firm in gilt letters on the front cover, and contains 40 pages. The first boiler noticed is the Little Giant, for steam and hot water, both direct and down draft, after which are the Standard steam boiler, the Standard sectional, the Standard hot water combination and the Standard steel hot water combination. All these goods are illustrated to good advantage by fine cuts, showing general and sectional views, while the particular features of construction are presented on accompanying pages. A full table of dimensions, capacities, surfaces and prices are also given. Several pages at the end of the pamphlet contain useful hints to the steam and hot water fitter, and a number of tables of the capacities of Giblin & Co.'s boilers will be found very useful. Testimonial letters at the end, which are signed and dated, speak in the highest terms of these heaters.

ATLAS MFG. COMPANY of New Haven, Conn., are issuing circulars describing the Bradley steel shelf bracket, which, they state, weighs less than one-half of other brackets and will support much more weight. This result is obtained without the use of the central rib, which has always been an inconvenience in driving the screws. The Atlas coat and hat hooks are also referred to as being especially adapted for use in all places where hard usage is to be expected, such as school houses, halls and public buildings.

THE BRIDGEPORT CHAIN COMPANY of Bridgeport, Conn., have issued a price-list of their Monarch sash chain, and call attention to the fact that all their chains are flattened on the bend of the link, thus making them stronger than would otherwise be the case and causing them to run more freely over ordinary pulleys. The construction employed is also said to prevent the breaking down to which the rounded shape links are liable. The chain is made in several varieties, having a tensile strength ranging from 375 to 750 pounds, and intended for use in connection with sash running from 75 to 150 pounds. The chain is sold in rolls of 500 feet each. In their card this month the company present an illustration of the Monarch sash chain, showing the manner in which it is employed. The makers state that they will send a price-list and samples to any one who may be sufficiently interested to apply.

THE LUDLOW-SAYLOR WIRE COMPANY, Fourth and Elm streets, St. Louis, Mo., have recently issued an oblong publication of 48 pages devoted exclusively to designs of wrought iron fences. The designs range from very simple constructions up to elaborate work, and are accompanied by brief letterpress, giving sizes, prices, &c. With each order of fence the company furnish a diagram showing exactly how it is to be set and everything in relation to it, so that no trouble may be experienced in setting the fence correctly and economically. Directions for measuring fencing that sets in the ground and also measuring fencing for stone coping are found on the second page of the cover. The company manufacture, in addition to fencing, window guards, flower stands, counter railings, window fixtures, crestings, stable fittings, wire cloth and ornamental metal work of all descriptions. They have in the press a new catalogue to be devoted exclusively to bank railings and office fixtures.

THE NEW YORK CENTRAL IRON WORKS, Geneva, N. Y., have in course of preparation some new circulars of the Dunning steam and hot water house heating boilers. These boilers are all made in their plant, which includes a foundry, machine shop and boiler shop, the boilers proper being of the wrought iron construction and made either of the fire tube or sheet flue indirect draft style. Some idea of the capacity of their plant is reflected in a battery of four boilers recently completed that were of the horizontal tubular type, 66 inches by 18 feet, hand made throughout. The same care is taken in making their surface burning and self feeding house heating apparatus, whether for steam or hot water, and the trade are invited to secure their circulars and prices.

THE STANLEY RULE & LEVEL COMPANY of New Britain, Conn., have received a bronze medal, awarded by the World's Columbian Commission, for accuracy and excellence of manufacture, on their exhibit of boxwood rules at the Chicago Exposition.

SAMSON CORDAGE WORKS of Boston, Mass., and 90 Chambers street, New York City, issue a catalogue devoted to window sash cord, Samson spot cord, cotton clothes lines, railroad signal cord, arc light cord, trolley cord, elastic belt couplings, lariats, small lines, &c.

LANE BROTHERS of Poughkeepsie, N. Y., issue a catalogue showing barn and parlor door hangers, track, stays, sliding door latch, fire door hanger, store ladder, automatic lock, tackle blocks, measuring faucets, steel jack, coffee mills, drug mills, &c.

THE application of electricity is at present so diversified that members of all branches of trade are interested in its latest developments. The architect, contractor, builder and house owner are desirous of keeping abreast of the times by a knowledge of what is in the market adapted for use in the house and home, and they cannot, therefore, fail of being interested in a catalogue which has been issued by the Electric Gas Lighting Company of 195 Devonshire street, Boston, Mass. This concern manufactures and deals in domestic electrical supplies of all kinds, and in the 100-page catalogue which has been issued, electrical appliances are illustrated and described in a way to prove interesting and valuable. There are shown automatic gas lighting apparatus, electric hand lighting gas burners, automatic burners, batteries, switches, gongs, bells, buzzers, locks, door openers, push buttons, annunciators, speaking tube supplies, insulators, tools for electric work, &c. A valuable feature of the publication is a diagram of a return call system, showing the manner of running the wires and placing the bells.

A. L. ADAMS of Bridgeport, Conn., has issued a leaflet giving instructions how to execute various kinds of work by means of the Adams art auger bit, an illustration of which appeared in these columns some time since. There is also given an illustration of some of the work that can be executed with the bit, as well as engravings of the tool itself and some of the various forms of cutters employed.

THE CARD CALENDAR for the month of July issued by the F. A. Requarth Company of Dayton, Ohio, is of the same general design and style as those which have been sent out for the previous months of the year. The card is neatly printed and is arranged with an eye for hanging it up so as to have it convenient for reference. The days of the week and the month are set in a frame composed of turned columns and balusters, while above is a view of a double staircase.

WEIS & LESH of Jackson, Tenn., almost doubled the capacity of their plant recently, and, paradoxical as it may seem, did it by reducing the number of their machines, or, more properly speaking, by replacing their equipment of 12 lathes, which have been running five years, with seven of the Egan Company's new and improved automatic lathes.

WILLIAM CONNORS, manufacturer of elastic roofing cement, roofing paints and mortar colors, of 77 to 79 River street, Troy, N. Y., and with New York office at 9 Peck slip, is distributing to his friends in the trade a neat combination thermometer and calendar which cannot fail to be appreciated by all recipients. The thermometer is mounted at the left of what might be termed a card case, carrying the calendar for the year on slips of four months each. An opening cut in the front face exposes the calendar for the proper month. There is an eyelet for hanging up the device, so as to have it always convenient for reference.

J. H. ELLER & CO., Canton, Ohio, occupy three floors of a building covering a large area of ground with their architectural sheet metal works. A portion of the first floor is used for the production of sheet iron roofing and the machinery for painting it. On this floor they also have their machinery for making round and corrugated conductor and eave trough in 10-foot lengths. The second floor contains their drafting rooms, cornice shop and machinery for making numerous small specialties for tinners' use. The cellar contains their stamping presses for making ceiling and side wall panels, and contains their modeling department and racks for the die patterns, which occupy a large space owing to the great variety of designs that can be furnished by the house. Here not only a roof, but the whole inside and outside for a house can be supplied.

BOMMER BROS. of 351-353 Jay street, Brooklyn, N. Y., have received a medal and diploma for their exhibit at the World's Columbian Exposition. The medal is 3 inches in diameter. It is inclosed in a fine aluminum case, velvet lined. The diploma is 25½ x 36½ inches. In the award reference is made to the exceptional power and elasticity of the compound spring, the fine appearance and durability of the hinge, &c.

HAMMACHER, SCHLEMMER & CO. of 209 Bowery, New York City, have issued a new 400-page catalogue of Tools for all trades, and they will send a copy to any one who may apply for it.

CARPENTRY AND BUILDING

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
232-238 WILLIAM STREET, NEW YORK.

SEPTEMBER, 1896.

The office of *Carpentry and Building* in New York has been removed from 96-102 Reade street, to 232-238 William street.

The St. Louis office of *Carpentry and Building*, H. H. Roberts, manager, has been removed from the Bank of Commerce Building to the Commercial Building.

The Builders' Convention.

The tenth annual convention of the National Association of Builders, which will be held in Buffalo, N. Y., beginning September 15, will probably be the most significant since the association was founded. Its principal work will be to define with the utmost clearness the nature and true results of organization as comprehended by the association, and the manner in which it may be applied to the protection of the building interests of the country. The programme of business has been arranged with the special purpose in view of making the discussions upon organization the most important matter to be considered. The preliminary work done by the officers of the association has been most thorough, and organizations, whether connected with the association or not, have been urged to avail themselves of this opportunity to be present and participate in a discussion the significance of which is of the utmost importance. The true function of organization is poorly understood by builders generally, and the present convention will concentrate its efforts upon an attempt to point out the reasons for lack of greater success on the part of local organizations, and the manner in which those organizations may become efficient aids to the transaction of business, and in the protection of the builder in all his relationships. Members of local organizations of builders everywhere should take advantage of this opportunity for gaining an insight into what organization actually is, and should attend in as large numbers as possible. The Builders' Association Exchange of Buffalo has made preparations to entertain visitors from local associations not affiliated with the national body, with the same hospitality that is extended to regular delegates, and as many visitors as can attend will be gladly welcomed.

Building Inspectors' Meeting.

At the same date that the convention of builders will be held in Buffalo, the National Association of Inspectors and Commissioners of Buildings will hold its annual meeting. Among the various subjects that will be treated will be the question of uniformity of schedule for strength of floors, by a special committee appointed at the last convention; plumbing supervision; boiler and elevator inspection; the fee system as applied to building permits; advisability of uniforming building inspectors; uniform regulations for hotels, lodging houses, &c., in the matter of watchmen, signal lights and means of egress. The officers of this association have extended a cordial invitation to building inspectors and commissioners from any city in the United States or Canada to be present, and have urged all who may be so inclined to prepare papers, on subjects of interest, for presentation at the convention.

Arbitration and Conciliation.

An exceedingly gratifying and promising sign of progress in the Anglo-Saxon civilization of to-day is the disposition, never before so apparent, to adopt the principle of arbitration in disputes, whether international, industrial or social. By the latest official advices, it seems that prospects for the establishment of a permanent arbitartion treaty between this country and Great Britain are growing decidedly bright. Lord Salisbury, the cautious and conservative British Prime Minister, recently declared to a large deputation which approached him for the purpose of urging such a treaty, that "there is every hope that the United States and Great Britain will give to the world the first instance of a principle which, more than anything heretofore, will tend to abolish war." He also expressed as his own earnest wish and the general sentiment on both sides that every important issue between the nations should be arbitrated. The correspondence on the subject now going on between the two governments, although not as yet pointing to an agreement on any fixed form of arbitration, must, however, tend to advance the cause of peace between the great English speaking nations, and it will, at least, make it increasingly difficult in future for these nations to come to the point of belligerency. This is certainly encouraging. Moreover, the progress of a disposition toward conciliation and arbitration is becoming more apparent in the realm of labor disputes. A number of the most prominent labor leaders, including such men as Chief Arthur of the Brotherhood of Locomotive Engineers, Samuel Gompers and others have lately declared themselves as utterly opposed to strikes except as a last resort and in favor of conciliation. A growing disposition is seen, too, among workingmen to talk over matters in dispute before resorting to offensive measures, instead of throwing up work and afterward discussing their grievances. This has been instanced of late in the East in connection with the building trades. A movement is now on foot in New York among the members of these trades looking to the establishment of a permanent board of arbitration, to which all disputes must be submitted, and similar boards are being formed or are in contemplation at this time in Pittsburgh and other centers of industry.

Artificial Cooling.

It will be a matter of surprise if the flood of hot weather which swept across the country a few weeks ago should not bring to mind the possibility of directing modern invention toward making life more bearable during these periods of extreme heat. Artificial warming has been known since the dawn of history, and during the last century, or rather during the last 25 years, it has developed to a wonderful degree of efficiency. So much for comfort during the winter season, but as to any method of alleviating suffering during times of exceptional heat, little, if anything, has been done. Of course it will be stated that these periods of heat are but brief, and it would not pay to install an expensive apparatus whose application would only be necessary during a few weeks of the year, while in the case of heat in this latitude there is more or less call for it during six or seven months. However, even taking into account this important factor in the problem, the need of more comfort and even more endurable conditions during extreme temperatures remains. It is too much to suppose that the ordinary private residence could have a refrigerating apparatus, but there are many manufacturing establishments where the excessive heat of the summer reduces the efficiency of the workmen to a very noticeable degree, and in times of extraordinary heat it almost makes necessary the cessation of work. Reports from sugar refineries in this neighborhood are that large numbers of men were each day incapacitated during the hot weather of last month. The advisibility of artificial refrigeration may be a matter for argument, but there can be no question that it is entirely possible. Not only can the air be cooled but it also can be dried and sent into inclosed spaces, such as engine rooms, so as to keep them in a bearable condition. It is not too much to assert, either, that in large centers of population like New York City, a place of amusement which could be kept at a reasonably low temperature and supplied with fresh dry air would be immensely popular during hot summer weather. People spend a great deal of money and go to much trouble to get to seashore resorts, but in spite of the relief afforded by these places there is each evening a vast number of people left in the crowded cities who have the means and would be very glad to pay reasonably for a comfortable place of refuge. Perhaps at some later day it will be feasible to distribute refrigerating liquids through the streets after the manner of steam distribution, and instead of warming the houses, a central station could be made to furnish the means of cooling them.

Ideals.

We all have our ideals, be they high or low, but in how few cases do they so dominate our lives as to essentially change them for the better! The boy entering upon a trade or a profession or starting at the bottom of the ladder in a mercantile house is seldom without his visions of his later years of success. That he does not reach the goal of his ambition may be perchance because his idéal was beyond his reach, but far more likely because he failed to strive for it with undivided purpose. Altogether too likely he has looked upon riches as the acme of success. But let him for a moment look back upon the lives of great men. In how few instances were they even wealthy and in what single instance is a man long to be remembered simply because he was rich in wordly goods. The ideal of a good education and an upright character is one that can be reached by all and forms the substantial foundation upon which all future success must be erected. The young mechanic may well seek to be the best workman in the shop, to know more about the why and the wherefore of his methods of work than any one else, to have the credit of making the fewest mistakes. These are perhaps but lowly ideals, compared with some of our air castles, but they will sooner or later put the man in charge of others. But this means work, and study too, outside of working hours; it means the exercise of the powers of observation; it means that during the hours of labor the work must receive the undivided attention of the workman, and it means, above all things, the utmost patience. Such results as he strives for cannot all be secured in a day; it will take months and years, too, but with life spared he may always climb higher.

Mixing Concrete.

In the making of concrete the matter of mixing is fully as important as the choice of the materials used, for with unskillful methods there may be a vast amount of waste, both in the quantities of materials used and in the final strength of the concrete mass. It is possible to obtain as strong and as satisfactory results with a small amount of cement and a large amount proportionally of well chosen aggregate as with a large amount of cement and haphazard mixing with ill chosen aggregate. In any good concrete the main object is to fill the voids. The spaces between large stone should be filled with smaller stone; these spaces so reduced should in turn be filled with sand of a coarse variety, and then the smallest spaces filled entirely with cement. Every piece of stone and particle of sand, therefore, should be coated well with cement, and the best results are obtained when there is not too much of any material—stone, sand, or cement. Large masses of pure cement scattered through a mass of concrete shows a waste of good material, for a piece of good hard stone would do better work in the place of the mass of cement, and it would cost a fractional part as much.

There has been more or less discussion as to the kind of material that is best in concrete making. First, in regard to the size: For heavy and massive work, large stone may be used, sometimes as large as a man's head. Then the rest of the stone may be graded down so as to have the spaces between the stone well filled. The matrix should be composed of coarse sand, at least as large as the coarsest granulated sugar, and the cement should be thoroughly mixed with this sand before the mortar so formed is incorporated with the stone. Only sufficient water should be used to insure a stiff, tenacious mass. It is often advisable to wet the stone and coarse material before mixing. As for the kind of aggregate, that depends wholly on the use to which concrete is to be put. For heavy loads and masonry of high order, only hard broken stone, basalt, granite, &c., should be used. For fire proof work use broken brick, pottery, clinker, slag, and such material as withstands great heat. For light floors, filling, &c., use crushed coke clean cinders, &c. For heavy wear in pavements use pea granite or other hard stone. There is a good deal of controversy at present among engineers, says Ross F. Tucker in the *Brickbuilder*, as to the relative value of broken stone and round pebbles in making concrete. Tests have been made which show no practical difference in the strengths of concrete made under similar conditions with the two materials, yet judgment and reason would certainly choose stone in place of pebbles for important work.

There is often a confusion of ideas in naming the proportion of the materials for making concrete, due to the fact that it is not generally understood that three parts of sand and six parts of coarse 2-inch stone do not make nine parts together. The voids in coarse stone amount to about 47 per cent. of the mass, or, roughly, 50 per cent., which means that it is necessary to add to a certain mass of stone nearly half as much sand in order to fill the voids without increasing the bulk at all. According to Trautwine the following table gives the proper ratio:

1 cubic yard broken stone with 0.5 of its bulk voids requires 5 cubic yards gravel or fine stone
0.5 cubic yard gravel or fine stone, with 0.5 of its bulk voids requires 0.25 cubic yard sand.
0.25 cubic yard sand with 0.5 of its bulk voids requires 0.125 cubic yard dry cement.

So when a mixture is stated by the formula 1 — 3 — 6 — the result is a mixture of one part of cement to six parts of aggregate, and not of nine parts of aggregate, as might be assumed. This is a matter of much importance, not only in estimating, but in the strength of the concrete, for if one mixture is made of one part cement and, say, six parts of broken stone, and another mixture is made of one part cement, two parts sand, two parts of small stone, and six parts of large stone, the result of the second mixture will be far superior to the first in economy of materials, volume, and equal in strength. In all cases this idea should be developed to its fullest extent, where concrete is used intelligently.

Here, however, comes another idea of importance relating to the manner of mixing, whether it is to be done by hand or by machine. If it is to be done by hand account is to be taken of the uncertain quality of the labor. The energy required for mixing concrete is excessive, and the work is very fatiguing. It is harder to handle stiff concrete than one which is soft. The temptation then is to use too much water, which drowns the cement and wastes it. The mixture should be turned a number of times to insure a thorough distribution of cement and to fill the voids uniformly. The tendency, however, is to save time and labor, and, consequently, to avoid mixing as much as possible.

RESIDENCE OF MR. SAMUEL RICHARDS AT GLEN RIDGE, N. J.

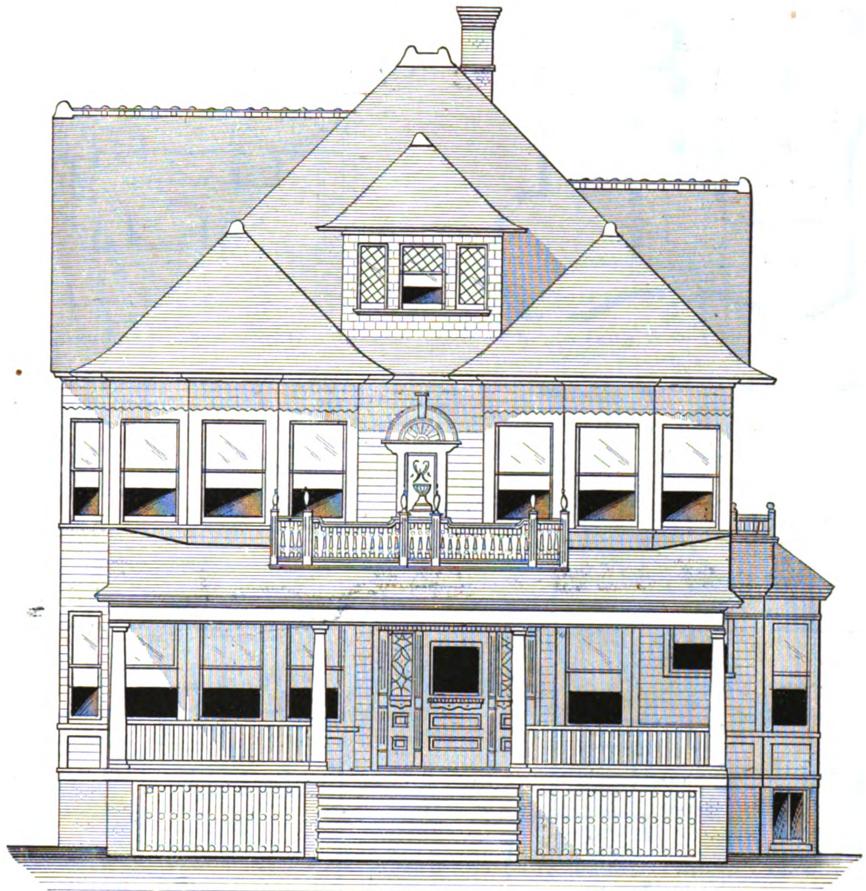
H. GALLOWAY TEN EYCK, Architect.

Supplement Carpentry and Building, September, 1896.

COTTAGE AT GLEN RIDGE, N. J.

THE architectural subject which forms the basis of our supplemental plate this month will appeal to many of our readers who are interested in designs of dwellings of attractive exterior and convenient disposition of rooms. The design, which is homelike in its general treatment and well adapted for erection upon a suburban lot, has a wide hall extending about half the depth of the building, and opening from it at the right is a library, while at the left is a parlor, both rooms having bay windows. A spindle arch divides the main hall from that portion which leads to the stairs, and beyond this access may be had to the dining room at the left and to the kitchen beyond the stairway at the right. The arrangement is such that communication between the kitchen and the front door is direct, thus doing away with the necessity of passing through any of the other rooms. Between the kitchen and the dining room is a butler's pantry provided with a dresser fitted with shelves and drawers. The kitchen is provided with all the requisites of a well appointed house, and from it the second story may be reached by the rear stairs, while access to the cellar is convenient by means of a flight under the main stairs. The second floor is cut up into four sleeping rooms, bathroom and ample closets. A noticeable feature is an archway separating the principal rooms so that access may be had one with another, and yet each may be cut off by means of a door clearly indicated on the plan. The bathroom is at the rear of the house between two of the sleeping rooms and so placed as to be readily reached from any portion of that floor. In the attic is a servant's room, a storeroom and a billiard room, with ample closet accommodation.

The frame of the building is of hemlock, mortised, tenoned and pinned together in the usual way. The exterior is covered with 1-inch hemlock boards put on diagonally, over which is a good quality of sheeting paper with clapboards as a finish. The gables, as will be seen from an inspection of the elevations, are shingled and the roof is covered with cypress shingles. The first story has a double floor, the first one being of rough boards and the top one of North Carolina flooring. The balance of the house is No. 1 North Carolina pine. The trim is selected Gulf cypress finished in the natural wood. The house is heated by steam and is plumbed in the best manner with open work fixtures nickel plated. The stairway is of natural ash and the mantels are of oak with tile facings. The house was erected not long ago at a cost of about $4200 for Samuel Richards of Glen Ridge, N. J., from drawings prepared by Architect H. Galloway Ten Eyck, with offices in the Firemen's Insurance Building, Newark, N. J.

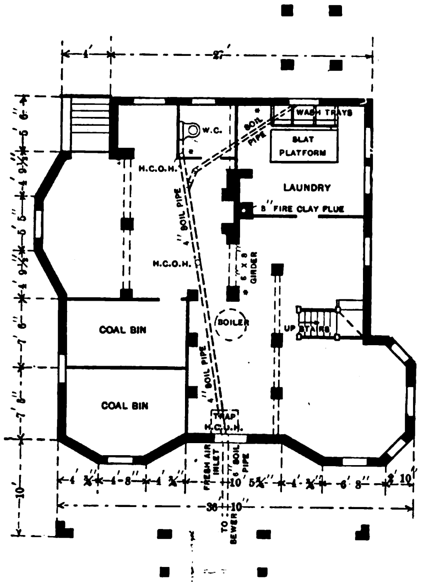


Front Elevation.—Scale, ⅛ Inch to the Foot.

Cottage at Glen Ridge, N. J.—H. Galloway, Ten Eyck, Architect, Newark, N. J.

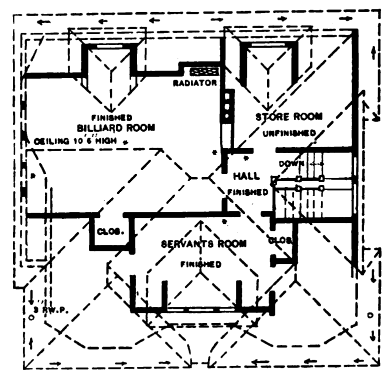
Constructing Floors.

In discussing the construction of floors, a well informed writer, in one of our contemporaries, says that in the matter of flooring, contractors may add to their profits or increase their losses more rapidly than in any other class of work about a building. A careful workma will see that his joists are properly sized before being placed on a wall, and that the "crowning edge" is above, and he will endeavor when "bridging" to give all his joists a crowning edge and have them all on one plane, so that his flooring will touch each joist without being forced down or sprung. This is an important matter, inasmuch as if the joists are at irregular hights it will cause a great deal of trouble in laying the floor and result in a big loss of time, which is loss of money. In driving flooring together



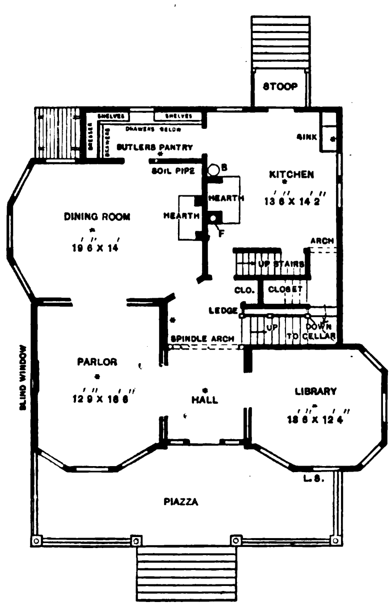
Foundation.

edge joints should be invisible. In tongue or blind nailing there is no necessity for breaking the tongue where each nail is driven, neither is there any necessity for the mark of the hammer to be seen wherever there is a nail. A man who will persistently leave his "X mark" engraved with a claw hammer on every joint of flooring should be taken from the work at once and given something to do more suitable to his capacity. By a proper cutting of lengths from 5 to 15 per cent. of the material may be saved, and the shrewd workman who has the interest of his employer at heart will always manage the disposition

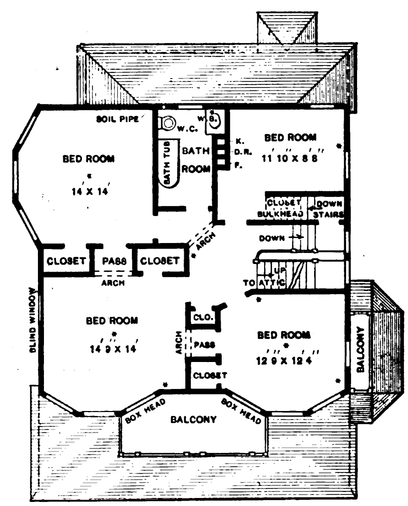


Attic and Outline of Roof Plans.

of his "butt joints" so as to have a minimum of waste. When a man fills a room with short ends of flooring while laying, he may be put down as an extravagant floor layer. It may be he can lay more surface in a day than another man who does not have so many butt ends, but as a matter of fact the man who puts down the lesser surface of



First Floor.



Second Floor.

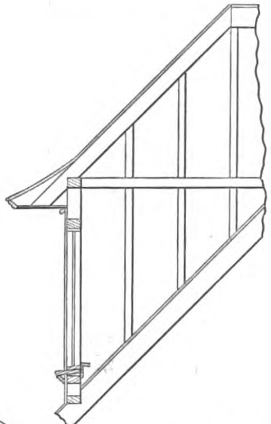
Cottage at Glen Ridge, N. J—Floor Plans—Scale, 1-16 Inch to the Foot.

ome care should be taken, and the tongues of the boards hould not unnecessarily be broken off or "mashed" in riving the stuff together. If any difficulty arises in getting down the floor on account of the machine work the flooring should be discarded at once, as it is the hight of folly to wrestle with a lot of badly matched flooring. It will pay two or three times over to have the stuff run through the machine again than to fool away time in trying to make a good job with inferior materials. Well matched flooring should "lay down" with ease and the floor and makes less waste is often the more profitable man for the contractor. The slasher and rusher who gets in a lot of work each day at an extra waste of material is profitable only to those who use kindling wood.

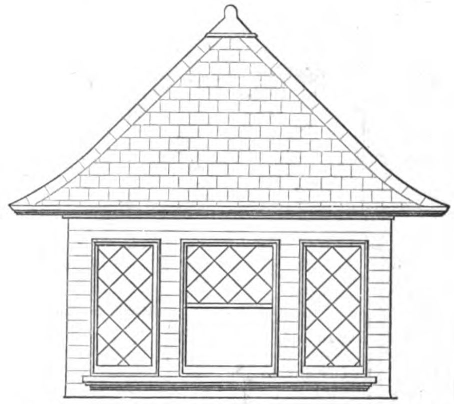
WHAT is said to be the smallest iron building in New York City is being constructed at the northeast corner of Melrose avenue and 161st street. The building has a frontage of 3½ feet and is 22 feet deep. It will be two stories high and will be occupied as a tailor shop and dwelling.

Mortar Under Shingles.

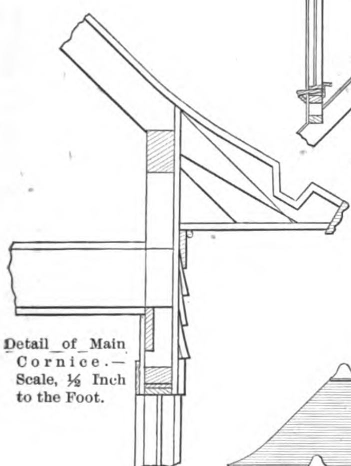
Many architects insert a clause in their specifications calling for ½ inch of rough mortar to be laid under the shingles. The object of this, of course, is to act as a non-conductor of heat and cold and as a fire arrester. We have never been quite sure that the mortar has ever accomplished either of the purposes for which it was intended, says the *Canadian Architect*. The lime in the mortar certainly does no good to the shingles, but harm if ever rain gets to where the lime strikes them, and the shrinkage of the roof boards is sure to crack and break the mortar up, if it should escape being shattered by the hammering and pounding while the shingling is being done. The mortar used for the purpose is generally the most miserable stuff the plasterer can concoct, and the laying of it on the roof boards is not by any means done in the best style. On a flat roof it may be effective, but on a steep roof we have our doubts about it, and in the end we are constrained to think it is about as expensive as good roofing paper.



Detail of Front Dormer.—Scale, ¼ Inch to the Foot.



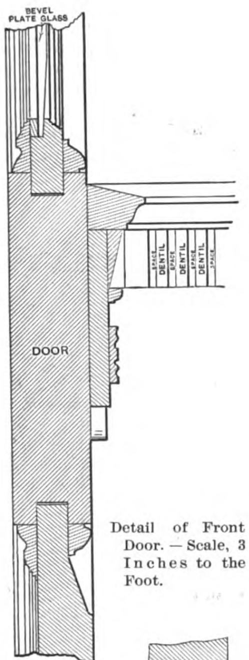
Elevation of Front Dormer.—Scale, ¼ Inch to the Foot.



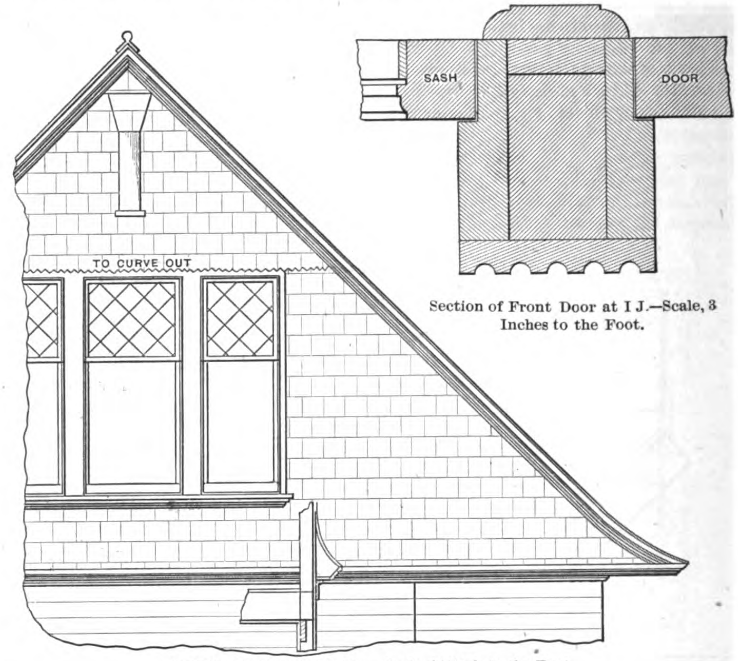
Detail of Main Cornice.—Scale, ½ Inch to the Foot.

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

Side Elevation and Miscellaneous Details of Cottage at Glen Ridge, N. J

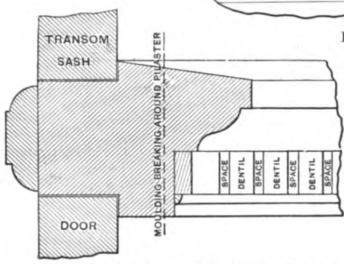


Detail of Front Door. — Scale, 3 Inches to the Foot.

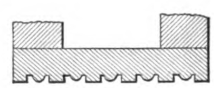


Detail of Right Side Gable.—Scale, ¼ Inch to the Foot.

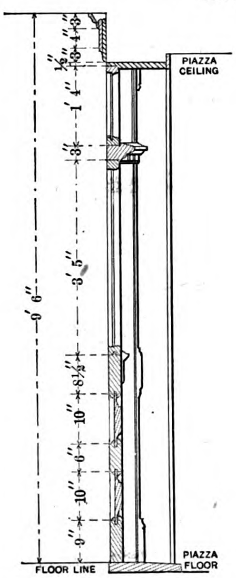
Section of Front Door at I J.—Scale, 3 Inches to the Foot.



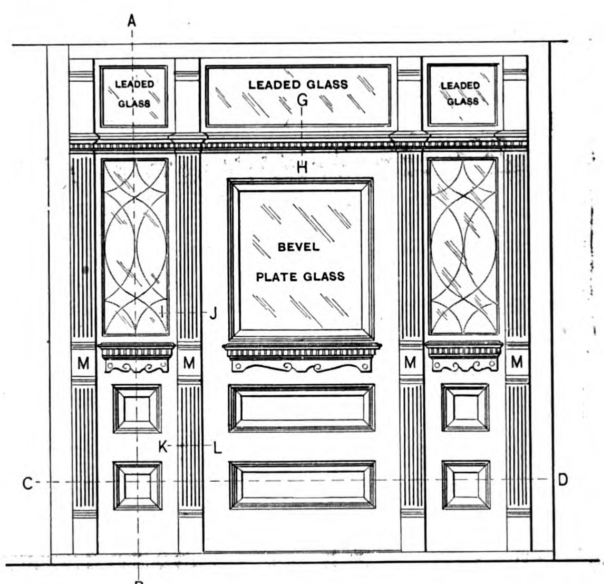
Section of Transom Bar on Line G H.—Scale, 3 Inches to the Foot.



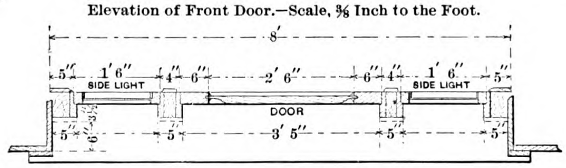
Section of Door at K L.—Scale, 3 Inches to the Foot.



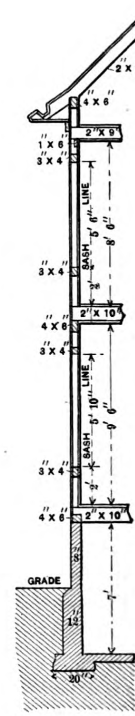
Section of Front Door on Line A B.—Scale, ⅜ Inch to the Foot.



Elevation of Front Door.—Scale, ⅜ Inch to the Foot.

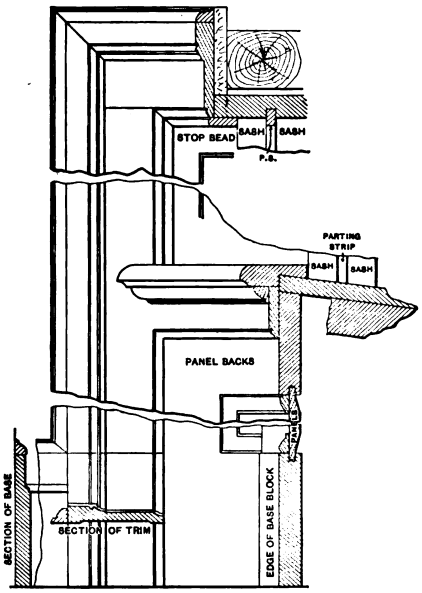


Section on Line C D.—Scale, ⅜ Inch to the Foot.

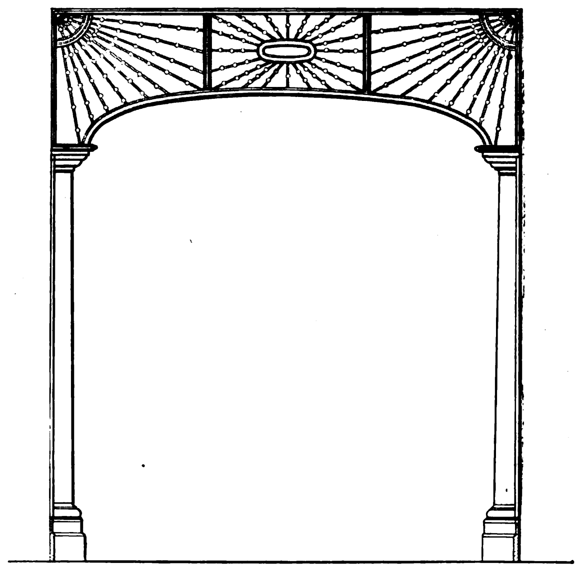


Section through Frame of the Building. — Scale, ⅛ Inch to Foot.

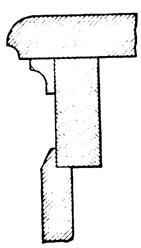
Miscellaneous Details of Cottage at Glen Ridge, N. J.



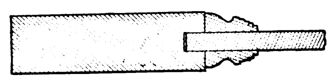
Details of Window Trim and Panel Backs.—Scale, 1½ Inches to the Foot.



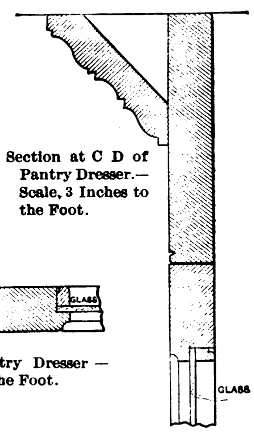
Spindle Arch in Main Hall.—Scale, ⅜ Inch to the Foot.



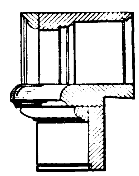
Section on Line E F of Pantry Dresser. — Scale, 3 Inches to the Foot.



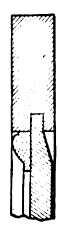
Section of Inside Door.—Scale, 3 Inches to the Foot.



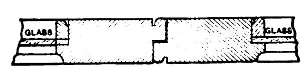
Section at C D of Pantry Dresser.—Scale, 3 Inches to the Foot.



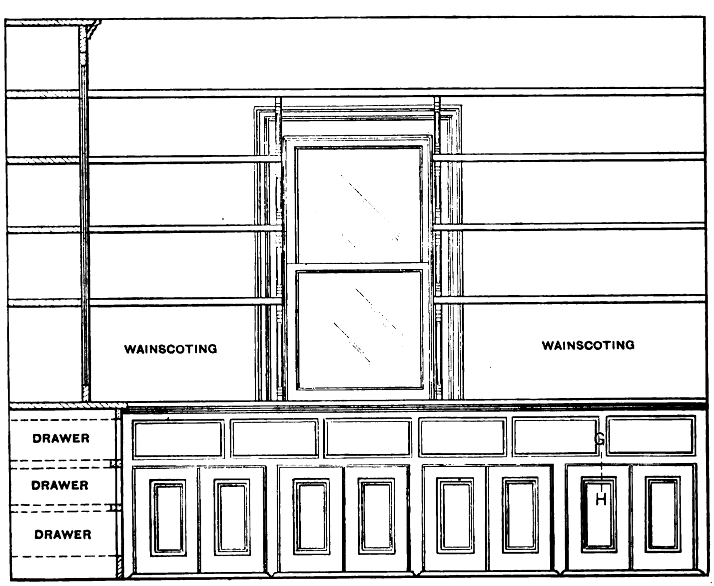
Nosing and Apron on Windows that Have no Panel Backs.—Scale, 1½ Inches to the Foot.



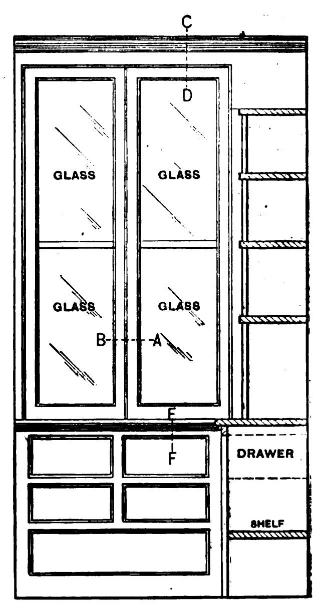
Section at G H of Pantry Dresser. —Scale, 3 Inches to the Foot.



Section at A B of Pantry Dresser — Scale, 3 Inches to the Foot.



Elevation of Pantry Dresser as Viewed from the Dining Room.—Scale, ⅜ Inch to the Foot.



Elevation of Dresser as Viewed from the Kitchen.—Scale, ⅜ Inch to the Foot

Miscellaneous Details of Cottage at Glen Ridge, N. J.

BUILDING WITH HOLLOW BRICK.

A WRITER in one of our Western exchanges tells how to use hollow brick in the construction of dwelling houses, office buildings, shops, &c., stating that in some parts of Ohio, and more especially in Northern Illinois, the material is extensively employed for this purpose and is rapidly becoming popular. What he has to say possesses so much of interest for many of our readers that we present herewith some extracts from the article in question.

A building is considered as being much more stable if constructed with hollow brick walls than if constructed with solid walls, besides possessing other advantages in regard to dryness and fire protection. Hollow tile wares are now made that combine these advantages, and also have the advantage which is now considered first—namely, that of cheapness. The foundations of these buildings are made of 8 x 8 x 16 semi-glazed tile, laid up in regular courses, selected as to color, in cement mortar. Each tile is manufactured with cross webs, making each piece of great strength and solidity. A specially designed tile, with molded edge and drip, under 8 inches deep, is made for a water table course, with 1½ inches extension beyond the face of wall; wash, 1½ inches.

The girders supporting the floor joists are carried on pilasters of 16 x 24 inch tile, built at regular distances, which also form a part of the outside wall, adding greatly to the architectural effect. Girders are anchored to the wall with strap iron anchors. The ends of the joists, where they run into the wall, rest upon tile corbels formed of the same sized tile, extending from the wall 4 inches. A special tile for window sills is made with the proper wash and drip, somewhat similar to the water table tile. For the jamb tile of the window openings a special tile is provided, allowing the usual 4-inch reveals for window weights.

Various architectural effects can be readily obtained by tile made for belt courses, frieze and round corner tile, and factories will make special tile from drawings submitted by the architects if desired.

By means of this hollow ware a chimney much lighter and cheaper than a brick chimney can be built. For the building of chimneys a tile 5 x 12 x 12, with a proper radius, conforming to the proposed diameter of the chimney, is made, the tile being locked together with iron clamps. The air space necessary in a large chimney is had with the hollow ware. For chimney tops special tile are provided to relieve the monotony of the straight sides. A number of these chimneys have been built, and all give the best results. A tile now made and used as a chimney tile is being well received. The tile is made in one piece, with four air chambers, and can be rapidly set in place. The interior flue is 8 x 8, and the tile measures 14 x 14 on the outside. It not only acts as a flue, but the chambers on the side act as ventilators, that can be used by openings in the rooms. This does not interfere in any way with the flue drafts. Tile for the lining of brick chimneys are also made and largely used. A large percentage of fires are caused by defective flues, but this danger can be greatly lessened by the use of these clay flue linings. Tiles of various shapes and sizes for uses that I will not take space to mention are made, such as capping tiles, skew backs, &c.

Very severe tests have proved that vaults can be built of this building tile. The writer recently observed the burning of a large factory, where a vault built of this material rigidly stood the intense heat for several hours, and upon examination the papers and books were found to be untouched. The vault was built with a double wall of 8 x 8 x 12 tile, with a 2-inch air space between, with the usual fire proof vault doors. Upon the rebuilding of the factory this vault was increased in size, but the old vault was used and added on to, thus showing the confidence of the architect in this material as a fire proof material. The fire walls in this building were also built of this material, used in the same way as in building the vault, and stood the test. The outerw all next to the fire scaled where the water struck it, and the outer shell of the tile fell away in places, but the damage was so slight that the wall was used in rebuilding.

FIRE PROOFING TESTS OF STRUCTURAL METAL IN BUILDINGS.

SOME time ago a joint committee consisting of representatives of the Architectural League of New York, the American Society of Mechanical Engineers and the Tariff Association of New York was appointed for the purpose of investigating and testing methods of fire proofing structural metal in buildings, and to obtain data for standard specifications. The committee added to its numbers by the creation of an advisory board composed of men prominently identified with the building and engineering professions. This step was taken for the purpose of more widely increasing interest in the experiments and also to prevent, as far as possible, the impression that the work was of a sectional or local character. The report which the committee has issued contains a great deal of information of interest and value to the architect and builder, and we present portions of it in a condensed form herewith. The committee first erected a testing plant properly equipped for the purpose, the furnace for testing columns being 14 feet square, outside measurement, and provided with an arched roof made of fire brick. The roof was independent of the side walls, being supported by outside corner posts.

The walls were of common brick, but can easily be changed so that experiments can be made on other materials. One side wall and the end wall with the door were 12½ inches in thickness; the rear wall 8½ inches, and the fourth wall 4 inches inside, 2 inches air space and 8½ inches outside, making a total thickness of 14½ inches.

The floor was covered with fire brick, with openings left for the branch gas pipes and air spaces to support the combustion. These branch gas pipes were 4 inches in diameter, capped with tuyeres reduced to 2 inches. In order to increase the temperature when desired, a barrel of naphtha was connected by means of a small pipe and blown into the gas pipe at the Y-branch by means of a steam jet.

The column was placed in compression by means of a hydraulic ram underneath, resting on three 24-inch I-beams the same as those across the top of the furnace. In order to keep the entire length of the column within the furnace filler blocks of cast iron were placed between the ends of the column and these I-beams. The hydraulic ram was 12 inches in diameter, and the water pressure could be carried to 2500 pounds per square inch. The temperature was measured by means of a Uehling & Steinbart pyrometer.

The committee decided that it would be best to make the tests according to the following programme:

First.—That a series of tests be made on steel and on cast iron columns, without any fire protection whatever; these tests then to be taken as a basis of comparison with those that were to follow.

Second.—That a series of tests be made with similar steel and cast iron columns, protected with different materials and in different manner.

Third.—That a series of tests be made on unprotected beams and girders.

Fourth.—That a series of tests be made on protected beams and girders.

It was also proposed that each series be divided for tests both with and without water.

Column Test No. 1.

Fire Tests Without Water. Steel Column.—The walls of the furnace were of common brick, as already described, and the door was closed with a double thickness of sheet iron, which made the opening practically tight. The column was a Carnegie steel box channel, of the dimensions shown in Fig. 1, and was unprotected.

The result of the test is shown by Fig. 2, which represents the column before it was removed from the furnace.

Strength by Gordon's Formula.

Breaking strength per square inch ....45,630 pounds.
Area of cross section...........................15 square inches.
Breaking load, 15 × 45,630....................684,450 pounds = 342 tons.
Actual greatest load, cold = 141.4 tons, with no change of form.

Column Test No. 2.

Fire Test without Water. Steel Column. Furnace same as Test No. 1.—The column was a Carnegie steel Z-bar, as shown in Fig. 1, and was uncovered.

Strength by Gordon's Formula.

Breaking strength per square inch...........42,820 pounds.
Area of cross section............................14.15 square inches.
Breaking load, 14.15 × 42,820................605,900 pounds = 303 tons.

Column Test No. 3.

Fire Test without Water. Cast Iron Column. Furnace

The fracture occurred at about the center of the column, where the deflection was the greatest. There was a crack about 5 inches long about 7 inches above the fracture on the convex side of the column, showing that the column first pulled apart on the outside of the bend. No water was thrown on this column during the test.

Column Test No. 5.

Fire Test with Water. Cast Iron Column. Furnace same as Tests Nos. 1, 2, 3 and 4.—The column was a cast iron, hollow, round column, with flanges faced on both ends, and was uncovered It was cast horizontally, with a dry sand core, by the Cornell Iron Works, New York. The column was the same as illustrated in Fig. 5, with the following exceptions: Flanges were 1⅝ inches thick, and were re-enforced with four ribs as in test No. 4. There was a slight defect in this casting, there being a porous portion a few inches long on one side about 3 feet 6 inches from the lower end.

Water was thrown upon the column through about 50 feet of 2½-inch rubber hose and a ¾ inch nozzle. The pressure at the hydrant was 50 pounds.

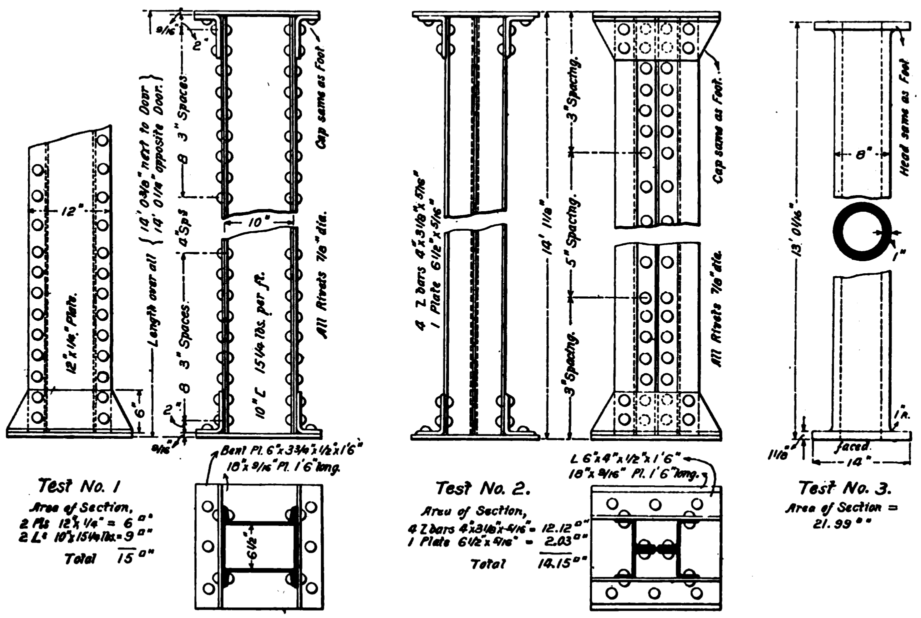


Fig. 1.—Columns Tested by the Committee.

Fire Proofing Tests of Structural Metal in Buildings.

same as Tests Nos. 1 and 2.—The column was a cast iron, hollow, round column, with flanges faced on both ends, as shown in Fig. 3, and was uncovered. It was cast horizontally, with a dry sand core, by the Cornell Iron Works, New York.

Strength by Gordon's Formula was as Follows:

Breaking strength.............................902,000 pounds.
Safe load, 1/5 × 902,000......................180,400 pounds = 90.2 tons.

The result of test No. 3 is shown in Fig 3.

Column Test No. 4.

Fire Test without Water. Cast Iron Column. Furnace same as Tests Nos. 1, 2 and 3.—The column was a cast iron, hollow, round column with flanges faced on both ends, and was uncovered. It was cast horizontally, with a dry sand core, by the Cornell Iron Works, New York. The column was the same as illustrated in Fig. 4, with the following exceptions: Length over all, 13 feet ¼ inch; thickness of flanges, 1⅝ inches; flanges re-enforced by four ribs, each ⅞ inch thick, reaching from outer end of flange to cylinder at an angle of about 45 degrees.

The result of the test is shown in Fig. 5.

The column was very red when the water was thrown on it the last time. The brick walls and arch roof cracked when water fell on them. The column was badly bent, but otherwise appeared uninjured.

Results of Tests of Unprotected Columns.

In giving the results of the tests of unprotected columns the committee says:

Test No. 1 was made on a steel column, when the temperature was raised rapidly. Test No. 3 was made on a cast iron column under similar conditions. Both columns began to fail as soon as they showed red.

Test No. 2 was made on a steel column, when the temperature was raised more slowly than in the other tests just described, and Test No. 4 was made on a cast iron column under similar conditions. Both these columns failed when they began to show red, although the time was longer than in tests 1 and 3.

Test No. 5 was made on a cast iron column, a jet of water being thrown upon it through a ¾-inch nozzle. The column was first heated to 675 degrees and then quenched with water without injury. The heat was then slowly raised again to 775 degrees and the column again quenched with water. The heat was then raised slowly to a temperature of 1075 degrees and the column, which then showed a dull redness, was again quenched with water. The heat was then raised again to 1300 degrees and the column, which now showed a bright red, was again quenched with water. The column was beginning to yield by bending just before the last application of water. The column was apparently unaffected by water, although it failed by bending under the load, the same as in cases 3 and 4.

Fig. 2.—Steel Column.—Load 46 Tons, Temp. 1200°.

Fig. 3.—Cast Iron Column.—Load 84.8 tons, Temp. 1100°.

Fig 4.—Cast Iron Column.—Load 84.8 tons, Temp. 1550°.

Fig. 5.—Cast Iron Column.—Load 84.8 tons, temp. 1300°.

Fire Proofing Tests of Structural Metal in Buildings.

Ideal Heating and Ventilation.

A gentleman having well defined theories of heating and ventilation as applied to dwellings recently erected for himself a house in which his theories were put to a practical test. The house in question is on the heights above Scranton, Pa., and is unique from the very foundations. The lower stories are built of a conglomerate stone found only in the anthracite region. It is not quarried, but obtained in natural boulders that, carefully selected and placed, have made a most artistic building. There is much mica in the composition of the material, and in the sun the effect is very brilliant.

The owner of the house has spent 13 winters in Florida, and, desiring to escape the cold of a northern winter in his own house, has paid the most careful attention to its heating and ventilating arrangements. Opening from every bedroom is a clothes closet, and in every closet is a window opening to the outer air and a heater. Night ventilating is accomplished by means of the closets, the bed in each room being placed so that the draft does not strike its occupant. The house is, in fact, one in which drafts are impossible. It is heated by hot water, and the contractor took his job with the agreement that open doors all over the house, with no drafts anywhere, should constitute its successful carrying out. He has achieved his end perfectly. A great square hall, open to the third floor, is the favorite gathering place of the family, and even in this spacious apartment too much air is never felt. It may be added that the contractor's task was a peculiarly difficult one, the owner of the house, who has a bald head, being especially susceptible to moving currents of air.

As most house builders after taking possession are apt to say that in building again they will have many things different, it is pleasant to record one who has put his theories into successful practice.

WHAT BUILDERS ARE DOING.

THE general condition of affairs in the building trades of the country is virtually the same as that reported last month. In a majority of the cities, the season is so far advanced that comparatively little new work of importance is likely to come into the market; and the uncertainty in general business circles is such that the likelihood of important investments in building prior to the election is very small. Communications from the territory lying west of the Mississippi River continue to show that builders and business men interested in building are suffering from the present depression to an extent almost unknown in the history of that section. The older districts of the East seem to be controlled by conditions which are less unstable and are progressing favorably, when the general tendency to stagnation throughout the country as a whole is considered. Such labor disturbances as have occurred during the past month have been limited to isolated cases, and their effect has caused but little stoppage of work.

Augusta, Ga.

On July 28 a movement which has been in motion for some time among the builders of Augusta, Ga., took shape in the establishment of an organization to be known as the Builders and Material Dealers' Exchange. The officers elected were: President, T. O. Brown; vice-president, Charles L. Rounds; treasurer, Walter Lynch; directors, H. C. Perkins, D. Slusky, Charles F. Degen, Bert Miller, John Phinizy. Headquarters for the exchange will be secured in some centrally located place, and a secretary will be secured whose sole business it will be to attend to the affairs of the organization. A charter will be secured and the exchange will be made a power for good in Augusta. All the lumber and supply dealers of the city are now members or will join in the near future. The builders anticipate that there may be some opposition to the new organization on the ground that it is a combination to control prices of work and material, but assurances are given to the public that the exchange is intended to be equally beneficial to all persons interested in building, whether owner, architect, contractor or dealer.

Baltimore, Md.

At the sixth annual meeting of the stockholders of the Builders' Exchange Building Company of Baltimore, which was held recently, the following directors were elected for the ensuing year: James A. Smyser, E. L. Bartlett, N. H. Creager, S. B. Sexton, Jr., P. M. Womble, Jr., B. F. Bennett, John L. Lawton, Wm. Ferguson, J. F. Adams. The directors elected the following officers: James A. Smyser, president; Noble H. Creager, vice-president; E. D. Miller, secretary, and B. F. Bennett, treasurer.

The amount of building going on at present in the city is below the average for this season of the year, but in spite of this fact a large amount of work is being done and builders generally are fairly well satisfied. There has been no disturbance of any kind between employers and workmen for some time past.

Boston, Mass.

The strike of hoisting engineers in Boston, which has been reported heretofore in these columns, and which still has official existence, is causing the employers but little disturbance at the present time. During the past month, the State Board of Arbitration intervened in behalf of the workmen, and an investigation was held with a view to bringing the employers and workmen together for the settlement of their difficulties. Before the resort to the State Board of Arbitration, a committee of the Central Labor Union addressed the Master Builders' Association, asking for the appointment of a committee to meet a committee of like number from the Central Labor Union. The Master Builders' Association considered the request, but in view of the fact that that association is composed of all branches of the building business, it was decided inexpedient to appoint such a committee. The Master Builders' Association as an organization has always favored arbitration for the settlement of differences between employers and workmen, but has endeavored so far as possible to confine action to the employers and workmen of the special trade affected by any disturbance. It is reported at the present time that the Central Labor Union will again endeavor to bring about some form of joint action between themselves and the Master Builders' Association, looking to the establishment of permanent agreements in the separate trades for the prevention of labor disturbances.

During the past month the amount of work on hand has continued about the same as has been previously reported; the outlook for the season continuing the promise of the earlier season. Aside from the strike of hoisting engineers, there has been no labor disturbance in the city during the past month. During the recent heated term, work was largely suspended on the more important contracts throughout the city, the heat being so intense that the employers considered it unwise to go on with the work.

The Master Builders' Association is preparing to send a large delegation to the Buffalo convention of the National Association of Builders, the total number that will attend being about 65. It is expected that the delegates from the several parts of New England will combine with the Master Builders' Association and that the whole party will travel to Buffalo in a special train, leaving Boston on September 13.

Buffalo, N. Y.

There has been little increase in activity in the building interests of Buffalo since the last report, and there seems to be little promise of any unusual increase during the remainder of the season. Everything seems to be quiet and to promise continued quiet for the balance of the year among the workmen.

The Builders' Association Exchange has virtually completed its plans for entertaining the delegates and visitors to the tenth annual convention of the National Association of Builders, which will be held in Buffalo, beginning September 15. Among the special features of the plan of entertainment is a daylight ride by electric cars from Buffalo to Niagara Falls, the outward journey to be made on one side of the Falls, including the Whirlpool and the Rapids, and the return journey to be made on the other side of the river, presenting the fullest possible view of all points of interest. During this ride an opportunity will be given the delegates and visitors to inpect the great plant of the Niagara Falls Electric Power Company. A collation will be served during the stay at the Falls.

Chicago, Ill.

There has been little, if any, improvement in the condition of the building business in Chicago during the past month, the state of affairs being about the same as that reported in the August issue of *Carpentry and Building*. On August 1 the hod carriers struck for a union wage scale of 30 cents an hour for plasterers' laborers and 25 cents an hour for bricklayers' laborers. A general strike was decided upon, and it was expected that at least 3000 men would stop work on that date. The number of men who have actually quit work is much smaller than was anticipated, and although at this writing the matter is still unsettled, the number of men on strike is too small to seriously interfere with the progress of work. It is stated that the Employing Plasterers' Association has unanimously resolved that they believe the demands of the laborers to be unjust, especially in view of the short notice which was given of the intention to strike. The employers, however, favor submitting the matter to arbitration, and efforts are now being made to settle the matter by mutual agreement.

The Builders and Traders' Exchange on August 7 elected the following delegates to the convention of the National Association of Builders at Buffalo:

William Grace, delegate at large.

Thomas A. Hogan,	Daniel Freemen,
T. A. Dungan,	Herman Mueller,
John Rawle,	John A. Boland,
Henry Appel,	Edward B. Myers,
Wm. H. Alsip,	George Tapper.

Arrangements are being made to send as large a delegation of visitors as possible in addition to the regular delegates.

The amount of work in the city building department for the months of June and July is said to be 30 per cent. less than that of a year ago. During the month of July 543 permits for buildings were issued, estimated to cost $1,760,650, while in July, 1895, there were 884 permits issued, for buildings valued at $3,717,035.

Cleveland, Ohio.

Building is reported as being unusually dull in Cleveland, with little prospect of improvement during the remainder of the season. The principal topic of interest to the workmen of Cleveland during the past month has been the Brown Hoisting Company's strike, which began about May 25. The original cause of the strike was a demand by the boiler makers of pay and a half for overtime. This was refused, and a general strike was threatened. The Brown Hoisting Company anticipated the strike by discharging all their 800 employees. The company immediately employed such non-union men as could be obtained until about 200 were at work, the strikers in the meanwhile making threats of violence to non-union workmen. The action of the strikers was such that police and militia protection was required for the safety of the workmen; but on the evening of June 30 a riot occurred during which several officers and workmen were seriously injured. From this time forward until the settlement of the strike, numerous frays occurred and four militia companies were constantly on duty. The services of the State Board of Arbitration were rejected by the Brown Hoisting Company on the ground that they were perfectly willing to take back their old employees as individuals, but refused to recognize the union which ordered the strike. The official action of the hoisting company upon which the workmen, so far as possible, returned to their former employers, is as follows:

No discrimination would be made against any of the men for participation in riots or for other causes. The original blacklist of 12 was also waived.

Time and a half for overtime would be allowed. The refusal of the company to allow this was the prime cause of the strike.

In case of grievance the men can go direct to the manager, and not first to a foreman, as demanded in a former proposition of the company.

The men would have to apply to the company for work as individuals, but would all be given work as soon as possible.

The non-union men in the works would not be discharged.

Milwaukee, Wis.

An effort is being made by the members of the Builders and Traders' Exchange of Milwaukee to increase the scope and usefulness of that organization. Amendments to the by-laws are being prepared which will throw the governing power of the exchange into a board of management elected at annual meetings instead of leaving the business of the organization to be transacted at monthly meetings of the members, as is now the custom. An attempt will be made to bring about closer relationship between the contractors and the architects, and to place the organization upon such generally improved footing that the building interests of the city will greatly profit thereby. There is some talk of the establishment of a building trades club similar to those existing in New York and Chicago. Preparations are being made for sending as large a delegation as possible to the convention at Buffalo, and the Milwaukee builders hope to secure the next convention for their city. There has been comparatively little improvement in the general condition of building during the past two months, and there seems little likelihood of any unusual activity between now and the close of the season. No labor disturbances have interfered with such work as is under way, and there are no indications that the present state of affairs will be disturbed.

Madison, Wis.

In view of the depression prevailing throughout the State generally, the builders of Madison, Wis., are elated over the amount of work on hand in their city. While the present season is not the best in its history, there is at present under way about $175,000 worth of work, which is very satisfactory. The work is largely confined to residences, although it includes one or two office buildings and a $15,000 improvement on one of the school buildings. There have been no disturbances among the workmen during the season, and the present outlook promises continued amicable relations between employers and workmen.

Oakland, Cal.

The condition of the building trades still remains unsettled, owing to the action of the trade unions in reference to the working card system. The Building Trades Council is at present conducting what amounts virtually to a boycott against the Shinglers' Union, based upon the complaint of the carpenters that the Shinglers' Union should not be recognized. The Oakland carpenters, through their union, are attempting to establish co-operation between the merchants and themselves for the purpose of wiping out irresponsible contractors. The large number of lien suits and other complications caused by irresponsible builders has brought about the present effort, and the work of the two parties, represented on the merchants' side by the Merchants' Exchange and on the carpenters' side by the Carpenters' Union, will doubtless be an efficient factor in bringing about better conditions.

The carpenters are considering the advisability of requesting the co-operation of the Builders' Exchange, in the hope that a closer relationship may be established between the two.

Pittsburgh, Pa.

The Builders' Exchange of Pittsburgh has recently taken action on a request by the Building Trades Union to establish a joint arbitration committee to which matters of interest to employers and workmen may be referred. G. S. Fulmer, secretary of the exchange, has announced that his organization has decided to appoint a committee.

The report of the building inspector for the month of July shows a slight falling off in the number of permits granted as compared with the same month of last year. In July of the present year permits were granted for the erection of 111 buildings aggregating a cost of $406,864, in addition to which 38 permits were granted for alterations involving an expenditure of $16,139. Of the 111 buildings erected 59 were brick, 48 frame and 2 were stone. In July of last year the number of permits granted was 128, covering 71 brick structures, 55 frame and 2 stone buildings, with an aggregate cost of $609,542.

Plans are now being drawn for a Farmers, Manufacturers and Merchants' Exchange, which will be on a plan somewhat similar to that of the Philadelphia Exchange, but with some additions. The building is to be of brick and 120 feet square, surmounted by two towers. The trimmings will be of stone, and it is expected that it will be completed about the first of December. Rooms will be arranged at either side of a large hall, 12 feet wide, running through the center of the building. The floor spaces which will be laid off are intended to accommodate a variety of tradesmen who will occupy them with their goods. The first floor will be occupied by retailers and a portion of the second floor by wholesalers, the idea of the undertaking being to do away with the margin of the middleman. Business is reported as being unusually active among the builders of Braddock and East Pittsburgh, there being upward of 100 dwelling houses in course of erection at the present time.

Philadelphia, Pa.

At a special meeting of the Master Builders' Exchange the following were placed in nomination for delegates to the tenth annual convention of the National Association of Builders, to be held in Buffalo, Sepember 15, 16 and 17: Washington J. Gear, Jr., F. F. Black, William B. Irvine, William Harkness, P. J. Murphy, Charles P. Hart, Charles G. Wetter, James Hasting, George Watson, Cyrus Borgner, Charles Cillingham, R. W. Lesley. In addition to the regular delegates a large party of visitors will attend the convention. The general condition of building in Philadelphia remains about the same as that reported last month. There were no labor disturbances during August.

Rochester, N. Y.

The general condition of affairs among the builders of Rochester is about the same as that reported in the August *Carpentry and Building* by Secretary Grant of the Builders' Exchange. The building laws of the city are at present being revised, and the new ordinance as prepared has been submitted to the Builders' Exchange and the Board of Underwriters for their approval and suggestions. The new law will contain complete instructions for the erection of buildings as regards thickness of foundations, walls, size of joists and regulations for the government of interior construction, &c. The law will be a much needed improvement and protection to the city, and will be based upon the most successful laws of the other principal cities of the country.

Springfield, Ill.

The Springfield Builders and Traders' Exchange has established itself in new quarters in the old Council Chamber, at the corner of Seventh and Washington streets. The rooms have been newly fitted and furnished throughout and provided with many conveniences for facilitating the transaction of business. The exchange has been compelled to overcome a prejudice against its existence, growing out of an unfounded rumor that its object was combination by the contractors for the purpose of controlling prices, &c. This rumor was the result of a rigid investigation of all applications for membership, and the rejection of those falling below the standard required. The exchange has established itself as an influence for good in the community and is steadily growing stronger and larger, as its principles and purposes become better known. The exchange is founded on the recommendations of the National Association of Builders, and is doing all in its power to bring into operation honorable codes of business practice, arbitration as a settlement of differences between employers and workmen, and other beneficial methods for generally improving the transaction of business.

Building is in a generally satisfactory condition and there have been few labor disturbances of sufficient importance to seriously obstruct the progress of work. A painters' strike early in June for $2.50 a day and against the employment of non-union men created a brief disturbance, but the matter was finally settled by the employers granting the demands of the workmen.

St. Louis, Mo.

Building business is better than the indications a few weeks ago seemed to warrant. The permits issued during the last four or five weeks furnish the best possible argument in reply to statements as to extreme and unprecedented dullness, says the St. Louis *Globe-Democrat* of August 10. Permits continue to be issued at the rate of about $1,000,000 per month, and, as pointed out a few days ago, the total for July, 1896, was greater than for 1895, if the frame buildings are omitted. There was a slight falling off in the permits for frame buildings, which is easily accounted for. The proportion of brick to frame houses in St. Louis is very large, statistics showing that the percentage of the latter gets smaller every year. A majority of the new buildings started during the last week or two are in the West End district. They include houses of the better class on Maple avenue, west of Union, and on Cates avenue, near Hamilton; also a series of very attractive houses on Morgan street, west of King's highway and along the Suburban tracks at the corner of Cabanne avenue. The costly residence on Westmoreland place for Hudson Bridge is a much more ambitious enterprise, and the house just commenced on West Pine street, near Taylor, will cost upward of $10,000, and be a very desirable addition to residences in that neighborhood. A handsome two-story dwelling house has just been commenced on Belt avenue, and another very similar in character on Clements avenue. This is anything but a favorite season for commencing building operations, and the fact that so many new houses have been commenced within the period of two or three weeks is exceedingly encouraging.

At the last regular quarterly meeting of the Builders' Exchange, the treasurer's report showed the organization to be in excellent condition, and the secretary stated that the membership is steadily increasing. Thomas J. Ward, Patrick Mulcahy and W. J. Baker were elected delegates to the coming convention at Buffalo. The exchange will be represented by a large number of visitors in addition to the regular delegates and alternates.

St. Paul, Minn.

Building is exceedingly quiet in St. Paul and Minneapolis. In the former city very few business buildings are in course of erection, and those that are being built are located in the newer portions of the city. There is practically no demand whatever for dwellings and buildings of a similar character. The general conditions in Minneapolis are reported as being about the same, and the prospect for the balance of the season in both cities is very discouraging.

The Builders' Exchange of St. Paul has recently voted to abandon further meetings, subject to the call of the president. This action is attributed to the exceeding dullness of business and the little prospect of improvement during the year. Such work as has been undertaken this season has been contracted for under competition so keen that little if any profit has remained to the contractor. The majority of the small operations which have been undertaken can offer but little more than day wages to the contractor.

Toledo, Ohio.

The amount of building is steadily increasing, though slowly, and Toledo builders are feeling more hopeful over the prospect of the season. The Builders' Exchange recently entertained a delegation from the Wheeling, W. Va., Exchange on a picnic at Put-In Bay. The exchange is in excellent condition and its recent removal to more centrally located quarters seems to have been a beneficial step. There has been no trouble between employers and workmen of any significance for some time past.

Trenton, N. J.

While there have been no extensive building projects carried on thus far this year, yet the aggregate amount invested in new buildings, repairs, additions and alterations amounts to a snug sum in the total.

During the month of June the most extensive operation was an addition to St. Mary's Cathedral, costing about $5000, and a brick store and dwelling, costing about $3500, the remainder being distributed among barns, additions and alterations.

Wilmington, Del.

Secretary Foulk of the Wilmington Builders' Exchange reports the building business in his city as being to all intents and purposes dead, the only contracts of importance under way being one new church and the alteration of a school house. The amount of minor work on hand is also exceedingly small, and builders generally are much discouraged over the outlook for the rest of the year.

Notes.

The recently appointed building inspector of East Orange, N. J., reports a satisfactory amount of work in progress, there being erected at the present time buildings whose estimated cost is upward of $100,000.

The Federal Labor Union of Nashville, Tenn., is endeavoring to form a State labor league for the discussion of economic questions that in any way affect the interests of organized labor.

The buildings recently destroyed by fire in Cripple Creek, Col., are very rapidly being rebuilt in much more substantial form than existed prior to the fire. Where formerly frame buildings of a temporary character were standing, brick and stone buildings are now being erected. Only union labor has been employed, and the best wages are paid, but it is stated that there is an overplus of workmen in all branches of the trade in the city.

Bathroom Plumbing for a Country Dwelling.

Among the many methods in use for supplying the bath, &c., with hot water in country plumbing, the plan shown in Fig. 1 may be interesting to many, when compared with the different appliances now used. The reservoir, or tank, was usually made of heavy galvanized iron and connected with circulation pipes to the kitchen range, which was commonly situated on the floor beneath the bathroom. The cut shows the tank supplied from a force pump, when necessary, with overflow to tub. Another plan sometimes met with is to provide two wood tanks lined with galvanized iron, incased and run up flush with the end of bath, 30 inches in hight, the same width as tub, and 15 inches back, thus forming two compartments, one of which is connected with the range in the usual manner, the other being kept for supply of cold water, and the discharge from each being carried to a double bath cock.

Fig. 2 shows a good arrangement of pipes in a country dwelling where the supply is obtained from a soft water tank situated in the attic. The reason for having the range boiler in the bathroom is because the kitchen is already hot enough without it, whereas the heat derived from the boiler is very acceptable in the bathroom in cold weather, and a good circulation is obtained. The hot water service is continued from the top of boiler and turned over the top of tank, as shown, which prevents any accumulation of steam, and obviates the use of a vacuum valve. The cold water pipe is also treated in the same manner, to allow the pipes to drain thoroughly when the stop cock at the tank is closed for repairs The draining can be easily accomplished by opening the faucets at the sink. A small hole must be made in the tube within the boiler near the top to prevent emptying by siphonage. Branches are provided to supply the bath and basin, care being taken to give these pipes a proper fall to insure their emptying.

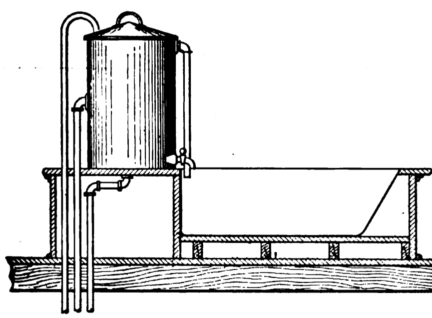


Fig. 1.—Tank Supplied by Force Pump.

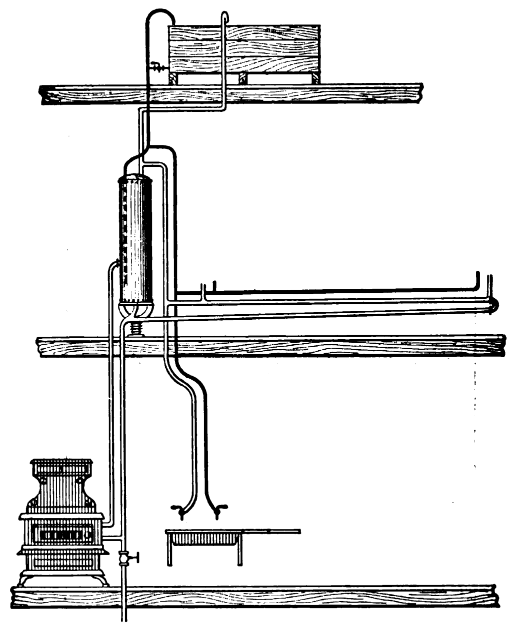


Fig. 2.—Tank Supply and Boiler Heating Bathroom.

Bathroom Plumbing for a Country Dwelling.

Lime Mortar in Freezing Weather.

There is a popular fallacy to which a great many masons adhere most tenaciously, that the addition of lime to cement mortar is desirable if the work is to be carried out in freezing weather. Upon what reasoning such a solution is based it is impossible to determine, though there seems to be a vague feeling that because the lime in slacking becomes very hot it therefore must impart a certain portion of its heat to the mortar, and so retard any effect of freezing weather. This is not only illogical, but it is not warranted by facts. Lime is slacked in cold water; it is then mixed with cold sand and cold cement, and is on ordinary building operations carried a long distance through the cold atmosphere, so that by the time it is actually laid up with the cold bricks in the cold wall all heat virtue has departed and the lime is absolutely inert in caloric. So much for theory, says a writer in one of our exchanges. To determine the practical effect, tests were made last winter during the course of the construction of one of our largest buildings. Upon the coldest day of the winter, when the thermometer registered below zero, two 8-inch square brick piers were constructed under as nearly as possible the exact conditions which would obtain in a wall. The piers were a little ever 1 foot high. One was laid up with mortar composed of 1 part lime, 2 parts cement and 4 parts sand. The mortar of the other was composed of 2 parts cement and 4 parts sand. The piers were allowed to stand under cover, which would protect them from beating storms, but they were exposed to alternate freezing and thawing effects of the temperature during a period of about three months. At the end of that time it was found that the mortar containing lime was considerably disintegrated, so that it could be crumbled easily between the fingers, while the cement mortar, though somewhat injured by frost, was still reasonably firm and hard. The first pier was dropped to the floor through a distance of 4 or 5 feet and was entirely destroyed, no bricks adhering to each other. Dropping the cement mortar pier through the same distance, it broke in two pieces, and not until it had been violently dashed against the floor six times was it entirely destroyed. Even then some of the bricks broke before the mortar became dislodged. The reason for this action of the two mortars is very apparent. The addition of lime to cement mortar tends to retard the setting. Consequently there would be a considerable period during which the cold weather could act disastrously upon the mortar. Furthermore, lime mortar sets by absorbing carbonic acid from the air, a process which takes a great deal of time. Cement mortar, on the contrary, sets by crystallization, and a few moments after it is in place in the wall the outer surface has taken a sufficient set to serve as at least a slight protection against the cold, while long before the lime mortar mixture would be hard the cement mortar would be so completely crystallized that the cold would have comparatively little effect upon it. Consequently, the addition of lime to cement mortar is a positive detriment in every sense.

CORRESPONDENCE.

Design for a Writing Desk.

From M. S. W., *Grand Rapids, Mich.*—I send by this morning's mail a design of a small writing desk in answer to the request of " W. B. B." of Ansonia, Conn. The general appearance of the desk when facing it is indicated in Fig. 1 of the sketches, while Fig. 2 represents a plan of the bottom board, which is fastened in place by dowels. Fig. 3 shows a vertical section through the desk, the dotted lines indicating the sweep and fall of the writing leaf of the desk. When this is extended in a horizontal position it is held up by a pair of desk supports such as are turned out by the Grand Rapids Brass Company. The supports can be purchased from almost any dealer in cabinet hardware for 80 cents. The back of the desk is intended to be made of five-ply whitewood veneers, similar to the stock used for mirror backing. An idea of the construction of the back is indicated in Fig. 4 of the sketches. Fig. 5 shows the drawer construction, while Fig. 6 is a detail of the cornice of the desk, drawn to a scale of 6 inches to the foot. The general construction employed is so clearly indicated by the sketches that further comment is unnecessary.

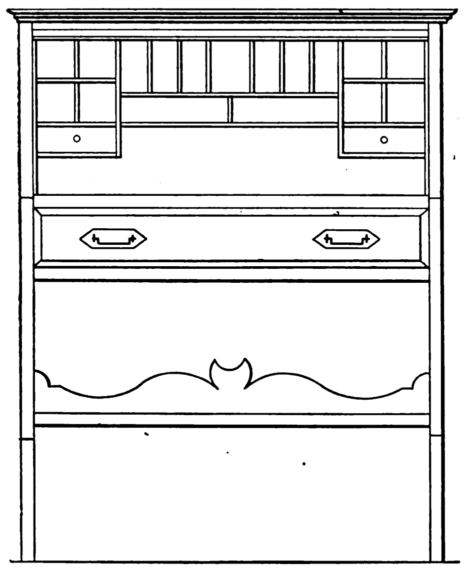


Fig. 1.—Front Elevation of Desk.—Scale, 1 Inch to the Foot.

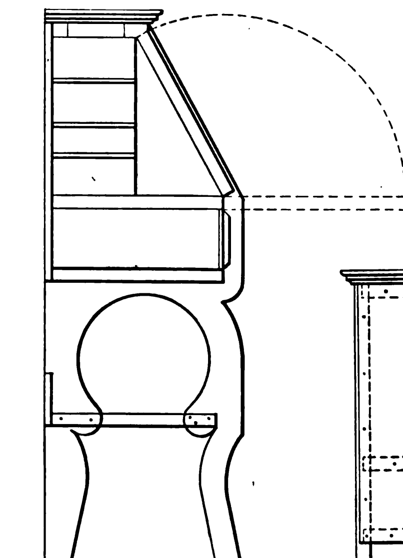


Fig. 3.—Vertical Section.—Scale, 1 Inch to the Foot.

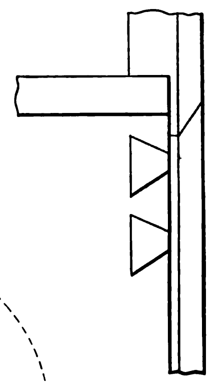


Fig. 5.—Detail of Drawer Construction.—Scale, 6 Inches to the Foot.

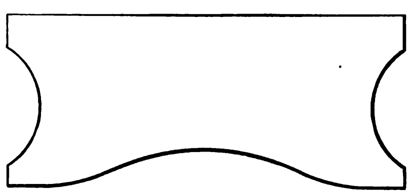


Fig. 2.—Plan of Bottom Board.—Scale, 1 Inch to the Foot.

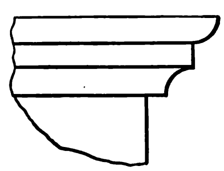


Fig. 6.—Cornice of Desk.—Scale, 6 Inches to the Foot.

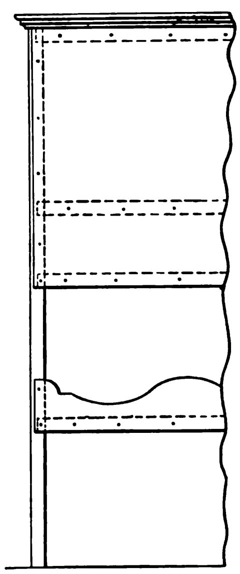


Fig. 4.—Partial Rear Elevation. Scale, 1 Inch to the Foot.

Design for a Writing Desk.

Insulation for Ice House Walls.

From S. F. B., *Wellington, Ohio.*—Allow me space to tell what I know about ice house or cold storage walls. About 17 years ago a firm here put up a cold storage house about 60 feet square, having 2-foot brick walls, 22 feet high, with ice room above. The lower story was studded next to the brick and ceiled up ; then studded again about 1 foot from the first and ceiled up with ⅞-inch oak. The space was rammed solid with sawdust and to-day the building is about useless, and sawdust did it. Dampness got in the dust and it molded and rotted, bursting off the ceiling. If one should put a tub of butter in there for 24 hours it would taste as rotten wood smells. Leave it there a week and it is spoiled clear through. If I was going to build an ice house or storage I would use no packing of any kind, for heat or cold will go through a solid wall but will not jump an air space. I would set my studs 18 inches on centers, cover the walls with matched sheeting ; then heavy paper up and down the walls, and nail ½ x 2 inch strips opposite the studs, on which I would put the siding and leave it open top and bottom for the air to circulate. On the inside edge of the studs up and down I would put paper, with a 2 x 2 strip on the studs ; then ceil up with No. 1 oak ceiling, and put the ice in without any sawdust whatever. Overhead I would put a good floor and from 1 to 2 feet of fine cut straw; also a good tight roof with gable windows for ventilation. I would use heavy oak sills and oak studs. It is not so much a question of the thickness of the walls, but the more nearly air tight the house the better the ice will keep. I use Fay's manila paper, as it is very strong, rolls out smooth, is sweet and clean and water tight.

Suggestions Regarding Builders' Hardware.

From M. L., *Warren, Ohio.*—I notice in the June number of the paper an article from " G. P. S.," Leavenworth, Kan., which is right to the point. In almost every house that is built there is trouble with the locks on the doors from the same cause, and " G. P. S." has clearly pointed out the remedy. If the manufacturers would, they could soon remedy the fault and save builders and owners much trouble. If they would leave out the blunt pointed drive screws, which are little better than a wire nail for putting on locks, and give us good screws in place of them, it would save builders the trouble of buying screws. "G. P. S." is correct as to the blinds. The hinges we get do not hold the blind open more than half the time. A light breeze will blow them shut, and some of the hinges have to be filed off before the blinds can be taken off.

Developement of Ogee Rafters.

From G. A., *Memphis, Tenn.*—I have lately become interested in the method of devloping ogee rafters submitted by "H. W. N.," in the issue of the paper for January, where the correspondent named advocates the use of scales, one 13 inches in length and one 17 inches in length, each divided into 12 equal parts, the former for octagon roofing and the latter for square hip. I would like to illustrate the method I prefer in producing the above scales, as doubtless many others are interested in this part of the operation, which is as follows: Set a long bevel at an angle of 45 degrees and mark 13 inches on the outer edge of the blade. Slide the bevel on the steel square and we have 9 3-16 inches on both blade and tongue, the hypothenuse of which is 13 inches. Draw two parallel lines indefinitely 9 3-16 inches apart, and erect two perpendicular lines also 9 3-16 inches apart, which will form a square, as shown in Fig. 1 Divide the perpendicular lines into 12 equal parts by laying the square with the heel on the base line and the 12-inch mark on the line parallel to it. Prick off very carefully inch divisions, repeating the operation on the opposite end of the plan. Draw lines across from point to point, having first tacked on diagonally a strip ⅛ x 1 x 13 inches. Square over the diagonal divisions and that part of the work is done. Now, divide one of the divisions into 8 equal parts and the result is a scale of 13 inches divided into 12 equal parts. The 17-inch scale is produced in the same manner, the sketch shown in Fig. 2 being self explanatory.

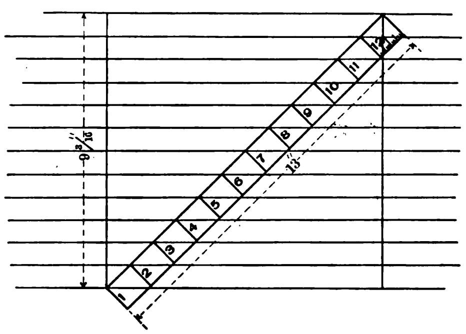


Fig. 1.—Scale of 13 Inches Divided into 12 Equal Parts.

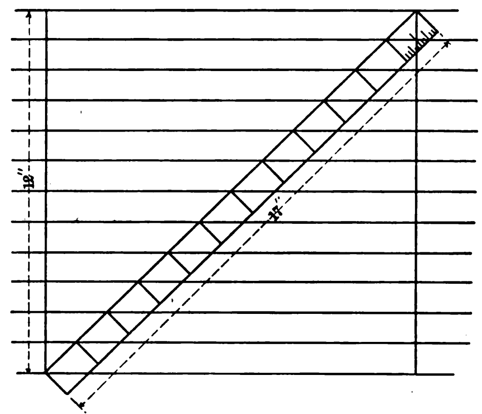


Fig. 2.—A 17-Inch Scale Similarly Divided.

Development of Ogee Rafters.—Sketches Accompanying Letter of "G. A."

Suggestions for Pattern Makers.

From G. A., *Memphis, Tenn.*—I have been waiting patiently since the April issue of *Carpentry and Building* for some one interested in pattern making to follow the suggestions of "A. W. W.," in giving the craft the benefit of his practical observations on this important line of business, for doubtless the paper finds its way into the hands of many mechanics who are sometimes called upon to execute a job in this particular line. I have just completed a pattern for an engine bed plate and found myself out of alcohol or shellac, so I was compelled to employ a substitute. Desiring to give the pattern a black coating, I proceeded to mix the following ingredients: Turpentine, ½ pint; lamp black, ½ ounce; graphite, ½ ounce; varnish, 1 ounce. I would like to have the opinions of others as to the merits of this composition used as a coating for wood patterns.

Construction of Hoisting Derrick.

From E. E. M., *Sayreville, N. J.*—Will some reader of the paper inform me how to make a suitable derrick to hoist about 12 tons? I want it about 20 feet high and as handy as possible, so as to move it from place to place when neccessary.

Condensation Under Iron Roofs.

From V. D., *Miles, Iowa.*—In a late issue of *Carpentry and Building*, being that for February, I notice "J. D. S." of Fredericton, N. B., is in trouble with his iron roofs. I had the same trouble with nearly every iron roof I constructed, and I have put on a number of them. In putting up our buildings we want to get them closed as soon as possible, and after iron is laid the night dew or frost collects on the outside, and about one half of it is on the under side and drops down upon whatever may be within the building I notice, however, that after the iron is well painted with a cement paint and the air is shut off from the under side of the roof all condensation ceases. Metal roofing should be well painted on both sides and dried before it is laid. All cross seams should be double locked joints, well hammered down and cemented with a roofing cement. I claim it will hold, and with the exception of tin, is not as liable to leak as soldered joints. With regard to papering under iron to deaden the sound, I find that a water proof paper is the best, as it will not collect as much dampness as tar or other coarse paper. I think we make our roofs too flat for iron. The more pitch they have the quicker the frost or dew will run off, and it will not have the chance to condense as it would if the roofs were flat. Now, this is my experience with iron roofs, and if it proves of any benefit to my brother chips, well and good. This is the only way, I think, to find out how others do their work, and I think the best way to learn. I hope to hear and learn from other readers.

Strength of Wooden Beams.

From CARPENTER, *Naugatuck, Conn.*—Will some of my brother chips give me a rule by which to figure out the breaking strain of timber, such as spruce and yellow pine, so that I can obtain the results without the use of algebra, or carrying around with me a lot of tables? The timber is to have bearings at both ends and be loaded at the center.

Answer.—In ascertaining the breaking strains of materials, whether of iron or of wood, it is necessary to have at command at least a few figures respecting the coefficient of strength. In computing the strength of a wooden beam which is supported at both ends and loaded in the center a rule which will be found useful in finding the safe load in pounds is as follows: Multiply the breadth of the beam by the square of the depth, and then by the coefficient of strength, dividing the product by the span in feet. In the case cited by our correspondent the coefficient of strength for American yellow pine is given as 100 pounds and that of spruce as 70 pounds. Kidder's "Architects and Builders' Pocket Book" states that these values for the coefficient for beams are one-third of the breaking weight of timbers of the same size and quality as those used in first-class buildings. This, it is stated, is a sufficient allowance for timbers in roof trusses and beams which do not have to carry a more severe load than that on a dwelling house floor, small halls, &c. Where there is likely to be very much vibration, as in the case of a mill or gymnasium floor or floors of large public halls, the author recommends that only four-fifths of the values given be employed.

Tool Chest Construction.

From D. T. C., *New Bedford, Mass.*—I have been a subscriber to *Carpentry and Building* for little more than a year, but I would not be without it if I had to pay $5 or more a year for it. I find it so interesting that when it comes I cannot lay it down until I have read it through. I have been much interested in the articles on roof framing published in its columns and also the letters about making a tool chest. I have particularly noticed the letter of "F. A. B.," and also the one from "G. P." I will try and give the readers an idea of a tool chest I made for my own use and find very convenient. From the sketches which I send it will be seen that I have free access to the small tools as well as to any portion of the chest, without the necessity of moving two or three drawers to get at the big tools, such as planes, mallets, &c., which is a very inconvenient feature incident to the ordinary tool chest. My chest has only four drawers, which slide in and out like those of a bureau, as may be seen from an inspection of Fig. 1. A person may say that a man must have lots of keys for all of these drawers, but I use no keys whatever. In Fig. 3 is shown an inside view of the back of the chest, E E being slides made of maple strips 1 inch square, with springs at the bottom which force up the slides when the chest is open. The slides are provided with hooks at F, which fasten with screws as indicated in Fig. 8. These hooks lock the drawers by sliding into a loop on the back of the drawers when the cover of the chest is closed. The loops are indicated at G in Figs. 4, 5, 6 and 7, the slides being kept in place by them. All the hooks and loops are made of brass, 1/8 inch thick and 3/4 inch wide. When the cover of the chest is closed it presses the slides E E down and locks the drawers. The drawer shown in Fig. 4 is divided into several compartments, J being for try squares, while K is for block plane. The drawer shown in Fig. 5 is intended for chisels. The drawer shown in Fig. 6 is divided for gauges and brads of different sizes, the compartment L being for whetstones. The drawer shown in Fig. 7, it will be observed, has no compartments in it. Fig. 2 represents the inside of the chest above the drawers. There is a saw tray for six saws, just back of which will be seen the two slides which are marked S S. The compartments M M are for iron and wooden jointers ; N N are for iron and wooden jack planes ; P for smoothing plane ; O for oil can ; Q for level ; R for my case of cutters for Stanley plow, while the rest of the space in the chest and drawers is used for other small tools. I also have a space 3½ inches deep underneath the drawers where I place tools that I do not use very often, such as wooden clamps, &c.

Fig. 1.—General View of Tool Chest.

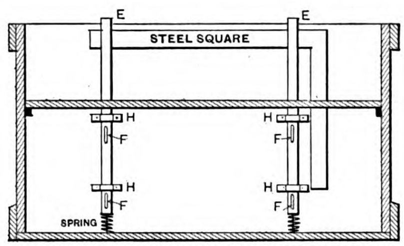


Fig. 3.—Vertical Section of Chest at the Rear.

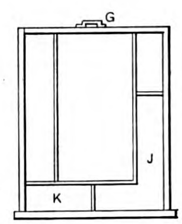


Fig. 4.—Plan of Drawer for Try Squares, Block Plane, &c.

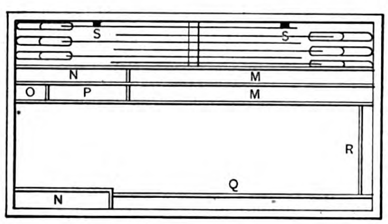


Fig. 2.—Plan View of Chest Above the Four Drawers.

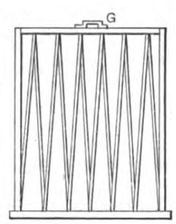


Fig. 5.—Plan of Drawer for Chisels.

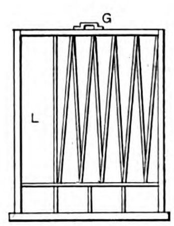


Fig. 6.—Plan of Drawer for Gauges, Brads and Whetstone.

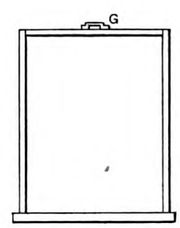


Fig. 7.—Plan of Drawer without Divisions.

Fig. 8.—Device for Fastening or Locking the Drawers.

Tool Chest Construction.—Illustrations Accompanying Letter from "D. T. C.," New Bedford, Mass.

I have a combination lock for the chest, therefore I have no key to carry in my pocket, or to lose, or to leave at home when I go to work, and I also know that the chest cannot be opened by means of false keys. The size of the chest is 36 inches long inside, 19 inches wide and 21 inches deep. The saw tray is 4 inches wide and 8 inches deep. The drawers are 18 inches long, 14 inches wide and 3½ inches high. I would like to hear from other readers of the paper concerning the construction and arrangement of tool chests.

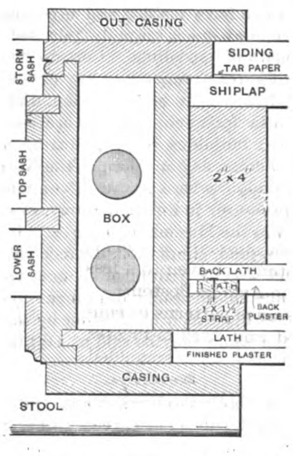
Working to Plaster Grounds.

From A. E. P., *Sparta, Wis.*—In answer to "H. E. W.," Santa Barbara, Cal., who asked in the March issue of the paper in regard to working to plaster grounds, I would state that in the first place the grounds should be fixed plumb and true and nailed on so the trim will lap about ¾ inch. There will, perhaps, be places where it is not possible to use wood grounds, so the best way in such cases is to make a plaster ground, which is done by running a small strip of plastering, say 6 inches wide, and ruling it off with a straight edge, allowing it to dry sufficiently to work it. In a room say 10 feet 6 inches high there will most likely be a wood ground for a base, and

I would advise running a plaster ground near the ceiling as well as one midway between the floor and ceiling. When this is done, it is easy to fill in between and rule off with a straight edge. All angles should be done in the same way. This method is used in London, England, with good results. The plaster ground that I refer to is commonly called a screed. The straight edge is made all sizes and beveled. Ceilings can be done in the same way. If there are any other questions which "H. E. W." would like to ask in regard to this matter, I shall be glad to answer them, as it seems to me there is need of reform in the plastering of buildings.

Box Window Frame Construction.

From A. B. C., *Brandon, Manitoba.*—I inclose plan of a box window frame which may be of some interest to readers of the paper. The sketch also shows an excellent method of back plastering. Immediately after the back



Box Window Frame Construction.—Sketch Accompanying Letter of "A. B. C."

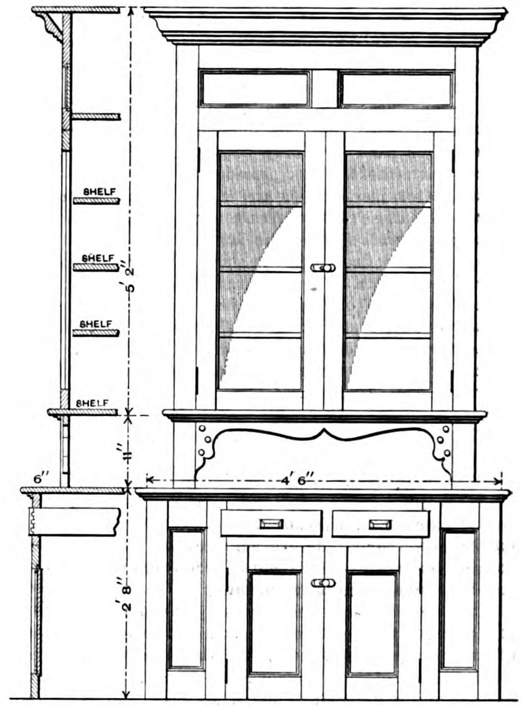
lath is put on a 1 x 1½ inch strap is nailed on the face of the studding, having a 1-inch lath nailed on the back of this. The sketch represents the style of box frame employed in the Northwest for frame buildings, and the method of back plastering indicated has proven very satisfactory for cold climates.

Cock-Tenon Framing.

From G. S. F., *Charlottesville, Va.*—In answer to the article in the April issue from "Tramp," Denver, Colo., asking for views on the advantages or disadvantages of cock-tenon framing, I would say in my humble opinion no framer of to-day would use any such tenon. In the days when the Canadian barn referred to was built there was not much iron work used about a frame building. Modern framers, however, have ceased to weaken timber by cutting mortises in it, but depend on iron straps and bolts to hold their work in place. Few carpenters of to-day would weaken the tie beam with mortises such as those shown in the correspondent's drawings marked No. 2.

Design of a Corner Closet.

From C. O. G., *East Hampton, N. Y.*—Some time ago I made inquiry through the columns of the Correspondence Department for some one to submit plans for a corner closet. A correspondent signing himself "J. H. B." of St. Paul, Minn., forwarded a plan which was published in the December issue, for which I am just as much obliged as if I had made use of it. I regret to say, however, that it was not of the exact style I desired. I inclose a sketch of one I have recently completed, thinking that perhaps it may be of interest to some of my young friends in the trade. The front, with the exception of the upper doors, which are of plate glass, is of home grown cherry. The panels at the extreme right and left of the base are stationary, while above the panel doors are two small drawers. The lower portion of the closet projects 6 inches, as indicated in the sectional view. There is an open space of 11 inches between the projection and the first shelf inclosed by the glass doors.

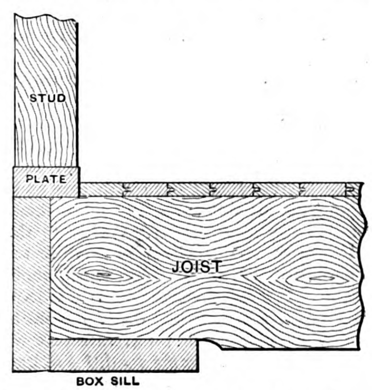


Design of a Corner Closet Submitted by "C. O. G"

On account of the hight of the ceiling I placed a double panel over the doors.

Making a Box Sill.

From P. E. A., *Sparta, Wis.*—In answer to "C. C. J.," New Bedford, Ill., whose inquiry appeared on page 95, I send a sketch showing the method I employ of making a box sill. It will be noticed that the arrangement is such



Method of Making a Box Sill Suggested by "P. A. E"

that no rats or mice can get between the studding, as is very often the case.

Lengths of Rafters for Porch Roof.

From B. F. J., *Aliquippa, Pa.*—Will some of the readers of the paper please give me information in regard to obtaining the length of rafters for a portico, there being a circular bay window projecting from the building? What I want to know is, how to get the lengths of the rafters in the swell of the window.

USE OF BRICK IN ARCHITECTURE *

WE have alternate stretchers and headers in each course called Flemish bond—though never, as far as I know, used in Flanders—and possibly so-called because it presented a more finished appearance than the English bond, and was therefore considered "flemished," or finished. This bond, while quite as strong for all practical purposes as the English or cross bond, has the advantage of evenly distributed headers and stretchers, so that if, as often occurs, the headers are a different color from the stretchers, we avoid the stripes which the other bond gives. This bond also may be arranged in two ways: Either with the headers placed over the center of the stretchers or placed over the center of the joint, the former the more usual, giving an equal distribution of joints in the wall surface, the latter giving the joints but a quarter brick lap over the joint below, and emphasizing diagonals both of the joints and brick.

Besides these ordinary bonds there are an infinite variety of less useful ones, which, however, give special opportunities for diapering, such as three headers and a stretcher in each course, called garden bond in England, and those using brick on edge. A good example of fancy bond is seen in the St. John's Inn at Hoorn

The use of face brick of far greater cost than the common brick, and the economy of using as few headers as possible in the facing, have led us either to be content with headers once in every seventh course; or, still worse, to make use of blind bond, where stretchers only appear on the face, and all is reduced to the dead uniformity of a painted surface, the neglect of constructive laws thus causing immediately a loss of beauty.

It is unfortunate both for our joint and our bond in this country that we have not, as in England, a fixed size of brick, or at least, that there should not be always a perfect ratio between the various dimensions, so that two headers and a joint will make a stretcher, and so that we may always bond thoroughly a face brick with a common brick. On the other hand, our variety of sizes gives us many opportunities for effects which could not be obtained with uniform brick.

Diapers.

The employment of brick of the various bonds, the patterns they naturally form when so orderly laid, and the variations of color found in common brick, suggested to the builders of Renaissance centuries the frequent use of diapers, accented more or less by colors. A little study of the possibility of patterns without cutting brick—*i.e.*, using a regular bond—is surprising and gives ample, indeed often too ample, chance for decoration. We are very familiar with late examples of the unwise use of colored brick in decorative diapers, but the earlier workers were content, and wisely so, with comparatively simple design and quiet contrasts of color. Here, as in every other place where the architect is tempted to use color, the greatest care must be exercised, and even with care and thought it is not granted to all architects, any more than it is to all painters, to use color wisely. Owing to this, many of the best critics and teachers of architecture have strongly deprecated the use of color, and monotones are certainly safer. It does, however, sometimes happen that an architect has arisen here and there who has been able to show us what color can do for architecture when well treated, and we have admirable facilities in the colored brick of all shades now manufactured here, and in our excellent terra cottas.

Use of Diapers.

To return, however, to the use of diapers. Their chief object is to give variety to a wall space, and therefore they should not be so marked as to make the pattern insistent, and should rather give a sense of variety, and suggest that study has been given even to the bare wall, than to lead the eye to the tracing of the design.

It is better to leave something to the imagination, as a diaper too pronounced is apt to be wearisome. Excellent examples of good diapers may be seen in Aduard, in Friesland and in the houses in Ypres, illustrated in Ysendyck, and in the various chateaux of France, especially the brick façade of the Chateau de Blois, and in many of the Elizabethan houses of England. Nor do we have to-day to go so far afield for good examples, as we have in the Madison Square tower in New York a beautifully executed piece of work, most suggestive of thought and most charming in color.

The capabilities of brick do not end, however, in the treatment of wall surfaces, for with molded brick we have endless opportunities for good string courses and moldings, and in terra cotta we have unbounded field both of form, color and enrichment.

As in the use of color there is danger, so too is there in the use of molded ornament. A mold once made it is almost as cheap to have molded and ornamental work as to have it plain, and one is strongly tempted to a profuse use of moldings and modelings. Certain classes of ornament, such as figures or foliage, or any of the less conventional forms, do not bear reduplication, and the evils of using terra cotta for such purposes are seen in many of the semi-Gothic buildings erected during the Doulton revival of terra cotta, as, for example, the Natural History Museum in London, where figures of animals and plant forms are reproduced in dull monotony, or even to a less marked extent in the Museum of Fine Arts in Boston.

On the other hand, simple Renaissance patterns of conventional mold may be reduplicated and used in masses with success, and indeed seem more proper when so molded than when carefully executed in stone by the hand of the carver, and the same may be said of Gothic ornamental diapers.

Moldings.

For moldings, both the English and Dutch have made large use of hand rubbed or carved rather than molded brick, and both countries are rich in examples of this work. The brick for this work are made of very fine clay well mixed with sand, which produces a brick very even in texture, and so soft as to enable the mason to cut it readily with a small saw or chisel, or grind it down on a wheel, or rub off with a mold.

The great objection to the use of such brick in this country would be that it is very porous and soft, and would be likely to disintegrate rapidly under the effects of frost. Even in England, where the frost is not so important a factor, the brick wear away very rapidly. I have seen houses in London that have not been standing more than ten years, where the string courses and molding exposed to the wear of passers by have lost all their arrises and had their angles completely rounded off. The same brick is constantly used for their carving as well as molding. With us, however, the hand rubbed molding is unknown, and carved brick, which was used sparingly here by the late Mr. Richardson, has never come into general use, it being, I think, rightly felt that a homogeneous mass is a more proper field for sculpture than a mass of jointed blocks, especially when the material, if durable, is hard to carve. In Bruges many houses showing the profuse use of such ornament are still standing in good preservation, and fine examples are scattered through Holland and Belgium. In England the country is rich in old brick buildings of the Queen Anne and Georgian periods, which were profusely covered with ornaments and enrichments executed in brick, and much good work has been done of late years by Norman Shaw and Messrs. Ernest George and Peto, both in London and in the country. Throughout the newer portion of Kensington, in the Albert mansions and the larger houses adjoining them in Hyde Park, and many of the artists' houses in the neighborhood of St. John's Wood, there are very beautiful examples of quiet and dignified use of plain red brick with well designed and well executed moldings.

It may be said in passing that the rubbed moldings thus executed have a crispness and texture which we do not obtain in molded brick.

* Continued from page 179, August issue.

ARCHITECTURAL DRAWING FOR MECHANICS.*

By I. P. HICKS.

ENOUGH has now been explained to enable the learner to study out for himself any other portion of the work, and there is no better way to do it than to practice on similar drawings made to ⅛ or ¼ inch scale. A very convenient scale to work out perspectives is ⅛ inch to the foot, and a better proportion for the perspective figures will result by making the station point 80 feet from the horizontal line.

With one more diagram to make plain the method of determining roof lines and vanishing points, we will bring the subject to a close. In this illustration, Fig. 64, the diagram is made open in order to avoid too many lines and to show more clearly the exact manner of locating the points necessary for producing the perspective. This figure is similiar to Fig. 63, and shows the extension of the lines to the vanishing points and also the manner of determining the amount of cornice projection. The plan has a line drawn around it representing the width of the cornice, and the two dotted lines from the opposite corners of the plan show plainly how the cornice projections are determined in the perspective The picture plane line, the ground line, the horizontal line and the vanishing points for the horizontal lines are made in the previous figure, except the station point has been fixed at 60 feet from the horizontal line instead of 56 feet. H L represents the hight line, on which set off the full hight of gable H L according to the elevation, Fig. 61, and draw the line L VP2. Set off on the hight line the distance from the ground to the eaves, as H T, and a line drawn from this point to VP2 will cut the corners of the gable at the eaves, as shown at A and B. The line A VP1 will represent the eave line. The line L VP2 cuts the ridge of the roof on the plane of the wall line of the gable and the peak of the gable is located by carrying the dotted line from the center of the plan into the perspective, locating the point C. The point D is located in the same manner and represents the peak of the gable at the outer edge of the cornice. A line from D to VP1 represents the ridge line, as shown.

The roof vanishing points will be found somewhere in a perpendicular line directly above and below the vanishing point for the horizontal lines of the gable. A line from A drawn through D and extended to intersect the perpendicular line will establish the vanishing point VP3 for the upward inclined lines of the roof. A line from D drawn through B and extended will at the intersection of the perpendicular line establish VP4 for the downward inclined lines of the roof, as shown. The dotted lines carried into the perspective from the plan show plainly the location of the points on the rear gable, and the dotted lines along the eaves and up the gable show the wall lines and width of cornice.

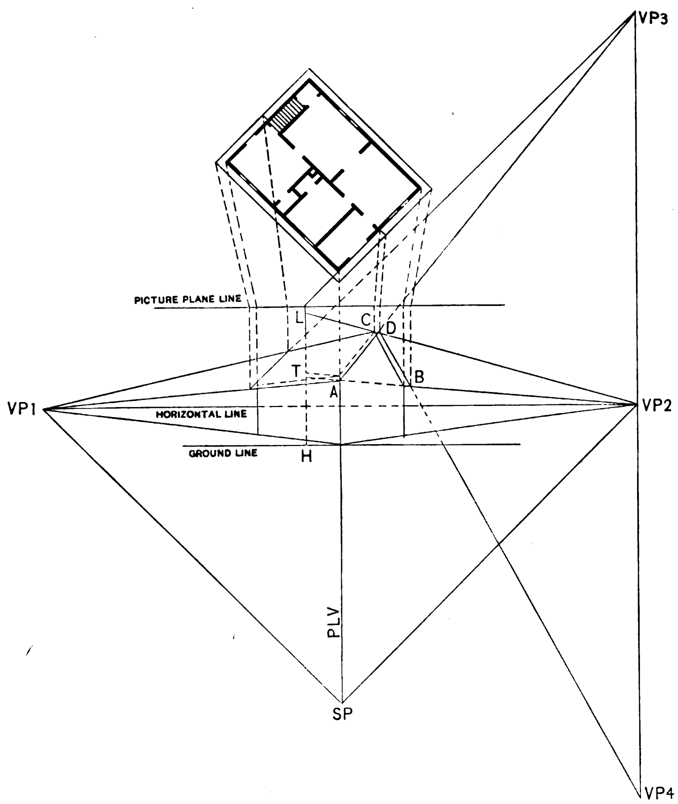


Fig 64.—Diagram Showing Method of Obtaining Roof Vanishing Points and Determining Perspective Proportions of Cornice.—Scale, 1-32 Inch to the Foot.

Architectural Drawing for Mechanics.

Fig. 64 represents a plain roof, and no doubt the learner will often meet with roofs more complicated, but the same principles if closely observed will enable him to solve the problems as they may come up from time to time. If the roof is in any way complicated it is best to draw a plan of the roof in the floor plan from which one is making the perspective, then the different points in the roof may be easily carried into the perspective and correctly located. This will bring to mind the best methods of finding the essential points far better than any other way within our knowledge and experience.

In making perspective drawings, it is not necessary that all the lines that are made for the purpose of locating the required points be regarded as permanent lines, for they may be drawn with a pencil and in finishing the drawing only those lines need be inked which represent the real perspective figure.

If by accident a line is inked which is not desired, the best way to erase it is with a small piece of sandpaper folded over the end of a small flat stick cut off at an angle of about 60 degrees. Ink marks can be very effectually removed in this manner without injuring the drawing. It is also best to go over the part erased with a good rubber eraser after the sandpaper application, as it will leave a better surface upon which to draw other lines if any are to be made.

For making real fine lines it is often necessary to point the drafting pen, as it is probable that one-half of the drawing pens as they come from the manufacturer will not make a very fine line, and it is impossible to make fine lines with a pen not properly pointed. The points of the pen should be so fine that they can barely be distinguished when looking directly at them. If one can see the points like the point of a saw tooth that has been in contact with a nail, then he cannot make fine lines with the pen in any event. Ordinarily it is only a few minutes' work to fix the pen, which can be done by screwing the nibs together, holding the pen between finger and thumb and applying it to an oil stone in a kind of circular manner, bearing only lightly on the stone and constantly turning the pen to bring the nibs up to a finely rounded point. They cannot be too sharp, and if properly pointed they will not cut the paper. Sometimes it is necessary to try them two or three times before just the right kind of a point is obtained.

Architectural drawing is a great study, and one which practically has no end, for a person can spend a lifetime in the profession and learn something new to the very last. The chance for improvement and the advancement of new ideas is always open, and none can expect to know everything there is pertaining to this interesting and useful profession. We hope that those who are seeking information on the subject discussed in this work will not be disappointed and give up in despair if their first efforts to follow the instructions do not prove altogether satisfactory. Remember that patience and perseverance are necessary requirements for those who follow the profession. Beginners in the art of drawing will be likely to be more or less discouraged at the time required to make the drawings, especially if they have other work and can only devote spare time to the study. Bear in mind that architectural drawing is a kind of work that cannot be rushed through like sawing off a board. It is work that has to be done with judgment, care and precision. If one has but little time to devote to the study do not try to do too much at once ; a little work of this kind well done will prove of more lasting benefit than a larger amount poorly executed. There is scarcely anything to be learned of drawing from a haphazard and hasty way of working. Start right, even if it does seem slow at first. Be content with the satisfaction of knowing that you are working in a way to gain the best results. Speed and proficiency will come from practice and experience, and in a short time one will find that he can do twice as much work in a given time as he could at the start and do it better. We would not advise any one to work too long at a time at drawing ; when tired and weary of it, lay it aside for a while. When the draftsman tires of the work he grows careless and indifferent ; his mind will be wandering from the work and poor results are most sure to follow.

Architecture is a study of itself and the successful architect should have nothing to divert his attention from his work, as it requires undivided attention, and to accomplish the best results he should not work too many hours a day, but be able to work somewhat at his pleasure, say from six to eight hours a day. It is wearisome to the mind to work continuously at it without proper rest. Architectural drawing is a profession which seems to grow in demand and one that still commands a good remuneration for the time consumed in the work. The present rates for architectural services are based as follows : For drawing plans, from 1½ to 2½ per cent. of the cost of construction, and 5 per cent. for personal superintendence. It will be readily seen from this that an architect would receive for drawing plans for a $2000 residence from $35 to $50, and for plans and personal superintendence $100. Considering that such plans could be prepared in three or four days, and that the personal superintendence is only occasional visits of a few hours each in looking over and inspecting the work as it progresses, it is a pretty fair consideration for services rendered. Yet it is not a higher price than a skillful architect and superintendent should have for such services. There is plenty of encouragement for young architects. The work is pleasant, light and profitable. Remember that there is always room at the top, that the demand for skilled workmen is constantly increasing and that it is the class of unskilled workmen who are the most unemployed. This should be an incentive to every student, professional man and tradesman to aspire to higher qualifications and attainments in his particular line of business. Skill and talent combined with practice and experience is the one essential qualification which leads to success.

We trust that the instructions we have given in this work will serve the purpose for which they were intended and give a start to those seeking information that will eventually bring them to a thorough understanding and successful issue on the subject set forth.

LAW IN THE BUILDING TRADES.

COMPLETION OF ARCHITECT'S CONTRACT AND TIME FOR FILING LIEN.

A building contract provided that all payments to the contractor should be made on certified statements of the architects, who were empowered to supervise the construction of the building at a compensation of 5 per cent. of its cost, and that final settlement should be made on their certificate, showing completion of the contract according to specifications. The Supreme Court of Wisconsin held that, as the last act required of the architects was to give a final certificate of satisfactory construction, their time for filing a lien for services did not begin to run until the performance of such act.—Bentley *vs.* Adams, 66 N. W. Rep., 505.

HOMESTEAD NOT EXEMPT FROM MECHANICS' LIEN.

A claim of homestead cannot be asserted against a mechanic's or material man's lien.—McNally *vs.* Hawkins Lumber Company, Supreme Court Ala., 19 So. Rep., 417.

INJUNCTION AGAINST THE ERECTION OF A BUILDING.

The erection of a building, not in itself a nuisance, will not be enjoined on the ground that certain uses to which it is alleged that it is to be devoted will constitute it a nuisance, where it is neither alleged nor proved that the building could not be devoted to other uses which would not be a nuisance.—Dalton *vs.* Cleveland, C. C. & St. L. Ry. Co., Sup. Ct. Ind., 43 N. E. Rep., 130.

RIGHT TO A LIEN IN MASSACHUSETTS.

Under the laws of Massachusetts, giving a lien to a person performing labor or furnishing materials for a building under an agreement with the owner or by his consent, or by the consent of any person acting for the owner, where persons furnish labor and materials with the knowledge of such owner, under an agreement with the contractor, they are not to be prevented from obtaining a lien by a provision in the original contract that the contractor shall not let any interest in it without the written consent of the architect, though such architect did not give consent to the contract between the material men and the contractor.—Wahlstrom *vs.* Trulson, Sup. Jud. Ct. Mass., 43 N. E. Rep., 183.

MATERIAL MEN SHUT OUT.

When the mortgagor, after foreclosure, remains in possession, under agreement with the purchaser, and contracts for a construction of a building on the property, one furnishing material for the contractor cannot acquire a mechanic's lien for same, against the purchaser, after the mortgagor has in good faith paid the contractor, as provided in the building contract.—Robbins *vs.* Arendt, Ct. App. N. Y., 43 N. E. Rep., 165.

WHO IS A CONTRACTOR ?

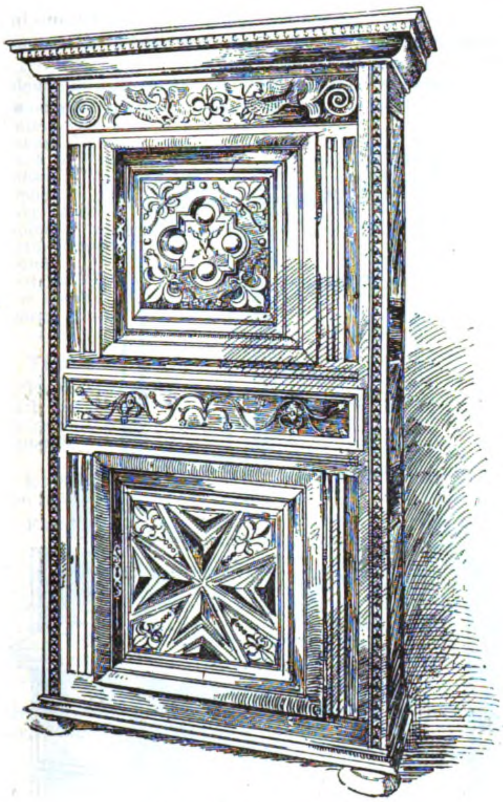
One whose lien statement shows the furnishing of a large number of articles and materials entering into the construction of parts of a building and the construction of such parts by his skilled workmen, is a contractor. The court said: "This is not a case where the party merely sold a marketable commodity, which he kept on sale, or manufactured to order to be used by others ; but it involved the furnishing of the necessary materials, and combining them in a structure like a roof, a steam beating apparatus, a water system,—in short, a dwelling house, all requiring skilled workmen, which he provided and furnished upon his own responsibility and credit, and thus became a contractor within the statute of Michigan, entitled to a lien."—Sterner *vs.* Haas, Sup. Ct. Mich., 66 N. W. Rep. 348.

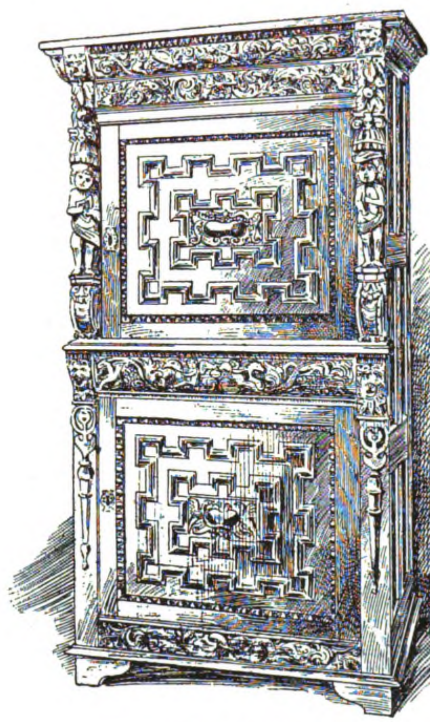
OWNERS NOT LIABLE TO SUB-CONTRACTORS IN TEXAS.

The contractors having failed to complete certain buildings, the owners of them are not liable to a subcontractor for the amounts paid by them to others in order to protect and complete the buildings, though they had notice of such sub-contractor's claim.—Breneman *vs.* Beumont Lumber Company, Ct. Civ. App. Tex., 34 S. W. Rep., 198.

Suggestive Designs for Cabinet Workers.

Some time since we presented in these columns a few designs of cabinet work, which we now supplement with others likely to prove equally interesting. The first illustration represents a cabinet of rather unusual form, made of chestnut and decorated with heavy carving. The second is an Elizabethan cabinet made of oak and also richly carved. It has two compartments, one at the top and the other at the bottom, separated by a long drawer. The third of the illustrations, all of which are reproduced from a late issue of the *Building News*, represents a writing desk, which is said to have been the property of the gifted and eccentric Dean Swift. It is made of oak, inlaid with walnut and decorated with marquetry. In the lower portion, the two side pedestals are fitted with different size drawers, slightly concaved in the front, and finished with a circular head on the top drawer, each ornamented with small beading round. In the central recess is a cupboard with shelves. Underneath the drop flap, which together with the lift up flap, at the top of this lower portion, incloses the *escritoire* proper, is a writing table, which slides out. The inclosed portion is fitted with beautifully made drawers and pigeon holes, with a small central cupboard. At the right and left the two central pigeon holes are surmounted with curved pediments hollowed out. The upper body has the ordinary cupboard arrangement, with shelves shaped on the edges, and inclosed by two doors with fluted pilasters of sycamore on the stiles, with flat Corinthian caps. Between these pilasters, of which there are two on each door, is a beveled mirror, with shaped head. While these designs are old and quaint in their conception they contain valuable suggestions to those interested in wood carving, cabinet making and furniture decoration.


A Quaint Design in Chestnut.


An Elizabethan Cabinet.

Suggestive Designs for Cabinet Workers.

Japanese Tools and Their Users.

Everything pertaining to the Japanese seems to possess interest for people living in other countries, and not the least entertaining to carpenters and builders are the tools of the native workman and the manner in which he uses them. A visitor to a Japanese workshop describes what he saw in the following language :

The workshop is a room perhaps 20 feet square, the floor covered with straw mats. There are four carpenters in the shop. Each squats on the floor with his bench—or what takes the place of the bench—and his smoking gear beside him. The bench is nothing more than a flat board of hardwood, the dimensions being 3 feet or 4 feet long, about 18 inches wide and 1 inch thick, and lies directly on the straw mats. The bench has no arrangement whatever for fixing tne work. It is merely a board of wood, and that work should be turned out on such a bench of a quality to rival all but the finest cabinet work at home is certainly a thing I should not have believed unless I had seen it. One thing which enables a Japanese carpenter to get on without any arrangement for fixing his work is that he uses his feet as well as his hands.

It is doubtless mostly due to practice, but also in great measure to the footgear used by the Japanese, that they can use their toes to grip in a manner which Europeans could not imitate at all.

The tools are much more simple than ours. The hammer is merely a cylindrical mass of iron with a transverse round hole through which the handle passes. The saw is merely a strip of steel with serrated edge, and with a "tang" whereby it is fixed into a round handle like a chisel handle, much as we fix a file at home. The work is done by the upward or drawing stroke.

The plane is, in general form, somewhat like ours, but the wooden portion is much thinner—shallower from top to bottom—and the knife is inserted much nearer one end than with us. It is unlike our planes in that there is no second adjustable iron, and there is no wedge for fixing the iron. The iron is just in the form of a chisel, and is held in position by friction against the sides. With the plane, as with the saw, the work is done by pulling or drawing, not by pushing. The knife is fixed near the end which goes in advance as the plane is drawn along. One would suppose that with such a primitive tool only rough work could be done, but the very reverse is the case. I have seen a Japanese carpenter take out of the middle of a board of hardwood a thin, delicate shaving several feet long and the whole width of the plane iron. One reason, perhaps, why such good work is done by the Japanese plane is that unless the edge of the knife is kept in very good condition the tool will not work at all. It is, therefore, kept as sharp as a razor, a deal of time being consumed in the very frequent setting of it.

One result of the simple construction of the Japanese plane is that a carpenter thinks nothing of making a special plane for any piece of molding or such like work that he may have to do. These are sometimes very minute. I have seen them only about 1½ inches long and ⅜ inch wide. It thus comes that much of the work done by us with gouges, chisels, &c., is done by the Japanese with the plane.

None of the other tools differed greatly from those used at home except in being rougher and less finished in appearance.

The work that was being done was merely the exact copying of an English camera and dark slides. At work of this kind the Japanese are very clever, but they appear to have but little capacity for original mechanical contrivances. They, moreover, have very little idea of saving labor by machinery or of division of labor. The consequences are that, although they turn out work of the kind I have been describing cheaply—the camera was to cost about one-half what it would cost at home—they would turn it out no more cheaply if goods were manufactured on a large scale. If 1000 dark slides were to be made, each one would be made precisely as the first, one workman doing the whole of the work.

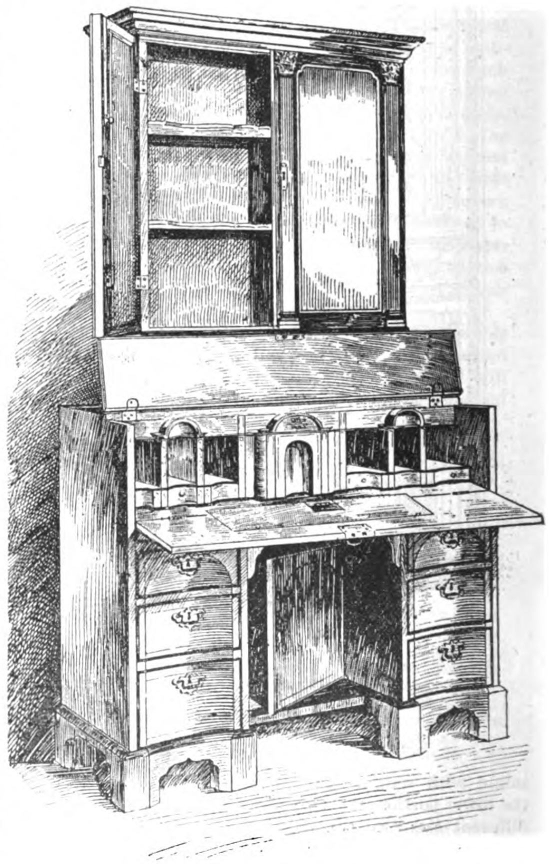
Lime and Mortar.

A well informed writer, in discussing the handling of lime and mortar, says that in country places where lime has to be hauled a long distance proper provision should be made for its preservation when it arrives at the works. In a damp atmosphere a cartage of 10 or 12 miles may cause a load of lime to be partly slaked before it reaches its destination, and in cases of that kind, it would be better when possible, to run it in the bed at once and finish the slaking; then nearly the full virtue of the lime may be captured. When this cannot be done the lime should be put in a dry place and used as soon as possible. Lime should never be stored in a cellar or in any place where it is damp, as it will lose half its virtue in a very short time in such a place, and the mortar made with it will never give satisfaction. Good live sand is a necessary requisite for making good mortar, and the contractor should see to it that such is furnished to the plasterer. Dead sand, while easy to work, never makes a good job, and mortar made with it soon rots and crumbles away from the wall. It is the silica in the sand that combines with the lime, that forms the hard solid mortar we find on some of our old houses. Good long hair that has been washed should be used in the mortar in proper proportions to insure good work. Plasterers, as a rule, stint the hair in their mortar as a matter of economy, but this is wrong, and in a measure dishonest. To insure good and lasting work, the mortar should not be used until it has been made at least ten days. It will be better to stand 14 days if conditions will permit. The best results in plaster work are obtained with well made mortar that has been made one month or more before being used.

GRILLE work has now become quite an important factor in interior decorative effects and manufacturers are devoting considerable attention to the study of the Empire and Venetian styles. In their adaptation for use as window screens they have become specially popular. Formerly they were used mostly for ornamental purposes at the tops of the windows only. Latterly they have served as a utilitarian as well as a decorative purpose, and when placed at the bottom of the window, especially where the window comes nearly or quite to the floor, they are made both in wood or brass, but as the latter is quite expensive there will always be a good demand for wood grilles, to which can be given quite as artistic designs as the brass at much less cost.

Deadening Noise on Bridges.

A means for preventing the noise made by trains in passing over iron bridges has been devised by a German engineer named Boedecker. He puts a decking of 1¼-inch planks between the cross girders, resting on 3-inch timbers laid on the bottom flanges. On the planks a



Suggestive Designs for Cabinet Workers.—An Old Writing Desk of the Seventeenth Century.

double layer of felt is laid, which is fixed to the vertical web of the cross girder. At the connections with the girder a timber cover joint is placed on felt, and two hooked bolts connect the whole firmly to the bottom flange. Four inches of slag gravel cover the decking, which is inclined toward the center of the bridge for drainage purposes. A layer of felt is laid between the planks and the timber they rest upon, and the iron work in contact with decking and ballast is asphalted. The decking weighs 600 pounds per yard for a bridge 11 feet wide, and costs 32 cents a square foot. It is water tight and has proved very satisfactory in preventing noise.

The Builders' Exchange

Directory and Official Announcements of the National Association of Builders.

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Tenth Annual Convention of Builders.

The following circular has been issued relative to the tenth annual convention of the National Association of Builders, to be held at Buffalo, N. Y., beginning Tuesday, September 15, 1896:

Circular No. 1.

Exchanges already affiliated are entitled to representation in accordance with the constitution as follows:

Extract from ARTICLE VII.—REPRESENTATION AT CONVENTION.

In all conventions and meetings of this association each local association shall be entitled to delegates, as follows: One delegate at large, who shall be the director chosen at the preceding annual convention, and one delegate in addition for each fifty members of that body, upon which membership the per-capita tax fixed at the preceding convention shall have been paid.

All delegates to conventions or meetings must have credentials from the associations they represent in form approved by this association.

Issued by order of the
EXECUTIVE COMMITTEE.
WM. H. SAYWARD, Secretary.

SPECIAL ANNOUNCEMENT.

The members of the Builders' Association Exchange of Buffalo have planned a series of most delightful entertainments for delegates and visitors attending the tenth convention of the National Association, and are particularly anxious to extend their hospitalities to as large a number of the builders of the country as possible.

The detail of the entertainment features has been briefly stated in a previous circular, but the officers and committees of the Buffalo Exchange wish to have it impressed upon all members of this association that the many attractions of the trips proposed cannot be expressed in the language of a circular, and they hope that every one who can will come, realize and enjoy the arrangements they have made to show to their guests the beauty of their city, its promise for future greatness by virtue of its situation on the great lake system, as well as by the newly developed electrical power at Niagara Falls, &c. The trip to the Falls, beside giving an opportunity to inspect the wonderful electric plant, the most important by far in the world, will include a feature entirely new, that is, the passage by electric cars all the way down the river on the American side, from the Falls to the end of the rapids, and then up the river on the Canadian side by the new electrical railway which runs at the very edge of the shore all along the rapids to the foot of the Falls.

HOTEL ACCOMMODATION.

Owing to the fact that there will be two other conventions held in Buffalo during the week that the National Association will hold its convention, it is desirable that delegates and visitors arrange for hotel accommodation as soon as possible, either through Secretary J. C. Almendiger of the Builders' Association Exchange, or with the hotels direct.

The names of some of the principal hotels with their rates are given herewith:

The Iroquois, corner Main and Eagle streets; strictly fire proof. American plan. Rates, $4 per day, $5 per day with bath.

The Genesee, American plan, corner Main and Genesee streets. Rates, $2.50 per day, $3 to $3.50 per day with bath.

The Tifft, American plan, Main near Lafayette street. Rates, $3 per day, $3.50 to $4 with bath.

The Niagara, Porter avenue and Seventh street. Rates, $3.50 per day, one person; $3 per day, two persons; $4.50 per day, one person, with bath; $3.50 per day, two persons, with bath.

All entertainment has been arranged in such a manner that it will in no way interfere with or detract from the real purposes of the meeting, and builders everywhere who have the welfare of the fraternity at heart are urged to attend. The courtesies of the occasion will be gladly accorded to delegates and visitors alike.

Programme of Business.

TUESDAY, SEPTEMBER 15, 1896.

MORNING SESSION.

Address of welcome by Mayor of the City of Buffalo.
Address by president of the Buffalo Exchange.
Address by the president of the National Association of Builders.
Appointment of Committee on Credentials.

AFTERNOON SESSION.

Report of Committee on Credentials.
Roll call.
Appointment of Committee on Time and Place of next Convention and Nomination of Officers.
Annual report of secretary.
Annual report of treasurer.
Consideration of the following requests presented by the Master Builders' Association of Boston:

1. That the National Association of Builders take action in support of the movement to create an expert commission to have charge of all architectural work of the United States Government.
2. That the National Association of Builders recommend all filial bodies to secure an amendment to the building laws of their various cities looking toward the creation of boards of appeal.
3. That the National Association of Builders recommend the Joint Committee on Uniform Contract to secure an amendment to the uniform contract, so that payments shall be called for under the contract in gold, rather than in "current funds," as the said contract now reads.

Presentation and reference of resolutions.

WEDNESDAY, SEPTEMBER 1 .

MORNING SESSION.

Consideration of amendments to constitution.
Consideration of the question: "Are organizations of builders, either local or national, desirable? If so, what are the functions of such bodies, and should the value of organization be measured by, or be dependent upon, immediate specific results only ?"

THURSDAY, SEPTEMBER 17.

There will be no session of the convention on Thursday.

FRIDAY, SEPTEMBER 18.

MORNING SESSION.

Report of Committee on Resolutions.
Report of Committee on Time and Place for next Convention, and Nomination of Officers.
Election of officers.
Unfinished business.
Miscellaneous.

Circular No. 2.

TRANSPORTATION.

A reduced fare has been conceded by railway passenger associations except that governing the territory lying south of the Ohio River and west of the Mississippi River and the north line of the State of Illinois, at the rate of one and one-third fare for the round trip on the "certificate plan," to delegates and others attending the tenth annual convention, and the National Association has guaranteed the fulfillment of the following

CONDITIONS:

Each person attending the convention must purchase within three days, Sunday excepted, before the opening of the convention, a first-class ticket at the regular rate from the point of departure to Buffalo, obtaining therewith a certificate of such purchase from the local ticket agent. This certificate, upon being signed by the National Secretary and indorsed by the representative of the passenger associations at the convention, will entitle the holder to a return fare, over the same route by which he came, at one-third of the regular rate.

Tickets for return journey will be furnished only on certificates procured not more than three days before the meeting assembles, and will be available for continuous passage only; no stop over privileges being allowed on tickets sold at less than regular unlimited fares. Certificates will not be honored unless presented within three days after the date of the adjournment of the convention. It is understood that Sunday will not be reckoned as a day. In no case will the reduced rate for return ticket be granted without a certificate properly signed and indorsed as above, and no refund of fare can be obtained because of failure to secure certificate at point of departure.

NOTICE TO DELEGATES.

Delegates from exchanges located south of the Ohio River, west of the Mississippi River and north of the State of Illinois, in order to secure the reduced rate, should purchase tickets to the nearest point within the limit described, and there secure through tickets to Buffalo, obtaining a Central Traffic Association certificate therewith.

All certificates must be presented to the secretary at the convention for his signature and to be *viséd* by the railroads' representative, whereupon they will entitle the holder to a return ticket, over the same route by which the trip to Buffalo was made, at one-third of the regular fare, subject to the foregoing conditions.

All persons attending the convention are requested to secure certificates whether or not they intend to avail themselves of the reduced rate, as the certificates are the evidence of attendance upon which the passenger associations base their concession.

Issued from the office of the secretary, August 15, 1896.

The Use of Cement in Freezing Temperatures.

Considerable discussion has lately taken place with regard to the use of cement in freezing temperatures and it may prove interesting to add to what has already appeared on the subject a few rules from *Municipal Engineering*. These are as follows:

As little water should be used as will permit a thorough incorporation of the materials.

The water, sand and stone may well be heated to about 100 degrees F., and in any case should be above 32 degrees F.

Salt may be used in small quantities to delay freezing until the work is in place, or in larger quantities to prevent freezing until the cement has set and hardened sufficiently to resist the destructive tendency of the freezing weather.

New Publications.

COMBINED BOOK OF SASH, DOORS, BLINDS, MOLDINGS AND ALL KINDS OF INTERIOR AND EXTERIOR FINISH. Size 7½ x 10½ inches; 140 pages; profusely illustrated; bound in stiff board covers; published by Rand, McNally & Co.; price $2.

This is a revised edition of a well-known work which has proven very popular with the trade. Within its covers are to be found the latest styles, elevations, designs, &c., of embossed, ground and cut glass, brackets, scroll and turned work, wood drapery, stair fronts, corner blocks and beads, plinth blocks, sawed and turned balustrades, door and window frames, pulpits, pew ends, &c. There are also glass lists which cannot fail to prove valuable in connection with the designs presented, being those adopted January 25 of the present year by the Wholesale Sash, Door and Blind Manufacturers' Association of the Northwest. The volume also embraces a revised edition of the National Molding Book, containing the latest designs of moldings, interior house finish, stair and porch railings, as well as full size cuts of frames in use in different localities. The cuts give the exact size of each molding with figures representing the ripping width of lumber. The prices of moldings given are those adopted April 15 of the present year by the association above named and also by the Eastern Sash, Door and Blind Manufacturers' Association. Among the features of the molding book are diagrams of electrical moldings, hot bed sash, rabbetted and grooved, hothouse fixtures and material for Eastlake stairs.

CONTENTS.

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This is followed by a section given to the Geometrical Measurement of Roof Surfaces with numerous illustrations and examples. It embraces a new and simple system of framing curved roofs, also the simplest methods of roof framing of every description, with practical examples thoroughly illustrating nearly every conceivable form of roof and showing many points never before presented.

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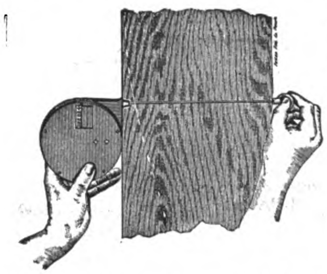
NOVELTIES.

Krueger's Automatic Self Registering Lumber Measure.

An automatic self registering lumber measure, which is likely to interest a large class among the readers of this journal, has just been introduced to the trade by the Johnstown Specialty Company of Johnstown, Pa. The device is referred to as being of great



Novelties.—Fig. 1.—Krueger's Automatic Self Registering Lumber Measure.

value to those handling lumber, for the reason that it saves time and mental labor to the lumberman, avoids costly mistakes in measuring, prevents controversies affecting invoices between purchaser and seller, and is absolutely reliable in its work. The view which we present in Fig. 1 of the cuts shows the device as it is used in the process of measuring. It is first set by a simple operation to the length of the board or boards to be measured If the latter are of various lengths, the device can be changed from one length to another during the process of measuring, always adding to the record the number of feet measured by each operation. The measuring is done by means of a cable drawn over the width of the board, the cable returning into the case after each operation ready for the next. The number of feet measured is shown in figures through an opening in the face The device is the invention of George Krueger of Johnstown. Pa., who is also the manager of the company named.

Copper Lightning Rods.

The engraving presented in Fig. 2 shows the tip and section of an all copper lightning rod manufactured by E. G. Washburne & Co., 46 Cortlandt street, New York City. Formerly lightning rods were made of iron in sections and were put up on chimneys, &c., running directly from the top to the ground; but since the meeting of the lightning rod conference in London the utility of the lightning rod has been investigated by the United States Government electricians, the conclusion arrived at being that the rod should be a continuous copper conductor properly placed on a complete circuit. To meet these requirements E. G. Washburne & Co. have made a pure copper cable with solid copper bar points and cast brass fastenings. The points are made 4 feet long and do not need braces. The manufacturers claim that this conductor placed on a

Fig. 2.—Copper Lightning Rods.

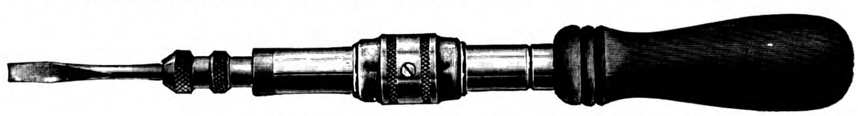
building in circuit form—that is, with two or more ground connections and groundings running down to moist earth or water—will protect any building from damage.

Jones Reversible Screw Driver.

F. A. Howard & Son, Belfast, Maine, have just brought out their Jones improved reversible clutch screw driver, as seen in Figs. 3, 4 and 5. This tool is marketed solely by Alford & Berkele Company, 77 Chambers street, New York City. Fig. 3 illustrates it closed, Fig. 4 showing the tool with extended spiral, both engravings being one-third size. The center brass sleeve turns on a brass tube and causes the steel spiral, with square grooves cut deep, to drive screws when the sleeve is turned slightly to the left, withdrawing them instantly by turning the sleeve to the right, without necessarily removing the bit from screw slot. A headless screw in the sleeve is used for regulating the friction. There are three full turns of the spiral to one ordinary pressure on the hardwood handle. Just back of the bit clutch is a loose sleeve to grasp with the free hand in driving screws, both clutch and sleeve being of steel with knurled surfaces. The tool is packed with three sizes of bits in a wooden box, and six of these boxes in a larger box. The

Fig 5.—Extra Bits for Jones Screw Driver.

screw driver is intended for mechanics mainly who have large numbers of screws to drive or draw, among which may be mentioned machinists, gun and lock smiths, cabinet, coffin, carriage, piano and organ makers.



Jones Reversible Screw Driver.—Fig. 3.—General View of Screw Driver.

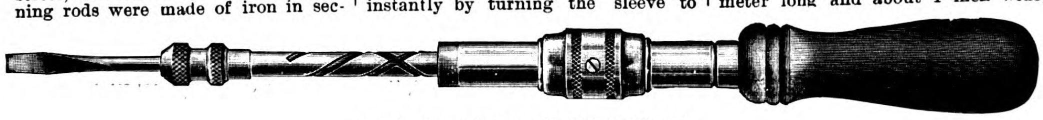


Fig 4.—Screw Driver with Spiral Extended.

Atkins Handy Tool.

E. C. Atkins & Co., Indianapolis, Ind., are putting on the market the

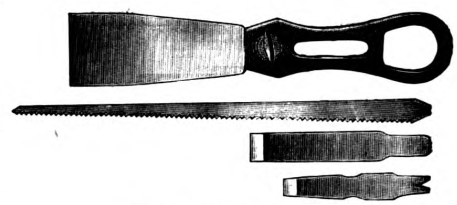


Fig. 6.—Atkins Handy Tool.

set of tools for house use shown in Fig. 6 of the cuts. The tools are referred to as made for use, of fine tempered steel, and are put up, one set in a box, each set consisting of a keyhole saw and pad, putty knife, chisel, screw driver and tack claw.

Lufkin Rule Company.

Lufkin Rule Company, Saginaw, Mich., and 2½ Murray street, New York, are manufacturing the Sterling linen measuring tapes, which are sold at about 40 per cent. reduction from the price of metallic tapes. The makers refer to them as made of best woven linens, ⅝ inch wide, reinforced with leather the first 4 inches and heavily coated, marked one side only in feet, inches and half inches. They are made in four sizes, 25, 50, 75 and 100 feet, contained in hard leather cases with flush handle and nickeled trimmings. They are also making a peculiar article known as "official gauge for the use of the municipal offices of the metric decimal system of the Republic of Mexico." It somewhat resembles a steel rule about ½ meter long and about 1 inch wide, with special markings graduated 1 to 12, together with a brass slide and thumb set nut. Anticipating the coming demand for metric measurements their factory has already been equipped with machinery for turning out steel, linen and metallic tapes marked according to the metric system. The company advise us that they have recently secured the United States Government order for metallic tapes, heretofore purchased abroad.

Tile Borders for Registers.

In order that the registers used in connection with heating systems shall be in keeping with the other handsome fittings of the building, Rives & Co. of Rochester, N. Y., have recently made a new departure in register borders, to be used in connection with the "Red Fellows," a term which will be applied to their registers owing to their being wrapped in red paper. The tile border consists of a nickel plated cast iron frame, with provision between the inner and outer edges of the frame for the use of tile of different sizes and colors. These borders are designed for use in both side wall and floor, and inasmuch as the enameled, embossed colored tile are the width of the ordinary floor border the entire width is materially greater, producing an effect similar to that seen in fire places and hearths. Fig. 7 shows a square register designed for use in a carpeted floor. Fig. 8 is a circular topped wall register with tile flange. It is pointed out by the manufacturers that a very handsome effect is produced, and heating contractors who make a specialty of fine work are invited to secure their catalogue, which shows these registers in colored prints, giving an excellent idea of their appearance when set in walls with handsome paper or neat, carpeted floors.

Fig. 7.—Floor Register with Tile Border.

Fig. 8.—Wall Register with Tile Flange.

Novelties.—Tile Borders for Registers.

Sash, Door and Blind Mortising and Relishing Machine.

One of the recent important additions to the already large line of sash, door and blind machinery which is being placed on the market by J. A. Fay & Co. of 221-241 West Front street, Cincinnati, Ohio, is shown in general view in Fig. 9 of the engravings. It is constructed in a substantial manner of iron and steel, and so designed that the various kinds of work may be performed without interference with one another. The meeting and bottom rails of sash are mortised at one operation and the chips cleaned out, leaving the work ready to be put together. This is accomplished by means of a hollow chisel incasing a revolving boring bit, all being supported in the stationary frame. Different depths of mortises are made by changing the stroke of the pitman. The fence is provided with stops, and after being set no laying off on the work is said to be required. The door relishing is accomplished by means of six sizes, adjustable for different widths of work. The table has a vertical adjustment by means of a treadle and is provided with a stop to regulate the depth of the relish. Sash and blind relishing may be accomplished without interfering either with the mortising or door relishing. The attachment for wedge cutting consists of a steel spindle carrying two saws, a table adjustable to and from them and provided with stops for gauging the depth of the work and for preventing the table from being moved into the saws. A guard is provided with the saws as a protection to the operator. The recess for the blind rod is routed at the same time the blind rail is relished by means of a vertical spindle and routing cutter raised to the work by a foot treadle. The tight and loose pulleys on the machine are 8 x 4 inches and should make 1000 revolutions per minute. There is a shop number on the machine and a number on each casting, by which it can be identified whenever it becomes necessary to order repairs.

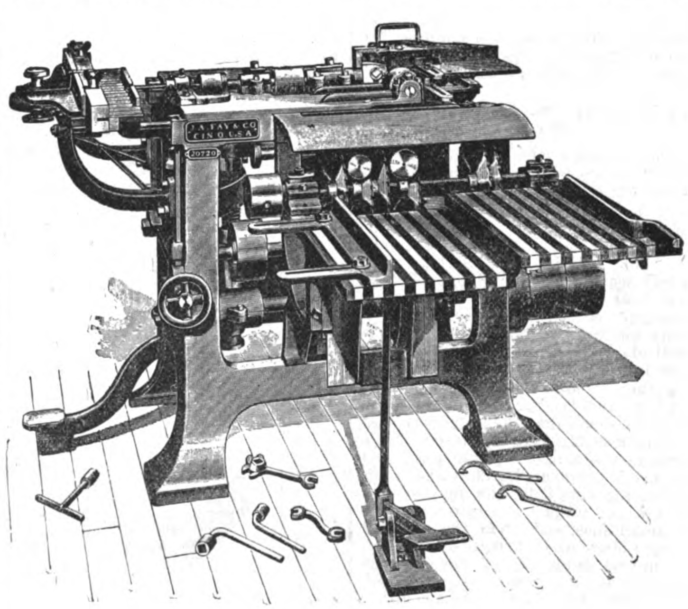
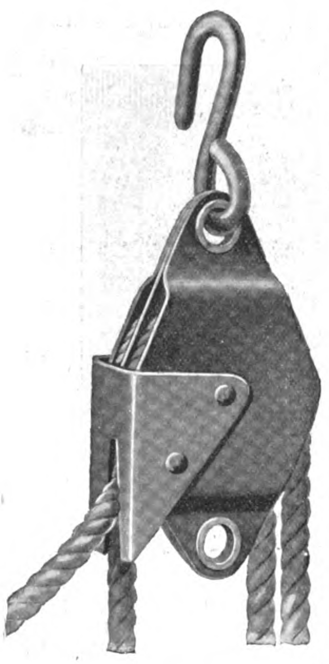


Fig. 9.—Sash, Door and Blind Mortising and Relishing Machine.

Lane's Junior Tackle Block.

A patent steel tackle block for which strong claims are made is that shown in Fig. 10 of the illustrations, and manufactured by Lane Brothers of Poughkeepsie, N. Y. It is known as Lane's Junior, being a lighter block than their regular line, and taking a ⅜-inch rope or smaller cord. The case is made of steel heavily coated with tin and the hook is also of steel, there being no malleable iron in the make up of the block. The steel insures lightness combined with strength, and severe tests have shown that the rope will part before there is injury to the block. Another feature is the self locking device, by means of which the operator when raising a load can lock it at any point. This is done instantly by merely a quick jerk of the hauling rope or cord, and is unlocked with equal facility, thus doing away with all need of tying the hauling rope. There is a series of blocks, five in number, which may be used separately or in connection with each other, as circumstances require. Each kind is packed in a separate box, rendering



Novelties —Fig. 10.—Lane's Junior Tackle Block.

them convenient for the dealer to handle. The blocks are adapted for use about houses, also for tents, awnings, yachts, sailing craft, &c.

The McCabe Ball Bearing Door Hanger.

The McCabe Mfg. Company of 532-542 West Twenty-second street, New York City, have just brought out a new door hanger, a view of which is presented in Fig. 11 of the illustrations. The engraving clearly shows the construction of the carriage with a ball bearing swivel joint, as well as ball bearing journals The hanger is constructed entirely of steel and carefully made in every particular. It is well adapted for use in connection with a series of doors, which may be hinged together in such a way that they will fold up and lay back flat against the wall, in something the same way that a Japanese fan can be closed. This renders the hanger especially adapted for use in schools, churches and auditoriums, where it is often necessary to divide up a large space into a number of small ones, and when the series of hinged doors are not required they can be moved back out of the way as quickly as they were placed in position. The manufacturers have fitted up several buildings with the new hanger, and they state that it works to the satisfaction of all concerned. A catalogue has been issued, calling attention to the hanger, and copies of it, as well as prices, will be furnished on application to the company.

Special Design of Hardware.

The accompanying cut, Fig. 12, shows a line of hardware of special design, made by the Russell & Erwin Mfg. Company of New York, from architects' drawings, for use in the Manhattan Hotel. This is a 14-story building in course of erection in a commanding location at the corner of Madison avenue and Forty-second street, New York City, and is to include every known modern convenience for the comfort of guests. The making of hardware from architects' designs to harmonize with the general architecture of buildings is a branch of their business to which the company devote especial attention.

The Goodell Reversible Automatic Screw Driver.

A reversible automatic screw driver which is being introduced to the trade by Goodell Brothers Company of Greenfield, Mass., is illustrated in Fig. 13 of the engravings. The tool has two separate and distinct spirals, each working entirely independent of the other; its value as a tool for driving screws automatically being in no way lessened because of its reversible mechanism. The tool is the same relative size as the company's screw driver No. 2, and has two brass nuts between the handle and the sleeve. In operation, for right hand work the brass nut nearest the handle is tightened and the brass nut nearest the sleeve is loosened. For left hand work the order of tightening and loosening the nuts is reversed. The tool can also be used as an ordinary screw driver. Three tool steel blades are furnished with each tool. The tool is spoken of by the makers as practical, strong, durable and of moderate cost.

Improved Power Mortiser.

The illustration which is shown in Fig. 14 of the cuts represents a general view of the improved new style No. 2 power mortiser, with boring attachment, clamp table and rack and pinion feed, which has recently been added to the assortment of wood working machinery turned out by the Rowley & Hermance Company of Williamsport, Pa. This machine, which is designed to be principally employed on hardwood and the heavier class of building material, has a frame cast in one solid piece, extending over the crank shaft, with the caps placed below. By this arrangement, the manufacturers state, the entire strain or jar comes upon the frame instead of on the caps of the boxes, a feature which cannot fail to command the at-

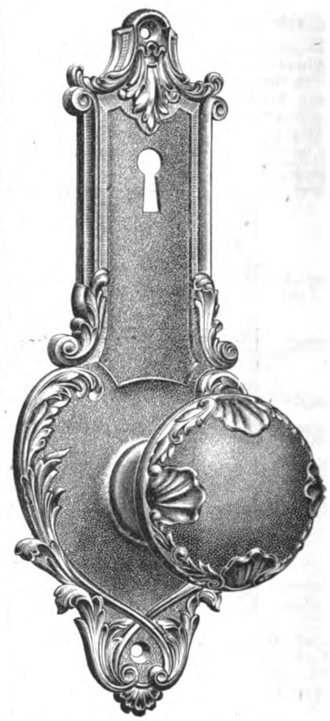


Fig. 12.—Special Design of Hardware

tention of those having to do with machines of this class. The clamp table is simple, durable and effective. The piece to be bored or mortised is clamped and moved forward by the hand wheel, which moves the bed. It is then bored, after which it is run

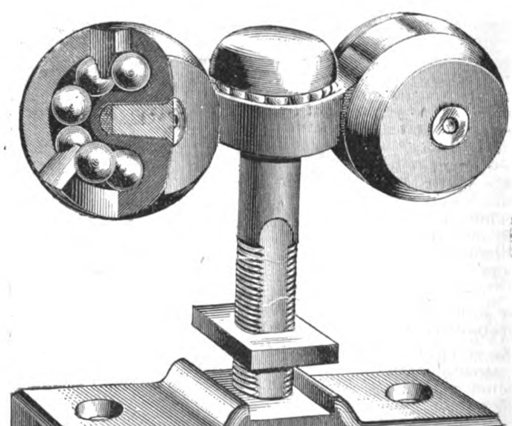
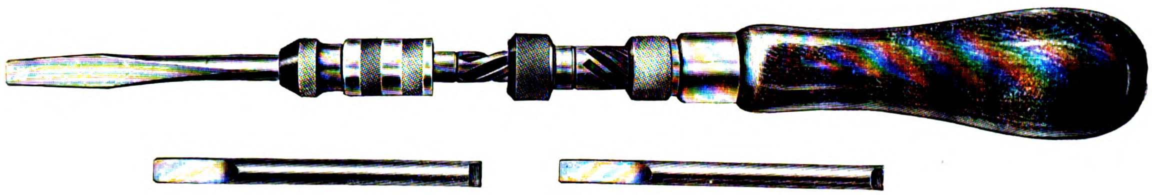


Fig. 11.—The McCabe Ball Bearing Door Hanger.

under the chisel and mortised without releasing it from its position The boring attachment is bolted to the side of the frame and is driven by gearing. A belt friction reverse is provided by means of which the chisel can be instantly reversed, whether working or at rest. The table is so made that it can be tilted to any angle for radial mortising and will take in a piece 8 inches wide.

TRADE NOTES.

SOME IDEA of the increasing popularity of sheet metal lath for building purposes may be gained by a visit to the works of D. B. Hilton, 256 State street, Brooklyn, N. Y. Mr. Hilton a few months since received from George A. Ohl & Co. of Newark, N. J., a machine which he had invented for making Hilton's expanded steel lath, which is finding a market among the heating trade for covering flues which run through buildings as well as by the general building trade. The increase in the business since Mr. Hilton has had his first machine in operation has been such as to necessitate the placing of an order for a second machine, which is now in course of construction. The lath, made from No. 26 black steel, in a single passage through the machine is corrugated lengthwise to give it strength, and is cut in such a manner as to permit it to be expanded about one-third of its original width, while the edges are turned at the same time so as to give a good key for the mortar. This lath is manufactured in sheets either 14 or 18 inches wide and 8 feet long. Those who are interested in the lath can secure a circular giving full information in reference to it on application.



Novelties.—Fig. 13.—The Goodell Reversible Automatic Screw Driver.

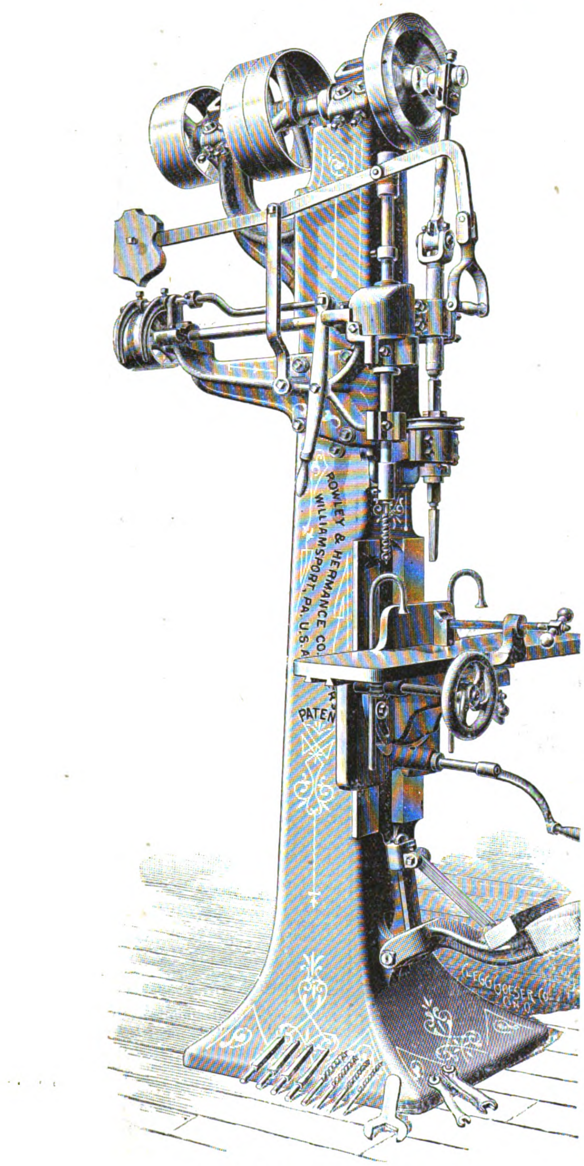


Fig. 14.—Improved Power Mortiser.

THE FLEXIBLE DOOR & SHUTTER COMPANY have removed their works from Worcester, Mass., to Bloomsburg, Pa., and have a New York office at 74 Fifth avenue. There is a permanent exhibition of their specialties at the New York Building Material Exhibit in the Cammeyer Building, Sixth avenue and Twentieth street. The company favor us with a prettily illustrated folder calling attention to their productions, and especially to their ventilating school wardrobes, and showing the uses for which their flexible partition doors, flexifold doors, rolling curtains, &c., are particularly adapted. They state that their rolling partitions are in successful use in hundreds of modern churches, schools and institutions. Catalogues and prices will be forwarded by the company to any one who may be sufficiently interested to make application for them.

THE PACIFIC SHEET METAL WORKS, 209-211 Mission street, San Francisco, Cal., have gone into the business of manufacturing and putting up to order from architects' drawings and details all kinds of sheet metal work in connection with buildings of any kind, including tin, copper and corrugated iron roofing, copper and galvanized cornices and moldings, tanks, skylights, ventilators, chimney tops, &c. They also make a specialty of spiral leader pipe. The sheet metal work is under the personal supervision of F. B. Gibson, who has had an extended experience in this line. The president of the company is Sidney M. Smith, and the secretary, treasurer and general manager is Irving Ayres.

A NEW CATALOGUE has been issued by the William R. Pitt Composite Iron Works, 123 Fifth avenue, New York, which shows the many different forms of folding gates and guards of their manufacture. These are made under the Pitt-Bostwick patents and are suitable for bank vaults, guards for doors and windows, entrance or driveway gates, theater gates, office gates, baggage and sleeping car gates, ferry safety gates, guards for business and express wagons, elevator guards, &c. The illustrations show various styles of gates applied to a number of different purposes, and there are also represented cuts of a variety of grills and iron railings, and at the end are some very handsome designs of wrought iron scroll gates. The catalogue is of large size and the 60 pages are filled with illustrations, while sufficient descriptive text is given to explain the special features of the goods.

THE KANSAS CITY METAL ROOFING & CORRUGATING COMPANY, Kansas City, Mo., call attention to the increasing popularity of their Ruberoid roofing, in reporting the sale of 800 squares for covering the buildings of the Kansas City, Pittsburgh & Gulf Railroad Company, at Shreveport, La. This character of roofing is also used in many large buildings in Kansas City, Leavenworth and St. Joseph.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Washington, D. C., until September 10, for work including the roof covering, skylight, &c., for the United States Post Office Building, at Buffalo, N. Y., in accordance with the drawings and specifications, copies of which may be had from the Supervising Architect, Washington, or from the Superintendent at Buffalo, N. Y.

THE LUDLOW-SAYLOR WIRE COMPANY of Fourth and Elm streets, St. Louis, Mo., favor us with a 48-page catalogue which they have just issued from the press relating to counter and office railing, wickets and window guards. The company have for years made a specialty of this class of work, and have fitted up the largest banks in St. Louis, as well as others throughout the different States from Maine to California and from the Lakes to the Gulf of Mexico. The company also make a specialty of elevator inclosures and caps, and will be glad to correspond with any one in need of anything in the way of metal work, for which the company are prepared to furnish special designs should they be required. The catalogue first referred to presents numerous designs of counter and office railings, accompanied by numbers for use in ordering. The company began, a little more than a week ago, moving into their new quarters, a view of the building being presented on the last page of the cover of the catalogue of counter and bank railings. In their new quarters the company will enjoy exceptional facilities for the prompt execution of any orders which they may receive, not only in the special lines already named, but also in connection with all work in wrought iron, wire or brass.

THE CORTRIGHT METAL ROOFING COMPANY, with main office and factory at 50 North Twenty-third street, Philadelphia, Pa., report a constantly increasing demand from all parts of the country for their Victoria shingles, metal shingles and other lines, designed for covering the better class of buildings, such as churches, school houses and residences, where a storm proof, durable and ornamental material is required at a medium cost. We understand that the company will mail a catalogue to all applicants, while samples of actual goods will be submitted for comparison with other kinds of roofing if desired.

E. T. BARNUM of Detroit, Mich., manufacturer of wire, iron and brass work for buildings, has just been awarded contract for new steel jail cells for the city of Pagosa Springs, Col., and has completed the contract for large steel jail cells for Wythe County, Va. Mr. Barnum has an extensive trade in the above lines, extending from the Atlantic to the Pacific, and has issued many handsome catalogues for these special lines. A copy of the special builders' catalogue, which is full of valuable information, will be sent free on application.

GEORGE FRINK SPENCER has recently returned from an extended trip abroad, combining business with pleasure. Mr. Spencer is manager for the well-known firm of I. P. Frink, 551 Pearl street, New York, maker of reflectors for lighting churches, halls, public buildings, art galleries, &c.

THE PRACTICAL AND THOROUGH SYSTEM of home scientific instruction by mail, conducted by the International Correspondence Schools of Scranton, Pa., has earned a well merited success, as one may judge from the fact that during the three years in which they have been in operation no less than 13,000 students have availed themselves of the advantages offered by the institution, over 5000 having enrolled in the past year. Manager T. J. Foster advises us that the growth of the shools has necessitated the erection this summer, at a cost of $100,000, of new buildings to accommodate the instructors and facilitate their work. This will enable the schools to cater to a still larger number of students the coming season. With this object the proprietors are now offering special inducements of greater value than ever before to those who enroll before September 1, 1896.

AKRON SPIRIT LEVEL WORKS of Akron, Ohio, issue an illustrated price-list showing plumbs and levels of various styles and prices. Special attention is directed to their new Mason level No. 24, arranged for plumb bob.

THE H W. JOHNS MFG. COMPANY have recently removed their eastern branch from 119-121 Federal street, to 77-79 Pearl street, Boston, Mass.

ON AUGUST 3 the Baron de Hirsch Trade School at 225 East Ninth street, New York, began its fifth season since the school has been in the charge of J. Ernst G. Yalden. Notice that applicants would be received was made public only one week previous, yet it resulted in the formation of the largest classes in the history of the institution, and those who have been received have been selected with a view to their aptness for work. The 52 attendants at the school are divided between plumbing, machinist, carpentry and sign painting classes. The school term continues five and a half months, and two classes are examined each year, the exhibition of the work and the examination of the class which recently closed clearly demonstrating the proficiency attained by the pupils. During the month intervening between the two sessions of the year the superintendent made a canvass to find the percentage of the graduates of former classes that have employment, and discovered that over 80 per cent. have steady work and are well thought of by their employers.

THE E. S. WHEELER COMPANY of 256 Water street, New Haven, Conn., have issued an edition of their catalogue of specialties intended for distribution among architects. The goods illustrated and described include porcelain and enameled bathtubs, siphon closets, wash trays, sinks, washtubs, porcelain slop sinks, fittings, &c., while attention is called to lavatories, roofing plates and especially to the Wheeler's improved method roofing. In offering this catalogue to the trade the company refer to the impossibility of the architect, in the interests of clients, giving an exact specification of the character of the porcelain and earthen ware with definite physical and chemical tests. They say that the large increase in the use of plumbers' porcelain earthen ware and iron ware has enabled its cost to be much reduced, but there are being carried to a point of absurdity efforts on the part of some sellers to conceal the identity of their material by baptizing it with fancy names, to the end that a piece of ordinary earthen ware, made by a dozen potteries, could be sold at a price above its real value. In the pages of the catalogue referred to the company state that the names are attached only for the purpose of identification and easier specification. The test of the quality of this material, they say, is in its careful examination, and they will be glad at all times to send, if desired, sample closets, baths or other goods to any responsible plumber east of the Mississippi for architects' examination.

THE building in which the Matthews Decorative Glass Company, at 328-330 East Twenty sixth street, New York City, occupy four floors, was visited by fire Sunday morning, August 23, and damaged to the extent of several thousand dollars. The structure, having a frontage of 50 feet on the street and extending back more than 100 feet, was built in the most substantial manner and fitted up with the latest and most improved appliances. Mr. Ferguson, the manager of the glass company, is said to place the loss of that concern at $20,000 on stock and $18,000 on machinery and fixtures.

WE have received from the Ducker Portable House Company of 26 Cortlandt street, New York City, a number of leaflets carrying illustrations of many of the different styles of portable houses which they are prepared to supply. Each sheet is numbered and gives the size of the house, the number of rooms into which it is divided and the cost. These goods are referred to as strong and durable, being made of thoroughly seasoned and carefully selected materials, and easily erected and taken down without the use of nails, screws or any external appliances. They are made principally of hard wood, each section being tongued and grooved, and when fastened it is claimed the joints are absolutely air tight. The sections are bolted to the fountain sills, into which are dovetailed the cross beams. The roof sections have hard wood panels on the inside and are covered on the outside with heavily painted ribbed steel or canvas, as may be desired. The floors are ⅞-inch yellow pine tongued and grooved, made in sections, and the length of the house can be increased or diminished in multiples of 2 feet 9 inches, that being the uniform width of all sections. These houses are made for almost any use, and the company will furnish, on application, plans and estimates for any style of building desired.

WE ARE INDEBTED to the American Roofing Company, St. Louis, Mo., and Cincinnati, Ohio, for a copy of a handsome catalogue which they have just issued. The volume, which in size is the same as the former editions, is handsomely bound in roughened green paper, with the name of the concern stamped prominently on the front cover and their trade-mark on the back. The catalogue contains over 80 pages, or about double the number of their 1895 edition. The first section is the roofing and siding department, and this takes up the subject of corrugated iron with all sizes of corrugations and corrugated curved sheets, which are illustrated, as is also the application of this material to buildings, both for roofs and sidings. Crimped roofing, standing seam roofing, pressed standing seam roofing, roll and cap steel roofing, sheet steel pressed brick and rock faced brick, rock faced stone, beaded siding and ceiling, metal shingles, metal laths, &c., are referred to in the order named. In the steel ceiling department the first illustration shows the Excelsior ceiling; then a number of patterns of handsome designs for stamped ceilings and walls. The gutter department relates to eave trough, roof and box gutters, leader and conductor pipes, elbows and shoes, cut offs, &c. The miscellaneous department at the close is devoted to skylights, tinners' supplies, roofing tools, &c., as well as several tables giving discount sheets, weights, rules of measurement, &c.

S. M. GUNASAUL COMPANY, Omaha, Neb., announce to the trade that they have appointed J. C. McCarthy & Co., 97 Chambers street, New York, their general agents for the sale of their automatic door holders and bumpers. It is their purpose to carry a stock of goods at this point for quick delivery or shipment. This specialty is made as a floor holder in Nos. 4 and 5, japanned and nickeled respectively. No. 2 is a base holder, variously made of oak, ash, cherry, birch, maple and walnut, to suit the buyer.

THE PARAGON PLASTER COMPANY, Syracuse, N. Y., have made a specialty of the manufacture of a fine grade of plaster for building, which is shipped in bags ready to be mixed with water for application. Through long experience they claim to be able to furnish a plaster of uniform character that sets quick, dries hard and has a tensile strength at least three times greater than mortar mixed by the ordinary process.

A NOVEL FORM OF CIRCULAR is distributed by the Globe Iron Roofing & Corrugating Company, Cincinnati, Ohio. It comes through the mails as a sealed folder about the size of a large envelope. On cutting one edge of the folder it opens lengthwise, presenting six circular pages in addition to the back and front, which are utilized in calling attention to the goods of this concern. The interior leaves make allusion to the Globe standing seam steel roofing, corrugated sheets, self capping standing seam steel roofing, metal clapboards, beaded siding and ceiling, steel brick siding, Excelsior V-crimped steel roofing, &c. On the back of the folder is an illustration showing the application of corrugated iron and the Globe roofing to a building.

"A STATEMENT FOR THE CIVIL ENGINEER AND ARCHITECT," is the title of a pamphlet which has lately been issued from the press by the National Paint Works of Williamsport, Pa. It is edited by W. H. Loomis and contains facts, records of experience and remarks on wood and metal decoration and preservation. The subject of paint for iron and steel protection is one that has received much attention from engineers and architects and much inquiry and investigations have been made by many of the most prominent engineers. In the pamphlet before us reference is made to standard prepared paints of various kinds, building and bridge paints, semi-paste paints, prepared red lead, oxide of iron paint, asphalt, carbon and graphite. Reference is also made to the paint produced by the National Paint Works and a number of pages of the pamphlet are devoted to testimonial letters relative thereto, and also to illustrations of work in connection with which the company's paints have been employed.

THE annual catalogue of Purdue University, Lafayette, Ind., which has recently been issued from the press, contains the announcements for 1896-97. The volume is made up of 180 pages, and presents in a comprehensive manner an account of the origin of Purdue University, a general statement of its objects and purposes, a description of the various buildings and their equipment, and schedules of the various courses of study pursued. Full information is given relative to admission, tuition, &c., concluding with a catalogue of students for 1895-96.

"FURNACES AND HOW TO BUY THEM" is the title of an interesting publication of 32 pages which has been issued from the press by Giblin & Co. of Utica, N. Y. Within its paper covers is presented for 1896 a line of heaters which the manufacturers have sold during the past 12 years, but with improvements which add to their beauty and efficiency and render them of more satisfactory operation than ever before. The goods illustrated and described embrace the Standard furnace, with four-dome radiator in one casing; the Rival furnace, the Standard and the Standard Junior, the Rival Junior, the Standard Smokeless, the Standard Tubular and the Standard hot water combination heater. The information presented is of a character interesting to builders and contractors as well as house owners generally.

WE HAVE RECEIVED from Hammacher, Schlemmer & Co. of 209 Bowery, New York City, a copy of a new tool catalogue which they have just issued from the press. The volume consists of more than 400 pages, profusely illustrated with engravings of tools intended for cabinet makers, pattern makers, carpenters, wood carvers, upholsterers, sculptors, masons, plasterers, plumbers, painters, molders, gas fitters, modelers, machinists, jewelers, &c. In offering this publication to the trade the manufacturers state that their tools are selected with great care and are of the best makes. They also refer to the fact that meritorious novelties will from time to time be added to their present line, the aim being to carry a complete stock of first-class goods. The volume shows not only a full assortment of tools for practically all trades, but a large variety of supplies needed in factories, such as band saws, brazing apparatus, circular saws, emery wheels, emery paper and cloth, grindstones, steam glue heaters, veneer presses, trucks, vises, belting, &c. The matter has been arranged with a due regard to the requirements of the trades addressed, and in connection with the numerous illustrations are numbers, sizes, prices and other information likely to prove valuable in connection therewith. The volume is bound in colored paper covers and is well calculated to prove as valuable to the heads of manufacturing establishments as to the workmen employed by them.

THE PASSENGER STATIONS on the elevated railway loop which traverses the business center of Chicago are now being completed. They are of handsome design, attracting much attention both by reason of their ornamental appearance and the very effective manner in which sheet metal is employed in their construction. The sides are of paneled galvanized iron, applied to substantial frame work, while the roofs are corrugated, but finished with appropriate creatings. The work was done by James A. Miller & Bro., 129 and 131 South Clinton street, Chicago, Ill., who have thus had an opportunity to display their skill where probably more attention will be given to their handicraft than anywhere else in the city.

CARPENTRY AND BUILDING

WITH WHICH IS INCORPORATED
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DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
232-238 WILLIAM STREET, NEW YORK.

OCTOBER, 1896

Results of Builders' Convention.

The close of the first decade in the history of the National Association of Builders was marked by the convention held in Buffalo on September 15, 16, 17 and 18. As a result of that convention the delegates and the local bodies through their reports are in possession of clearly defined information as to the true character of organization and the responsibilities for success or failure of the individuals of which it is composed. The exact situation in which the association finds itself was given its true value, and although the number of constituent bodies has reached the lowest point in the history of the organization, the present outlook seems to promise more for the permanent success of the association than did the conditions existing in times apparently indicative of greater prosperity. The defection of many local organizations is logical enough when the business depression that has prevailed for several years is taken into account. It was shown that the adverse business conditions have so disrupted many of the exchanges that as organizations they are exercising few if any of their proper functions. These defections in no way indicate disagreement with the conditions upon which the national Association of Builders exists, but proves conclusively that they have fallen to pieces from sheer inertia and lack of understanding of the obligations of the builder, either to his fellow man or to the community in which he lives. The clear definition of this state of affairs has placed in the possession of all delegates in attendance the material with which to work for the betterment of those conditions by which their several organizations are surrounded, and no pains were spared to define the exact state prevailing in the national body so that all might be enabled to devote their energies to improve a state admittedly capable of improvement in many directions.

Brussels International Exposition.

The present age might well be termed the era of international expositions. Each succeeding year produces its crop of these undertakings, and there is hardly a single civilized country which has not already held one or more of them. Next year the little kingdom of Belgium will have her turn. Information has just been published in regard to the International Exposition to be opened in Brussels on April 24, 1897, and which is to be on an ambitious and important scale. The exposition, which is under the patronage of the King of the Belgians, and has for its president the monarch's brother, the Count of Flanders, has been organized with the assistance of the Belgian Government and of the municipality of Brussels. It will comprise works of art and science and the industrial and natural products of all nations, classed under fourteen sections. These include fine arts, social economy, hygiene, medical and pharmaceutical arts, life saving apparatus, industrial and decorative arts, liberal arts, sciences, lighting, heating, ventilation and applications thereof, electricity, traction, military science, manufactures, plant, processes and products, sporting apparatus, sports, popular games and pastimes, temporary agricultural and horticultural competitions, practical teaching, economical institutions and manual labor for women, commerce, &c. Congresses and lectures will be a special feature of the enterprise, as well as competitions between exhibits. The exposition will be held in the existing state buildings and in new structures in the Parc du Cinquantenaire and the Parc du Tervuren. The buildings are to cover over 100,000 square yards of ground under shelter, while the entire area occupied by the exposition will be about 600 acres. Money prizes will be awarded for special merit in exhibits, and all foreign exhibits will be admitted free of duty, provided they are re-exported at the close of the exposition, which will last for six months.

Tennessee Centennial Exposition.

The Tennessee Centennial and International Exposition, to be opened at Nashville on May 1, 1897, promises to be a notable undertaking in its bearing on the future prosperity of the South. It holds large possibilities in the way of promotion of the trade of the Southern States, and should prove a valuable field for the manufacturers of other parts of the country in which to advertise their goods. According to the published announcements of the management, every facility will be afforded for the exhibition of manufactures and products of all kinds. The space for exhibits is absolutely free and applications for the same should be made at as early a date as possible, for we are advised that already a large number have been received by the commissioners. From late reports it appears that the exposition grounds are nearly completed and many of the buildings are already finished. In many respects the exposition promises to exceed previous undertakings of the kind, except such mammoth shows as that held in Chicago three years ago. Steps are already being taken by business men in various parts of the country to secure a proper representation of the industries of their districts. It is to be hoped that the New England and Eastern States, as well as the West, will rally to the support of Tennessee in its praiseworthy effort to encourage interstate commerce and to promote the mutual interests of the Southern and incidentally of all the other States of the Union.

Building With Character.

Smartness and shrewdness are excellent contributory capital wherewith to start in business. Industry and push, too, are substantial aids to success. Intelligence, of course, is indispensable, and with patient perseverance it will usually conquer all obstacles and land a man sooner or later on the upper rounds of the ladder. Foresight, punctuality and self control, which embraces temperance, are also qualities which help materially in the struggle and which go to make up the successful business man. But all of these attributes combined will fail to secure for a man a permanent success of the best and most satisfactory kind, unless they are indissolubly joined together with the cement of character. It is character, after all, which really counts in the business world and it alone which insures to the business man the unfailing respect and confidence of his associates and of the community at large. The man on whom we can rely, "whose word is as good as his bond," is the man with whom we prefer to deal every time. The man whose integrity is above suspicion is the one who grapples his friends and his customers to himself with hooks of steel. Success of a meretricious kind may be obtained by the tricky individual, but such success is at best a jerry built structure, put together with sand, instead of honest mortar, and which must inevitably disintegrate under the influence of time or the stress of business adversity.

German Bathing Appliances.

The advertising columns of foreign trade papers reflect in a curious way some of the practices of the people. A German paper, for instance, tells in its advertising pages an interesting story of the practice of the country in sanitary matters. Even a casual observer could not fail to be struck by the multiplicity of bathtubs which are there displayed, but among all the collection there is not one that resembles the tubs that form so prominent a feature in our sanitary journals. The German tubs are all portable, and of late years (and perhaps in former years, too), they have mostly been made of the type that may be described as automatic washing—that is, the bather is assisted in his ablutions by the movement of the tub. Sometimes it is made to pitch back and forth and sometimes it is made to roll, or rather to rock like a cradle, and the result is that the occupant is soused and encompassed by the eddying water. It should be explained that the ends or edges of the tub, as the case may be, are so curved that the water does not spill, but instead it turns upon the bather like a combing wave. It certainly is a cooling and soothing sight on a hot day to observe these advertising cuts showing the bather with arms folded rocking back and forth, as the water tumbles alternately over his head and feet; or again, as he rolls lazily in the bottom of his tub, and lets the tide swash over him from side to side. In addition to these fascinating movable tubs, there are shown the old standard patterns that were so common here before the introduction of the stationary tubs. As might be expected, when tubs of this sort are so much used there is a large demand for water heaters, and these in various forms are advertised, some as separately portable and others attached to the tubs. The portable heaters, for which there is apparently so large a demand, show a decided lack of convenience when compared with what we know in this country as kitchen boilers and water backs with their ever ready supply of warm water. The tub, judging from these pictures, appears to be more of a sanitary article than a luxury, for the water heater attachment permits the bather to use the fluid at its temperature of maximum cleansing.

Putting Down Base and Wainscoting.

Discussing the proper manner of putting down base or wainscoting, a writer who has well defined ideas on the subject says that there are many places where it is folly to do it after the floors are laid. He says: Take kitchens, for instance. Here a floor is scarcely ever carpeted, and it is more used perhaps than any other floor in the house, and this being the case it is only a matter of time, and a very short time at that, before the floor will be so badly worn that a new floor will be absolutely necessary. Now, if the old floor is to be taken up—and in nine cases out of ten such will be the result—then the base or the lower member of the wainscot must be taken off the wall, a process that is difficult and fraught with danger to the wall and to the wood work removed, as it is likely to be split, broken, or so badly shattered as to be unfit for use again. To avoid all this, in rooms in which the floors are likely to be much used and quickly worn out, a rough floor should be laid down first, and then the base or wainscoting should be put down, the lowest member fitting down to the rough flooring; then the top or finishing floor should be put down tight between the baseboards. In the angle where the floor adjoins the base an ovolo or quarter round should be nailed well on the floor, which will have a tendency to keep the floor warm. When it becomes necessary to take up the floor it may readily be done by removing the ovolo molding—which may be used again—and then the old flooring can be torn up without removing or injuring the base boards in the slightest. It is an awkward job to tear up an old floor and put down a new one, if all the base boards have to be taken down and put in place again when the new floor is completed, and often the plasterer has to be called in to mend and patch the broken walls after the carpenter is through, and following on the heels of the plasterer comes the painter, who is obliged to repaint the whole base or wainscot in order to cover over the splits, cracks and patches the carpenter left behind, and all because the base had been laid after the floors were down instead of being laid down before the finishing floor went down.

Making a Straight Edge.

Those who have occasion to employ a straight edge and are desirous of making one for themselves will doubtless find the following description of the process full of interest and value:

Three pieces of mahogany, or rather hardwood, about 3 feet long by ¼ inch thick, are planed up as truly as possible, the planed surfaces of all three being from time to time applied to one another in order to judge of the trueness to which the surfaces are being reduced. When any one of three prepared surfaces will lie on the prepared surface of either of the other two without allowing any light to pass through the line of junction the edges may be considered sufficiently true to admit of their being used in the production of a metallic straight edge. To this end three similar strips of steel, of the size desired, are smoothed or cleaned upon their sides on a grindstone or with a file. They are then laid one upon the other and a hole drilled at each end, a rather tight fitting pin or rivet being run through each hole to keep the three bars together. In this state they will appear as one thickish bar. The compound bar being placed in the vise and clamped on each side with sheet lead or zinc, the edges are filed level, beginning first with a rough file, and gradually increasing in fineness. Every now and then the edge being produced is tested against one of the wooden edges above described, which should be previously rubbed over with red chalk, &c., to render prominences visible. When the eye no longer detects any differences in level on the application of the wooden straight edge, the steel pieces are to be removed from the vise and pins extracted. They must now be tested against one another until, by careful filing and repeated comparison with one another, it is found that the edges of all three will unite closely without any irregularities being perceptible. A good way of ascertaining whether any such exists is to place two edges in contact and rub them together with some force; the prominent portions will by this treatment be somewhat burnished and will render themselves apparent by their superior luster. The reason why three edges should be prepared simultaneously will be sufficiently evident on reflection. It will be readily understood, if A and B were two strips of steel, that A might be slightly concave and B correspondingly convex without the eye being able to detect any fault, as no light would pass; but if a third strip, C, having the same convexity as B, were applied against the latter, the fault would immediately become apparent, and on correcting the faults of B and C, and applying them to A, the concavity of this latter would also be rendered visible.

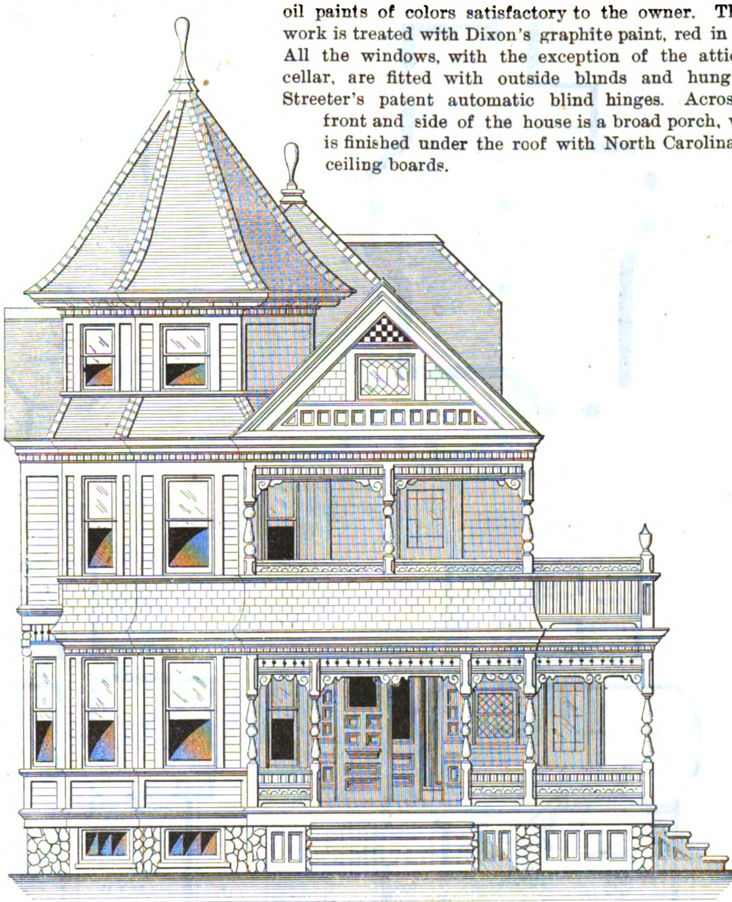
COTTAGE OF MR. JOHN H. SCHLOO AT HASBROUCK HEIGHTS, NEW JERSEY.

STANLEY ARTHUR DENNIS, ARCHITECT.

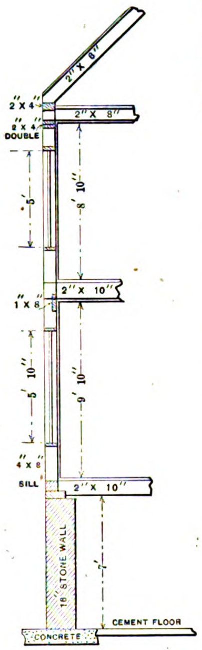
SUPPLEMENT CARPENTRY AND BUILDING, OCTOBER, 1896.

AN ATTRACTIVE SUBURBAN COTTAGE.

THE cottage which forms the basis of our half-tone supplemental plate this month occupies a commanding position in one of the many delightful suburbs of the Eastern metropolis, being in close proximity to the dwelling designed by the same author and illustrated some months ago, and which has proven very popular with patrons of the paper. The exterior is treated in an attractive style, while the interior is so divided as to give a convenient arrangement of rooms. The house was erected walls, with the exception of the bays, are covered with narrow, square edged planed clapboards, while the bays and gables are covered with dimension white pine shingles with fancy assorted butts. They are laid 4 inches to the weather and put on with wire nails. All other exterior wood work is of white pine. The main roof, tower and the front porch are covered with single ply tar paper and No. 1 8 x 16 inch Chapman slate. The exterior wood work is treated with two coats of white lead and linseed oil paints of colors satisfactory to the owner. The tin work is treated with Dixon's graphite paint, red in color. All the windows, with the exception of the attic and cellar, are fitted with outside blinds and hung with Streeter's patent automatic blind hinges. Across the front and side of the house is a broad porch, which is finished under the roof with North Carolina pine ceiling boards.



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



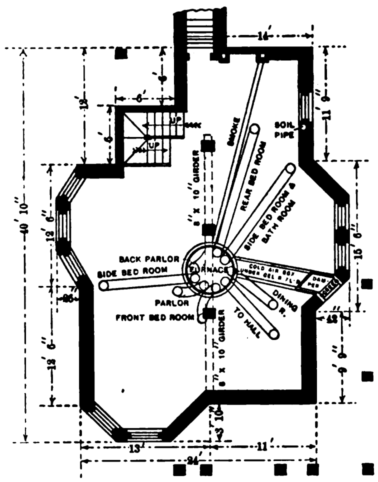
Section.

An Attractive Suburban Cottage.—Stanley A. Dennis, Architect, Arlington, New Jersey.

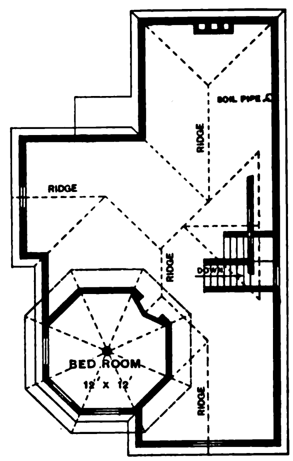
at a cost of about $3700, the work being done under one contract. There is a cellar 7 feet in the clear under the building, and a cement bottom composed of 4 inches of concrete, over which is a separate coating 1 inch thick, composed of equal parts of Portland cement and sand. The cellar walls, 18 inches thick, are composed of local brown stone, and pointed on the outside above grade with black cement mortar. The structure is of balloon frame, well spiked together. The sills on the foundation are 4 x 8 inches, the first and second story floor beams 2 x 10 inches, attic beams 2 x 8 inches, rafters 2 x 6 inches and studding 2 x 4 inches, all placed 16 inches on centers. The corner posts are 4 x 6 inches, mortised for ribbon boards, and all the plates are made of 2 x 6 inch wall strips doubled and well spiked together. The window and door studding are doubled, also under all partitions, and the floor beams for trimmers and headers. All the outside

The first story of the house, which is 10 feet in the clear, has a double floor, the top one being of narrow ⅞-inch North Carolina flooring boards resting upon two-ply Empire sheething paper and lath and blind nailed. The second floor, which is 9 feet in the clear, is covered with ⅞ x 4 inch North Carolina pine flooring boards. The attic is covered with the same kind of flooring boards, although the best were selected and used on the second story. The trim throughout the house is of selected, kiln dried white pine. The kitchen and the bathroom are wainscoted 3½ feet high with narrow North Carolina pine ceiling boards with a rabbeted molded cap on top. The whole interior is finished in the natural wood with one coat of Berry Bro.'s liquid filler and three coats of their hard oil finish. The front doors are grained to resemble oak and are fitted with large lights of bevel plate glass, as is also the vestibule door. The house is plastered with three coats of sand and lime mortar, well haired. It is finished with white mortar, white sand and plaster of paris, well troweled down straight and hard.

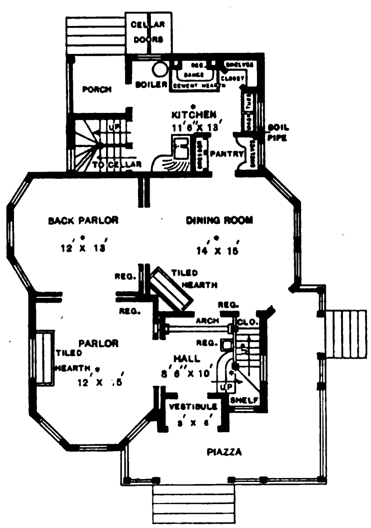
In the cellar is a cold room with ample shelves, &c., two large coal bins, made dust tight and with a large and small door to each, and a Richardson & Boynton portable hot air furnace, with pipes leading to the registers, which are set in the walls, with the exception of the one in the main hall, which is in the floor. The pantry, is located over the kitchen and is provided with a 6-foot steel clad bathtub, large oval porcelain wash bowl with marble back and sides and ornamental porcelain wash-down water closet. The plumbing is of exposed type and the fixtures are nickel plated. The house here shown was erected a year ago last summer, at Hasbrouck Heights, N. J., for John H. Schloo, from drawings prepared and construction superintended by Stanley A. Dennis, architect, of 486 Chestnut street, Arlington, N. J.,



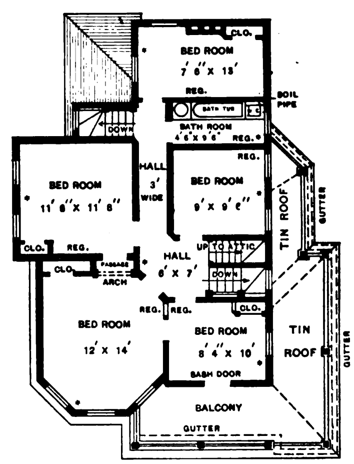
Foundation.



Attic with Outline of Roof Plan.



First Floor.



Second Floor.

An Attractive Suburban Cottage.—Floor Plans—Scale, 1-16 Inch to the Foot.

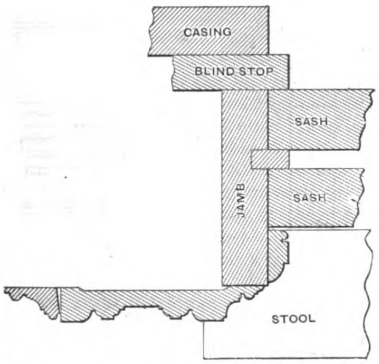
which affords communication between the kitchen and the dining room, contains a large dresser fitted with adjustable shelves and glass doors running to the ceiling, while under the counter shelf are several drawers and closets. The kitchen is fitted with a range boiler, washtubs and sink with open plumbing. The back stairs lead from the kitchen to the second story rear hall, and there are also stairs leading down from the kitchen to the cellar.

In the parlor is an oak mantel with tiled hearth. The main stairs leading up from the reception hall are fitted with turned oak newels, balusters and rails. The space between the stair strings and floor, as well as the angle underneath the stairs, is laid off into neat 6-inch molded panels of white pine. On the second floor are five sleeping rooms containing large closets and bathroom. The latter and Room 46 World Building, N. Y. City. The builder was Thomas J. Byram of Arlington, N. J.

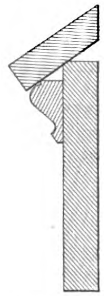
A RATHER striking building, so far as the architecture is concerned, will soon occupy a plot of ground 100 x 200 feet in size on the northwest corner of Broadway and Thirty-seventh street, New York City. The structure is to be devoted entirely to business purposes, and while only two stories in hight the dignity of its classic architecture will make it an ornament to that part of the city. The material employed will be cream white brick and terra cotta. It is expected that work on the new building will commence by November 1 and that it will be completed early next year. The drawings have been prepared by Hoppin & Koen, architects, of 160 Fifth avenue.

Fire Proof Floor Construction.

A new sort of fire proof floor construction is described in the *Deutsche Bauzeitung*. It is a patented affair, but has some interesting features. After a floor has been laid with iron beams, which may be spaced 2 feet from centers, or even more, if the floor between them is given a curved intrados, parallel slips of sheet iron on edge are laid on them, 4 or 5 inches apart. The intervals between the slips are then filled with similar slips, bent to a zig-zag shape, so that the angles will just touch the longitudinal slips on each side, and the points of contact are secured together by wire rings. This skeleton is then filled in with concrete, and the floor so made is found to have great resistance, so that, as the patentees claim, it will support safely a load of 1000 to 1200 pounds per square foot.

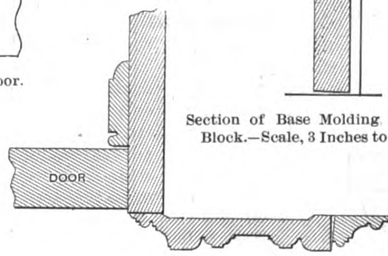


Detail of Window Finish on the First Floor. —Scale, 3 Inches to the Foot.

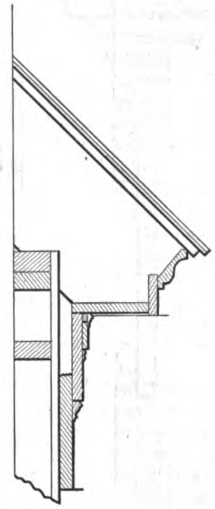


Detail of Water Table.—Scale, 3 Inches to the Foot.

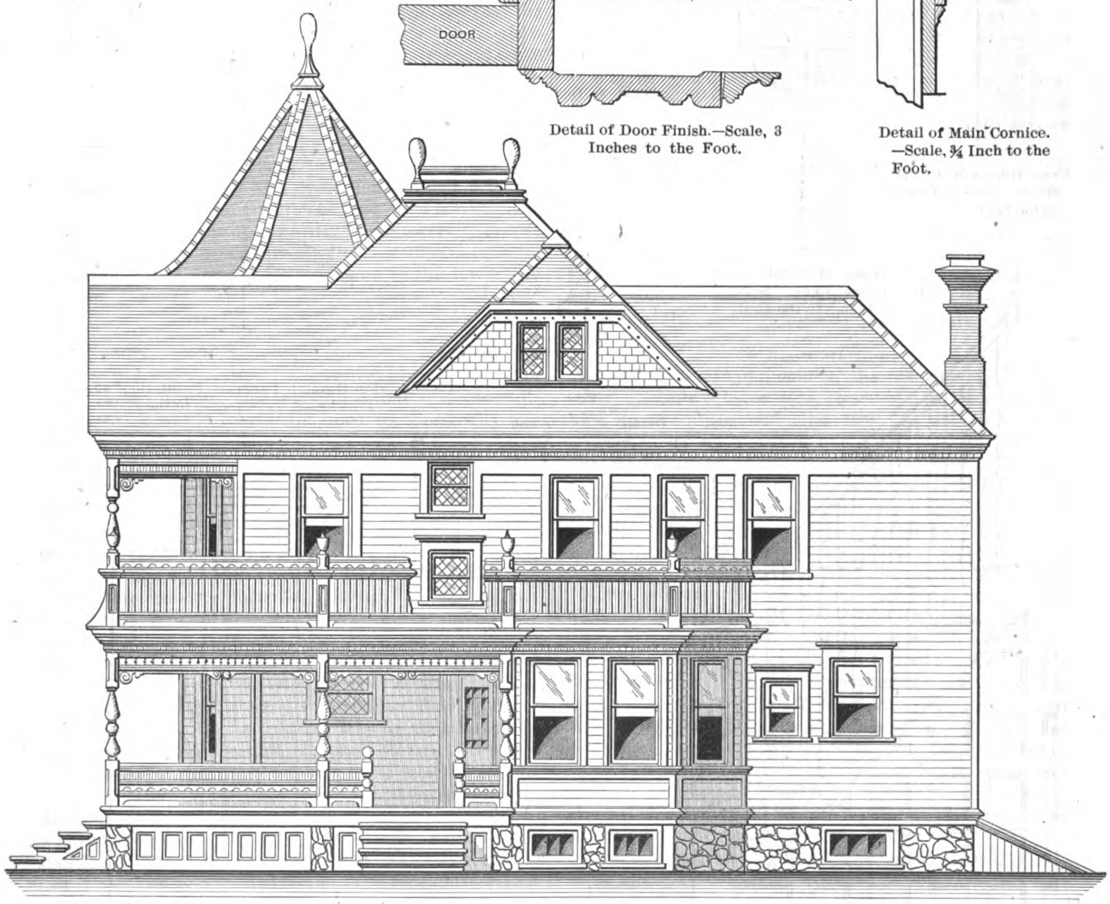
Section of Base Molding and Angle Block.—Scale, 3 Inches to the Foot.



Detail of Door Finish.—Scale, 3 Inches to the Foot.

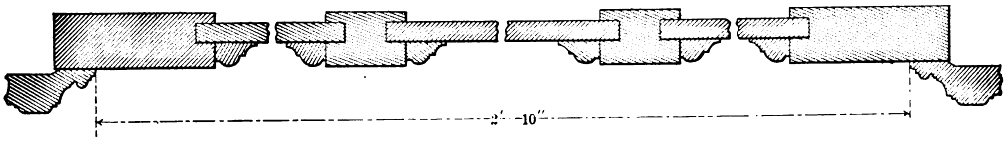


Detail of Main Cornice. —Scale, ¾ Inch to the Foot.

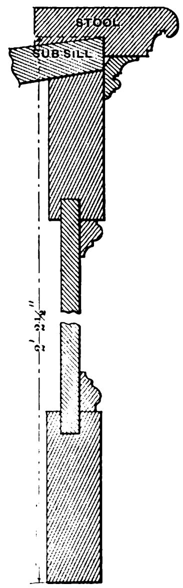


Side (Right) Elevation.—Scale, ⅛ Inch to the Foot.

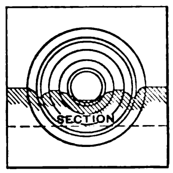
Miscellaneous Details and Side Elevation of an Attractive Suburban Cottage.



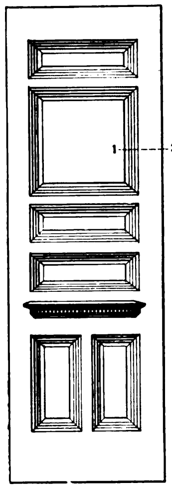
Horizontal Section of Panel Backs.—Scale, 3 Inches to the Foot.



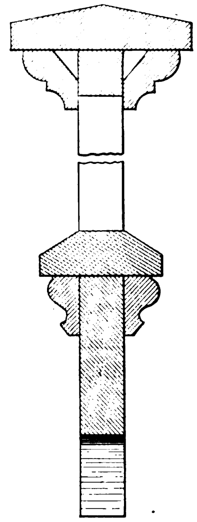
Vertical Section of Panel Backs.—Scale, 3 Inches to the Foot.



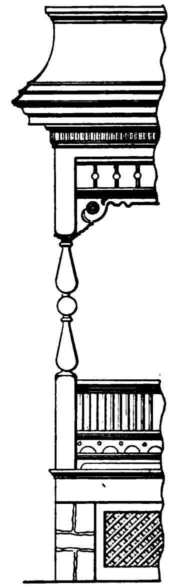
Corner Block.—Scale, 3 Inches to the Foot.



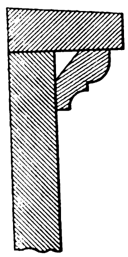
Elevation of Front Door. —Scale, ⅜ Inch to the Foot.



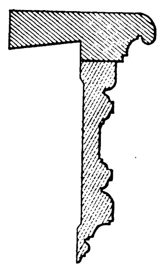
Cross Section of Porch Rail.—Scale, 3 Inches to the Foot.



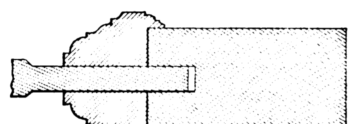
Detail of Main Porch. —Scale, ¾ Inch to the Foot.



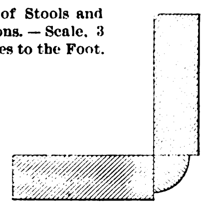
Detail of Window and Door Caps.—Scale, 3 Inches to the Foot.



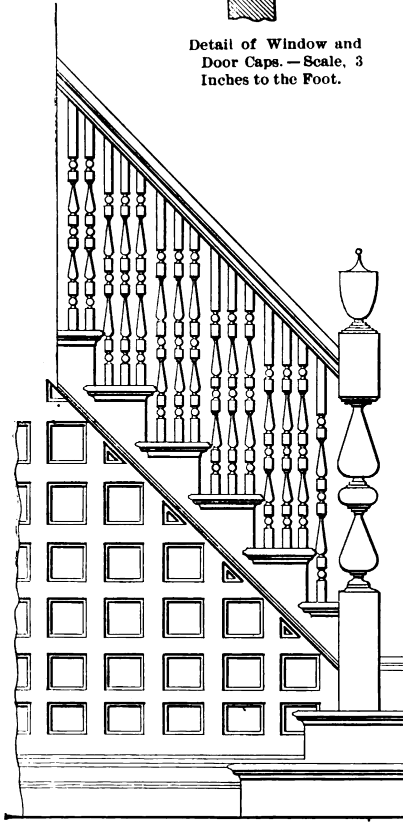
Detail of Stools and Aprons.—Scale, 3 Inches to the Foot.



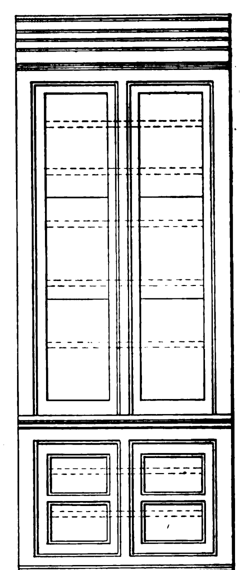
Section through Panel of Front Door at the Line 1 2.—Scale, 3 Inches to the Foot.



Section of Corner Boards. —Scale, 3 Inches to the Foot.



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



Front Elevation of Dresser in Pantry.— Scale, ⅜ Inch to the Foot.

Miscellaneous Constructive Details of an Attractive Suburban Cottage.

METHODS OF DEADENING FLOORS.

ONE of the great causes of complaint by those dwelling in apartment or "flat" houses is found in the construction of the floors and partitions, which are usually so thin as to readily permit sound to pass through, and thus greatly disturb the occupants of the various suites of apartments. There is no doubt that if more attention was given to the construction of the floors in flat houses and even in private dwellings there would be less moving from one place to another in a vain search for quiet, resulting in less wear and tear on the building, and at the same time the owner would be able to retain desirable tenants for a longer period, other things being satisfactory. The question may be asked as to what is a good method of deafening floors so that little, if any, sound can pass through them. The question permits of more than one reply, but it may be stated at the outset that if there is plenty of space and expense is not too much of an object the problem is very simple of solution. A very effectual method of killing sound is to lay two floors, including two sets of joists, the lower tier to carry the ceiling and the upper one the floor, being careful, of course, not to let the upper joists touch or connect in any way with the joists in the lower tier. If the building is of brick the ends of the upper joists should rest on a bed of sheet lead, which will tend to break the sound and prevent its traveling to the joists between. This method is effective and takes up considerable space, though it does not follow that the joists should be placed above each other their whole width. If the joists are 2 x 12 in each tier, it would make the floors over 2 feet thick, provided the upper tier was placed over the lower one; but this would cause a loss of too much space and make too much blank wall between the lintels of the lower windows and the sills of the upper ones, so it is better to place the joists side by side about 6 inches apart, raising the upper joists about 3 inches higher than the lower ones. The floor then laid on these joists would be clear of the lower tier altogether, and no connection would exist between the two, thus cutting off all chance of vibration being conveyed to the lower tier of joists.

Preventing Vibration.

Of course some provision must be made in the walls to prevent vibration being conveyed from one set of joists to the other. This is a simple matter if the walls are of brick, but if they are of wood some difficulty will be experienced, as the lining on both sides of the studding will carry the sound from one stud to another, which will, in turn, transmit it to the ceiling joists. If not lined or boarded on the inside, then the lath will carry the sound, though in a lesser degree than the lining. This difficulty may be overcome, says a writer in the *National Builder*, by having the studs carrying the joists made 1 inch narrower than the studs forming the wall. If the walls are 4 inches thick, without counting sheeting or lining, they will be far more than this with 2 x 4 scantlings set at proper distances. The ceiling joists proper should be spiked to these or else rest on the edge of a lining board or ribbon piece. Now, if we place between these studs, at proper distances, 3 x 3 scantlings, leaving their inner and outer faces ½ inch clear of the wall on both sides, and then spike the joists on these, perfect insulation results, as any vibratory occurrence would be conveyed direct to the foundation, providing, of course, care is taken not to connect in any way the upper joists with the linings or sheetings. This method of deafening, while almost perfect if properly constructed, is not to be recommended for ordinary work, owing to its cost and absorption of space. We might say that floors laid as described in the foregoing would answer for ballroom or dancing hall purposes, as the floor could be made "springy" while the ceiling below need not be affected. When a floor is intended to be "springy" the joist forming the carcase should not be tied to the wall, as it is evident they would draw the walls inward as they deflected, and if the floor was danced upon the walls would be badly shaken and rendered dangerous. The joists should be left loose ended in the walls, and should rest on hardwood or metal bearings to admit of their sliding to and fro without disturbing the wall.

An almost universal custom of deafening floors is to introduce a 2 inch layer of poor mortar between the joist. At about the middle of each joist, and on both sides, nail on strips 1 inch thick and 1½ or 2 inches wide the whole length of the joist; then cut in rough boards of hemlock, spruce or pine, keeping the joists close and resting the ends of the boards on the strips. When this is finished put in the rough mortar or "pugging," from 2 to 3 inches thick, and level up with a plasterer's float, keeping the mortar well up to the sides of the joists. There are several objections to this method, among which may be mentioned: 1, It loads down the floor and has a tendency to "sag" it; 2, it is not efficient, for as a non-conductor of sound it is quite feeble, as the joists convey sound from the top of the floor to the ceiling; 3, the greatest objection is its tendency to decay the timber work wherever the lime mortar comes in contact with the wood. In this case heavier joists will be necessary, and they will require to be closer together, and this, with the additional expense of putting on strips, furnishing and cutting in the boarding, supplying mortar, or "pugging," and floating it in place, makes the whole work much too expensive for the small results obtained.

Sometimes, instead of pugging being used, exhausted tan bark is employed, which answers very well as a deafener, but it has several bad qualities; it encourages certain kinds of insects, and it is not of pleasant odor.

Mineral wool, which is made from slag, and is non-combustible, is a favorite material to use for deafening floors or walls, but its expense for use in ordinary houses is urged as an objection by many.

Another method of deafening, which is very good both as to results and costs, may be described as follows: Before laying the floors see that all the joists are in line, then take strips of heavy felt a little wider than the thickness of the joists. Tack this on the top edge of the joists, and on the top of this felt lay the floor in the usual manner, taking care not to crimp the felt or break it so that the flooring will come in contact with the joists direct.

A Good Method.

Another, and in our opinion the best, method of deafening, all things taken into consideration, is as follows: Line up the joists, and after they are well and firmly bridged cover with planed and jointed boards. Do all plastering and other rough work in the rooms that have to be deafened; clean off the floor, seeing that all lime spots are removed or killed; then lay on this floor a layer of medium thick felt marking the lines of the joists. When the felting is all done, place ½-inch strips of pine or spruce over the line of joists, the strips to be about 2 inches or more in width. Nail these strips on the joists with flat headed wire or French nails of proper length; then on the top of these strips lay strips of heavy felting about 3 inches wide. On these strips lay the floor, and if the work be well done the noise of a brass band will hardly penetrate through to the other side. This method may be adopted in deafening the walls and floors of bathrooms, or in special walls in hospitals, and many other places. It also acts as a non-conductor of heat or cold, and for these reasons might be used where deafening was no object, but where the regulation of temperature was of much importance.

It often happens that a soil pipe, leading down from a water closet, or bathroom, is placed in some position that the noise from it is disagreeable and annoying. If in the wall between studding the sound may be deadened by building brick work and mortar around it, or packing mineral wool or eel grass around it. If the soil pipe should happen to be exposed either in a hallway or in some room it had better be boxed in with a square box, leaving an inch or so all round clear of the pipe, then fill in the box from top to bottom with a mixture of lime, sand and plaster of paris, in about equal part, or with good lime and hair mortar, and the noise will make no further trouble in that room or hall. In some places, we believe, it is the practice to take sawdust, steep it in lime whitewash, and then spread it out in the sun to dry, and use it for deafening in both walls and floors. This makes a very healthy filling and is proof against insects, rats, mice and fire. Planing mill shavings treated the same way also make a good non-conductor of sound, and may be used with effect for packing about soil pipes or in partitions or floors.

Polishes for Wood Workers.

Oftentimes it is very convenient to have at hand a recipe for a good polish for use on wood, and we present herewith several such taken from the *Cabinet Maker and Art Furnisher*. The writer states that for fine carved work the following is likely to be found useful: Put into a clean 3-gallon can 175 fluid ounces of methylated spirits, 6¼ ounces copal resin, finely powdered, 7½ ounces orange shellac, 14 drams of genuine gum arabic, powdered; cork up the can and stand it in a warm place, or in a vessel of hot water, for some hours (several days will be required if digested in the cold) until all the solids are dissolved; then tie a piece of muslin over the mouth of the can and pour off the fluid through the muslin so as to strain it. To use this polish, lay it on with a camel hair varnish brush; avoid rubbing the brush to and fro. If any part of the carved work requires to be "finished" off after using the polish, prepare a "finish" as follows: Put 47 fluid ounces of rectified spirits of wine into a bottle, and then dissolve therein 2 ounces of orange shellac and 2 ounces of gum benzoin; when the mixture is fluid add a small quantity of the genuine popy seed oil, shake up well, and keep well corked for use.

A polish for cheap carved work is prepared in a similar way by dissolving 1 pound of seed lac and 1 pound of sandrac (or dammara) resin in 1 gallon of methylated spirits of wine.* All moisture should be driven out of the wood before using this polish, which is laid on with a brush, and in exposed parts where the coating of polish would look too glaring varnish with common wood varnish, rub down with glass paper, and then give a thin layer of the above polish.

A polish for maple, ash, boxwood and other light wood is commonly made by dissolving bleached shellac (1 part in 5 parts of methylated (or rectified) spirits of wine), but as bleached shellac is a very difficult article to dissolve (it has been bleached by first dissolving the shellac in caustic lye, and then precipitating it therefrom by hydrochloric acid) when freshly prepared, the following mixture is the best for an all round polish where a colorless one is desired: Into a gallon can put 5 pints of methylated spirits and 8 ounces of camphor, and when these have dissolved put in ½ pound of common yellow resin (powdered), ½ pound of mastic resin (powdered), ½ pound sandrac resin (powdered), ½ pound of shellac; put all these solids in at the same time, so that they shall dissolve simultaneously; use a gentle heat to hasten the solution, cork up the can, and give a week or two's quiet rest to allow the sediment inherent in the resin to deposit; then pour off the clear varnish without disturbing the sediment. This fluid can be used as a varnish or self-shining polish on all kinds of wood or metal, whether laid on in the cold or warm.

A polish for dark wood is prepared by dissolving in 1 gallon of strongest methylated spirits 41 ounces of ruby (or black) shellac and ¼ pound of Venice turpentine; filter or strain before use.

To polish cheap furniture which will not bear the cost of French polishing, lay on with a sponge the following compound: Into a 2-gallon can put ½ gallon of strongest methylated spirits, ½ gallon of raw linseed oil, 1 quart of spirits of turpentine, ½ pound of best orange shellac, 8 fluid ounces of liquid ammonia, 8 fluid ounces of common (sulphuric) ether. This is prepared by first dissolving the shellac in the methylated spirits, then adding the turpentine and the oil, and finally, after well shaking up these ingredients, put in first the ether and lastly the ammonia. The bottle containing this polish should be shaken up each time before use. The addition of the last two ingredients hastens the drying of the polish.

A superior colorless polish is made by dissolving in 1 gallon of methylated spirits or wood spirits 1½ pounds of light colored shellac (bleached shellac by preference), ½ pound of white gum terzoin, and ¼ pound of sandrac resin.

For turned white woods to be polished in the lathe apply the following by means of a cloth while the wood is revolving: Dissolve ¼ pound of sandrac resin in 1 quart of methylated spirits in one bottle by a gentle heat, and in a separate bottle, also using heat, dissolve ¼ pound of genuine beeswax (bleached or not as desired) in sufficient spirits of turpentine to make the mixture of the consistency of thick cream or honey, then gradually stir in the alcoholic solution of the sandrac resin, stirring the whole time, so as not to cause separation of the compounds. In heating the turpentine and beeswax be careful to use a heat not sufficient to inflame the turpentine, or you will have that fluid quickly ignite. The heat of a water bath, or hot sand in an old saucepan, into which plunge the bottle, is the best to use.

New Publications.

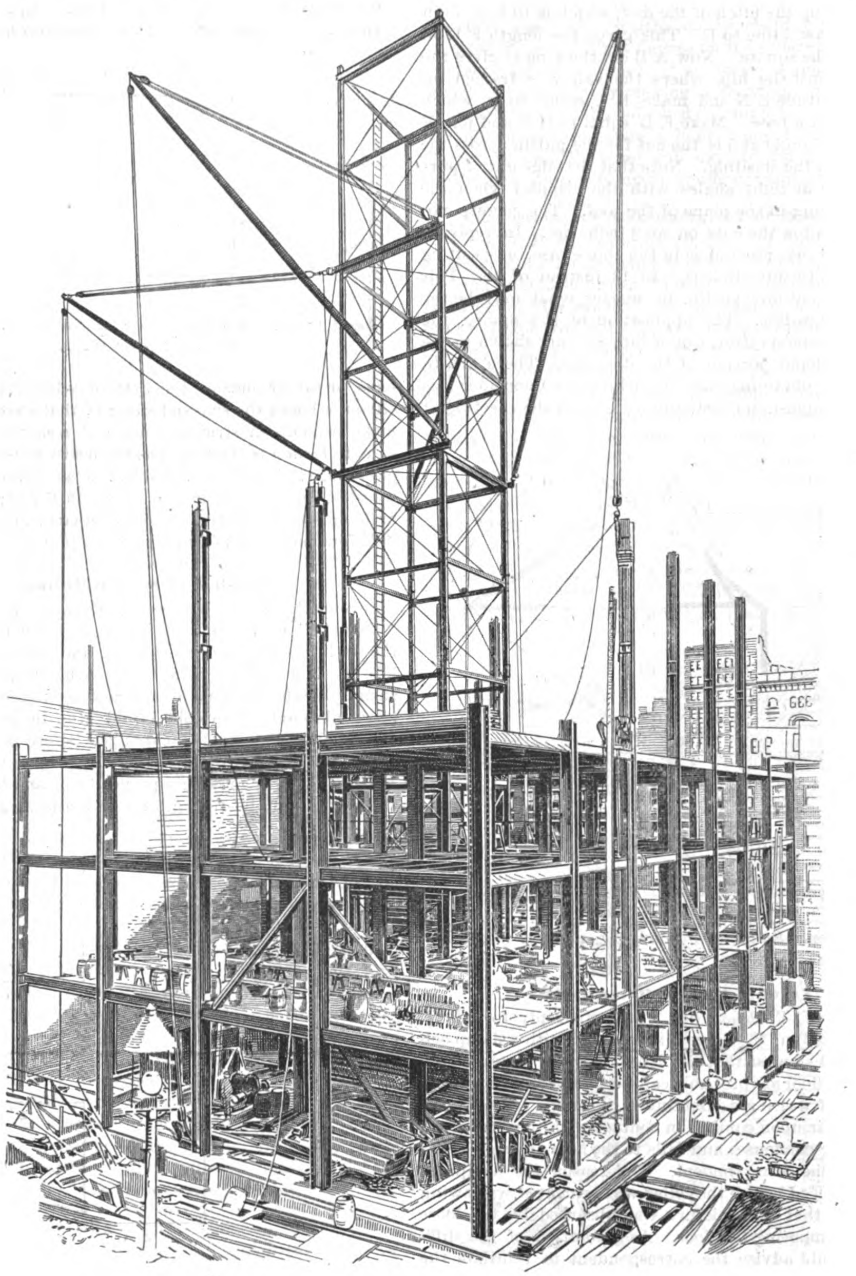
HOW TO FRAME A HOUSE. By O. B. Maginnis. Size, 7¼ x 10¼ inches; 48 pages; illustrated with over 48 engravings; bound in board covers with gilt side title. Published by the author. Price $1.

This is the second edition of a little work which treats of various methods of laying out, framing and raising timber houses on the balloon plan, and presents a system of roof framing which cannot fail to prove of interest to many in the trade. The first part of the work is comprised in eight chapters, which relate to balloon frames, floor joists, studding, wall plates and roof timbers; laying out and working balloon frames, girders, sills, posts and studding; laying out first and second floor joists; laying out and framing the roof; laying out, framing and constructing braced frame houses and framing bay windows. The second part is comprised in seven chapters, which cover roofs of various kinds and the framing, sheeting and slating of an eyebrow window. The text and accompanying illustrations combine to make a book of interest and value to carpenters and builders generally.

A RECENT comparison of figures covering building operations in New York City since January 1 shows that the number of plans for buildings filed with the Bureau of Buildings was 2530, estimated to cost $61,020,880, as against 3066, estimated to cost $68,146,754, for the same period last year.

A NOVEL ERECTING DERRICK.

IN putting up the tall office buildings which are now getting to be so common in the larger cities of the country various forms of hoisting apparatus are employed for raising into position the heavy iron and steel girders, columns, beams, &c., as well as the massive pieces of stone which in many cases are used in the exterior walls of the structure. Perhaps one of the most novel yet simple forms of apparatus for the purpose named is the derrick now in use on the 12-story building in process of erection at William, John and Platt streets, New York City, and of which we present in the accompanying engraving a general view showing the manner of operation. The derrick not only possesses many features of decided novelty and interest, but it is admirably adapted to the work it has to perform. It is placed in the center of the building, which is nearly square. It consists of four wooden columns or posts, placed at the corners of a rectangle. The sides are divided into panels by horizontal beams, and the whole is tied together by diagonals across each panel. The entire structure is carried upon its own foundation, and is independent of the building. The several parts are so fitted together as to permit of ready extension, panel by panel, as the building rises. Carried upon a step at each corner of the derrick is a boom 66 feet in length. Each of these four booms may be swung through an arc of nearly 270 degrees. Their length is such that all parts of the building can be covered, and if necessary any three of the booms can be brought to bear upon the same load. The hoisting is performed by two double drum hoisting engines, located upon the first or street floor of the building. The outer end of each boom is raised and lowered by a rope passing from one of the drums up a corner of the derrick to a block placed at the top of the second panel above the step of the boom, and thence out to the end of the boom. The raising of the load is performed by the capstans of the hoisting engines, the rope leading up the derrick to a block at the foot of the boom, and then to the fall at the outer end of the boom. The derrick was designed by Levering & Garrigues of 552 West Twenty-third street, New York City, who placed the iron work in position. The derrick is constructed so as to permit of its easy removal, piece by piece, and its erection in another locality. It is evident that its range is extended and that it provides fully for the rapid and easy handling of material.



A Novel Erecting Derrick.—General View of Building, Showing Manner in which Derrick Operates.

THE August fire loss of the United States and Canada, as computed by the *Journal of Commerce*, reached $8,895,-250, as compared with $9,929,000 in August, 1895. The total loss for the first eight months of the current year has reached $81,888,050, or nearly $4,000,000 less than last year in the same time, and $6,000,000 less than in 1894.

CORRESPONDENCE.

Top and Down Cuts of Purlins.

From G. D. I., *Philadelphia, Pa.*—Answering the inquiry of "H. V. S." of Butte, Mont., presented in a recent issue, I would say let A B of the sketch equal one half the width of the building; then will A C equal 12 feet. B C will be the plan of the valley. Take any point, as F, on the plate and square over to the ridge at N. From N set up the pitch of the roof, which is 16 feet. Join F O and draw a line to E. This gives the length F E on one side of the square. Now A B on the tongue gives the cut at 4 against the hip, where the valley is framed in. Take the altitude E N and make H I equal to it, which gives H F for a base. Make E L equal to H F and join F and L. The angle at 5 is the cut for the purlin across the face to fit on the sheeting. Note that the edge cut of purlin is always at right angles with the cripples when the purlin is laying in the plane of the roof. The correspondent also asks for the cuts on an 8-inch rise. In reply to this I would say, proceed as in the above case, only setting up the pitch to suit—that is, 8 to 12 instead of 16. This method will cut any purlin, no matter what may be the plan of the valley. The application of the square, the length of common rafter, run of hip, &c., are shown in the upper right-hand portion of the diagram. There are divers ways of obtaining cuts of purlins, but I consider this to be the simplest and best, giving cut on the sheeting at one operation. So far as I know the method is original and not copied.

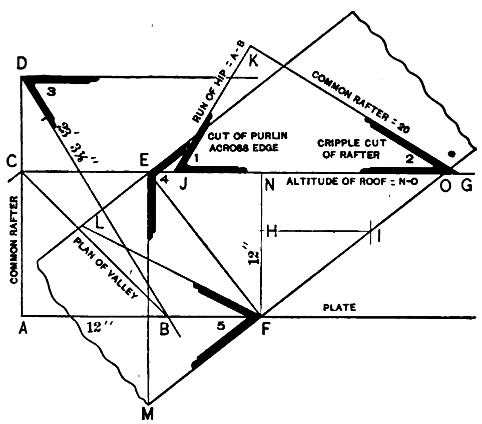


Diagram Accompanying Letter of "G. D. I."

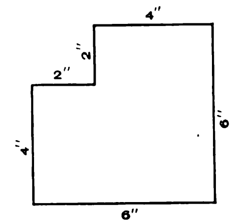
Trouble With a Damp Cellar.

From F. K. T., *Knoxville, Tenn.*—In reply to "J. F. G." of Brooklyn, N. Y., who is troubled with a damp cellar, I would suggest that the drops of water appearing on the cement floor are probably caused by the admission into the cellar of warm air containing moisture. The moisture in the air upon coming in contact with the cooler air of the cellar condenses and falls to the floor in drops as described by the correspondent. The reason the dampness was not noticed before the cellar was cemented, was owing to the fact that all moisture was absorbed by the loose material composing the floor. As a solution of the difficulty, I would advise the correspondent to ventilate the cellar or admit air to it at night or when the outside air is dry and its temperature equal to or lower than the air already in the cellar.

From W. S., *Syracuse, Neb.*—In answer to "J. F. G." of Brooklyn, N. Y., in the May issue of the paper, I would state that if he will give his cellar floor two coats of coal tar thinned with turpentine so it will penetrate the cement, and when the tar is perfectly dry give it one coat of Trinidad asphaltum paint, he will have no trouble with dampness. I tried this on the cement floor of our pumping pit at the water works, which is 16 feet deep and without drainage, and have had no dampness since that time. The tar and paint were applied about one year ago. The paint is made by the Trinidad Asphaltum Company of St. Louis, Mo.

Board Puzzles.

From D. H., *Jackson, N. Y.*—I desire to submit for solution to the readers of *Carpentry and Building* two problems, or rather puzzles, the first of which is as follows: Given, a board the size and shape of that shown in Fig. 1; make two cuts in straight lines with a saw and rearrange so as to form a perfect square, the board to be cut in three pieces only. The second problem is as follows: Given, a board of the size and shape shown in Fig. 2; first cut it in five pieces and form a perfect square; and second, cut it in four pieces and form a perfect square.



Board Puzzles.—Fig. 1.—Board to be Cut in Three Pieces to Form a Perfect Square.

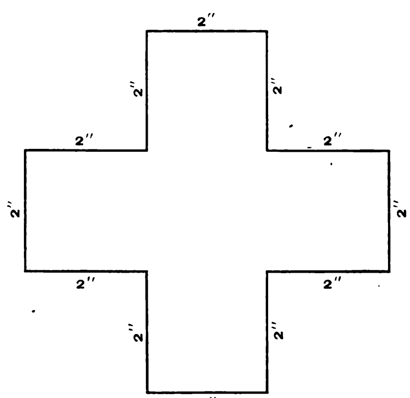


Fig. 2.—Shape of Board to be Cut in Four and Five Pieces to form a Perfect Square.

Problem in Stair Building.

From C. F. S., *Worcester, Mass.*—I would say to "P. C. D." of Richmond, Maine, that he can spring in the wall base by using 5-16 stuff and dadoing the riser into it. Furrow the thin base to the proper thickness, then split the base mold and add as much as the saw scarf takes out. Use cold liquid glue in putting on the base mold. Put up the carriages before plastering and use rough risers around the circle. The inner circle can best be done by making a proper form and bending over it several thin boards, gluing and allowing to stand 24 hours to dry. Bend on the pitch of the well, which will give the proper thickness and shape. The diagram that "P. C. D." submits is wrong in that it is shown with all the circle risers inside of the chord line. One step, at least, should be outside of the chord line, as that will give an easy, graceful rail. A better way for him to do, if he wants a first-class staircase, is to employ a man who thoroughly understands that class of work.

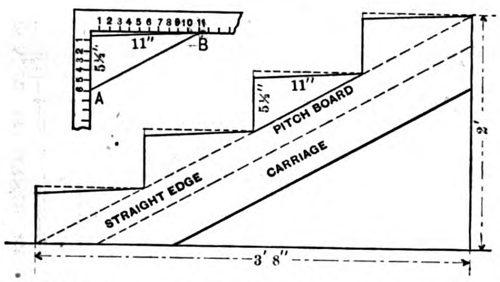
Walnut Stain for Basswood.

From F. S., *Carthage, N. Y.*—Will some reader of the paper kindly tell me through the columns of the Correspondence department how to make a walnut stain to use on basswood ?

Note.—The recipes for walnut stain presented in answer to "W. J. S." in the August issue may prove of interest to our correspondent.

Pitch Board for Stair Work.

From A. E. P., *Sparta, Wis.*—In answer to "T. W. B.," Brooklyn, N. Y., who asked in regard to pitch board for outside stair work, I inclose sketches which may be of interest. It will be seen that I cut ¼, ⅜, or ½ inch of the



Pitch Board for Stair Work.—Scale, ¾ Inch to the Foot.

pitch board before laying out the carriages. I always use a straight edge in laying out carriages, a straight edge being spaced off equal to A B, and by keeping the pitch board to the lines on the straight edge, all carriages will be the same.

Trouble in Making Blue Prints.

From R. E. B., *Clarksville, Tenn.*—Will some one please tell me why I have been unsuccessful in making blue prints. It seems to me I have tried every conceivable method, but have failed to get satisfactory results. I have followed every suggestion mentioned in *Carpentry and Building* relating to this subject, using good paper and tracing cloths, different lengths of exposure and employing the chemicals in various combinations, but to no purpose. Any one replying will confer a favor by giving full details of the process. I am a great admirer of the paper and find it very helpful to me as foreman in a planing mill. I would like to see published more details of interior and exterior work for the benefit of such readers as myself.

Note.—We do not understand why our correspondent fails to obtain satisfactory results in making his blue prints, if the suggestions contained in the various articles which have appeared in the columns of the paper have been carefully followed. A great deal, however, depends upon the quality of the paper and chemicals, but with a reasonable degree of care in exposure we should suppose that satisfactory results would be readily obtained. We, however, present the letter of our correspondent to the readers of the paper and have no doubt that if those who are in the habit of using blue prints will tell how they do the work a very interesting discussion will result.

Filing a Hand Saw.

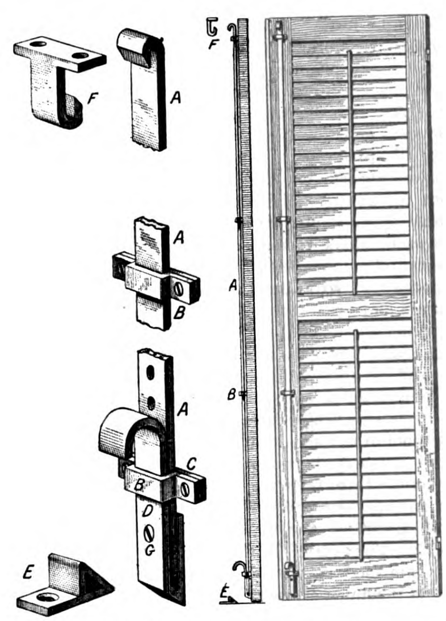
From SAW FILER, *New Jersey.*—I notice the letter of "Brownlow" in the last issue of the paper, and I will endeavor to help him out of the trouble with his hand saw. I would suggest that in the first place he joint the saw down as low as the shortest tooth, which will leave one tooth wider than another at its base. The next step is to press the file back toward the base of the tooth until the one that has just been filed is about the same size as the base of the smaller one. Proceed in this way until the length of the saw has been covered, after which turn it and file so as to divide the difference between the two teeth, filing them nearly down to a point. Now turn the saw to its first position and finish the teeth. The filing is largely a matter of judgment, which experience will improve. The correspondent will soon find, after he has tried it a few times, that he will get the teeth just about the right size if the suggestions above are followed.

Lengths and Bevels of Hip Rafters for an Octagon Roof.

From E. R., *Newton Highlands, Mass.*—I would like to ask through the columns of the paper how to obtain, with the steel square, the lengths and bevels of hip rafters for an octagon roof. What figures on the square will give the top bevel for the jacks ? It is easy enough to find the lengths and bevels by making a drawing, but that takes too much time. I have looked through books in vain for the information, and now I hope some of the readers of *Carpentry and Building* will explain, for I think it will be of much interest to many young carpenters.

Suggestions to Manufacturers of Hardware.

From G. P. S., *Leavenworth, Kan.*—I inclose herewith a sketch of a blind fastener mentioned in a previous letter, and published under the title "Suggestions to Manufacturers of Hardware." In the sketch A represents a rod of ⅛-inch iron with the end turned to form a hook at the top. This rod slides in fastenings B D. The lower end of the rod is provided with a beveled bolt, the back edge of which prevents the rod from going too hard, while the slight gravity handle or hook prevents it from falling out of the slides when the blinds are open. The lower catch is fastened to the sill of the upper catch F to the hight of the window jamb. The rod has holes at certain distances up from the bottom, so as to permit shortening for different lengths of blinds, this being done by taking out the screw G, cutting off the rod and again inserting the screw. The whole fastener can be made of wrought iron, as it is quite simple and inexpensive, and not as liable to get out of order as some of the other con-



Details of Blind Fastener Suggested by "G. P. S."

trivances with springs, &c., and would answer its purpose to the satisfaction of all.

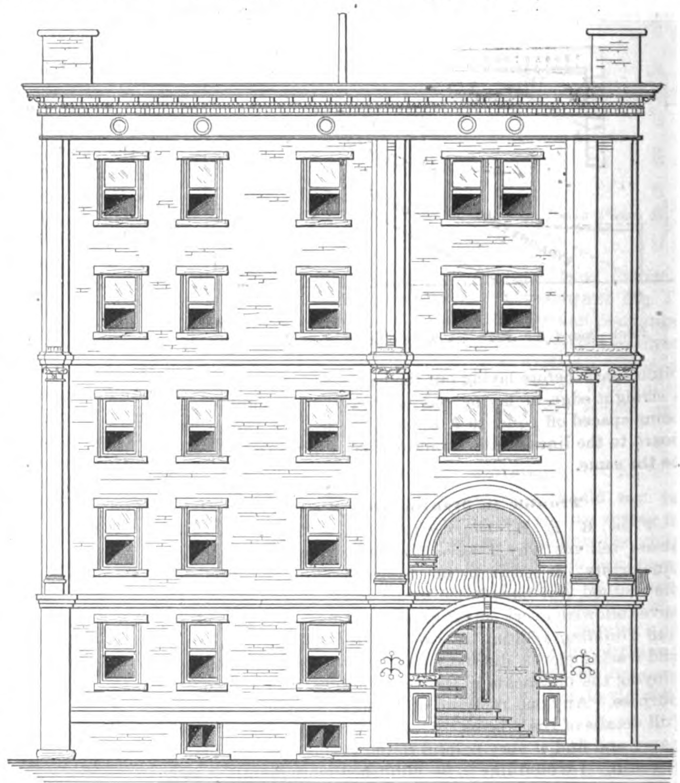
Chimney Building.

From J. P. S., *Fairview, Ill.*—I noticed and read with considerable interest the article on chimney building, in a recent issue. There are some things concerning chimney building, however, which are still not clear, and I would like to have light on the following: Which would be the better flue to use in connection with a hot air furnace in the basement and a cook stove on the first floor—an 8-inch square flue or one 8 x 12, assuming that if the 8 x 12 was used a hole would be cut through it on the flat side at the extreme edge in the basement for the heater and on the opposite side on the floor above for the cook stove? Which flue would have the greater capacity and render the better service?

Note.—We shall be glad to have those who have had experience give their opinion on this subject. While those who have given the greatest study to the subject of chimney building agree that the capacity of a flue is governed largely by its smallest dimension, we think that practical experience will show that of the two flues in question the 8 x 12 flue will have a sufficiently greater capacity to make its use advisable.

Design for a Society Building.

From GEORGE J. KELLEMAN, *Providence, R. I.*—I submit plans and elevations for a society building in answer to the request of "Bird's Eye" of Reading, Pa. The exterior of the building is of buff brick with terra cotta and bluestone trimmings, and with Ionic caps and bases. The cornice is of terra cotta and bluestone; the steps are of bluestone, the entrance of mosaic tile, and the roof of tar and gravel. The building is intended to be fire proof throughout, and of the steel frame construction, using cast iron columns. In preparing the design, I have followed the directions of the correspondent regarding the arrangement of the various floors. The foundation plan shows accommodations for the janitor and rooms for coal and heater, billiard rooms, bowling alleys, storage, &c. The first floor has eight business rooms with commodious vestibule, staircase hall, elevator, &c. On the second floor are 12 offices; and on the third floor kitchen, banquet rooms, cloak rooms, lavatories, library, reading room and a room for games. The fourth floor has three session halls with two ante-rooms each, cloak rooms, coat rooms and cedar closet, while the fifth floor has a large hall with stage at one end and cloak and coat rooms and ticket office at the other. The elevator shaft extends from the cellar to the sky-light, and is amply lighted by the latter. The inside finish is quartered oak in the front hall, vestibule and first story stairs, while the business rooms and hall separating them are in ash; the second floor, except the halls, in birch, finished cherry, while the library and reading rooms on the third floor are in ash. The banquet hall and parlor on this floor are in birch finished in imitation of natural mahogany, the banquet hall being wainscoted 4 feet high. The fourth floor is in ash except the stair hall, which is finished in birch, this material being also employed in the finish of the fifth floor. The flooring throughout is of maple 3 inches wide. All wood work is finished natural, and rubbed down with pumice stone and oil.



Front Elevation.—Scale, 1-16 Inch to the Foot.

Design for a Society Building.—George J. Kelleman, Architect, Providence, R. I.

Area of Pipes.

From H. S., JR., *Routledge, Man.*—With regard to the problem relative to area of pipes, I would say that it will take more than four 6-inch pipes to equal one 12-inch pipe in the matter of the flow of water carried, for the reason that it is necessary to take into account the greater surface in the four 6-inch pipes which forms a resistance to the flow of the water. The four 6-inch pipes have a circumference equal to 75.36 inches, while the one 12-inch pipe has a circumference of 37.69 inches. The following rule is near enough for most purposes: A circle, the diameter of which is double that of another, contains four times the area of the other.

Limit of Speaking Tubes.

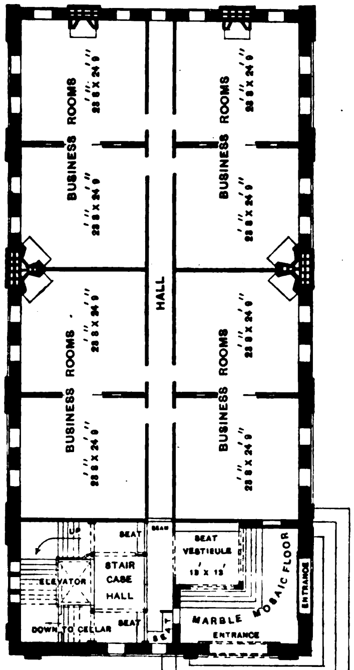
From J. H. R., *Munhall, Pa.*—Please inform me what distance a speaking tube made of 1-inch tin pipe will work satisfactorily.

Answer.—We are advised that ordinarily 100 feet is the practical limit of a speaking tube. The interference with the carrying of the voice, however, is due very largely to bends and elbows, and if the pipe is pretty straight it will carry 200 feet satisfactorily. A great many sharp turns would, however, reduce the limit even below the 100 feet mentioned above.

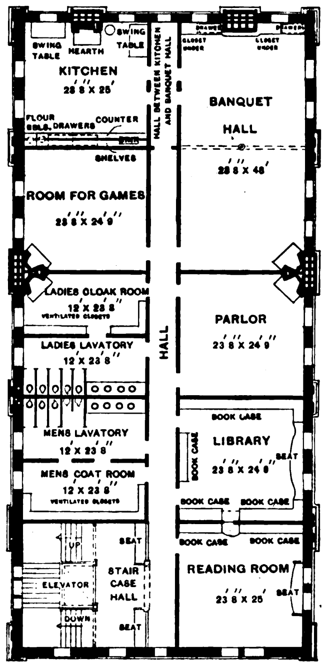
Creosote in Chimneys.

From C. H. L., *Fairfield, Me.*—Can any one give me information in regard to creosote in chimneys; what causes it and what will stop it?

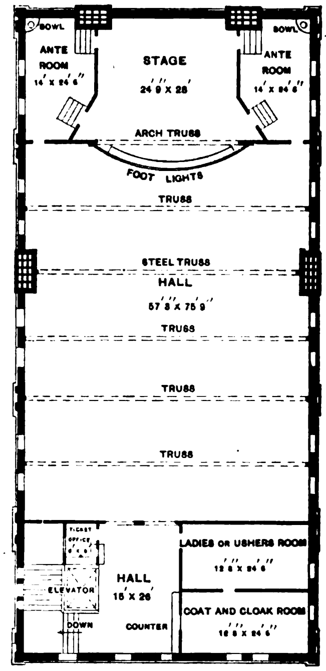
Answer.—Creosote is one of the results of the condensation of the products of combustion in the chimney, due to the lack of proper draft, which prevents their escape to the air before they are condensed. The remedies for creosote are varied and more or less successful according to the circumstances. One means of overcoming the difficulty is to increase the draft so as to give a greater rapidity of travel to the products of combustion through the chimney. It often happens that the brick work between the inside of the flue and the outside of the building is only a few inches thick and the effect of the outside temperature is to cool the chimney to a greater extent than the products of combustion passing through it will overcome This defect is sometimes obviated, where the chimney is in the outside wall of a house, by covering the wall either with another course of brick or with boards so placed as to leave a small space between them and the brick, to be filled with sand or mortar, thus preventing a too rapid cooling of the chimney flue. In the case of a very large joints of pipe extended up the chimney. By this arrangement the hot surfaces of the pipe in combination with the smoke serve to assist in increasing the up current, and thus produce a greater draft. It is possible that many of



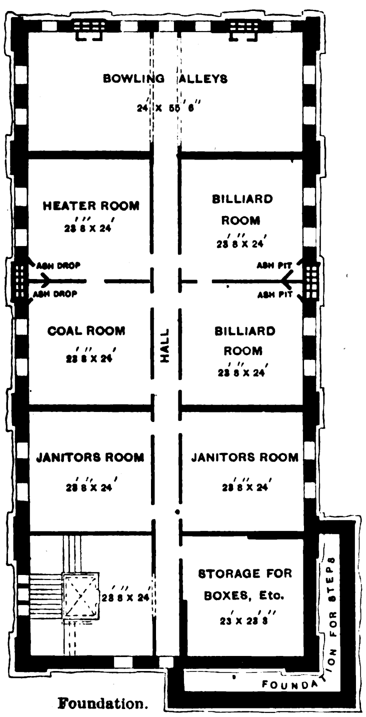
First Floor.



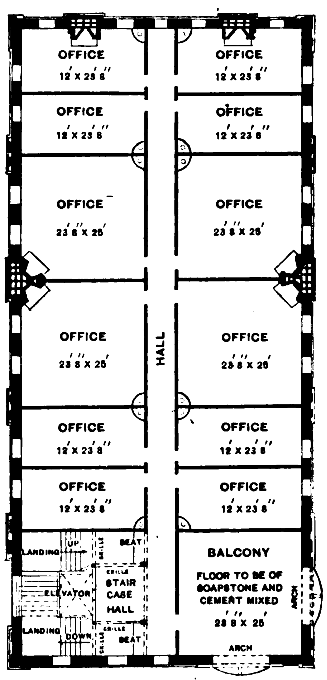
Third Floor.



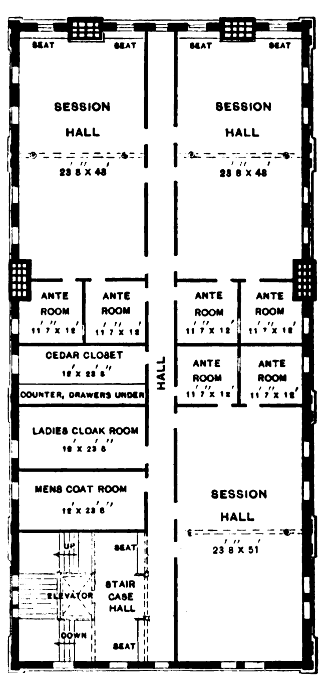
Fifth Floor.



Foundation.



Second Floor.



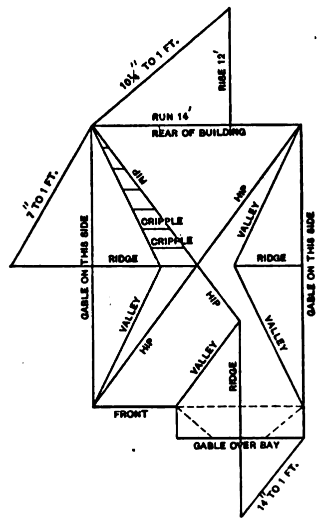
Fourth Floor.

Design for a Society Building.—Floor Plans.—Scale, 1-32 Inch to the Foot.

chimney, with which is connected a small stove, the products of combustion are not sufficient to heat the chimney so as to produce the proper up current, and in such a case benefit has been found to result from the use of a few our readers have experienced trouble with creosote in chimneys, and from such we will be glad to have letters describing the means they employed in remedying the difficulty.

Finding the Lengths and Bevels of Cripple Rafters.

From J. W. S., *Paterson, N. J.*—I am always interested in the Correspondence department of the paper, and would like to ask if some reader can tell me how to find the lengths and bevels of the cripples shown on the plan which I send, running from the hips down to the valleys. I think it is a queer roof anyhow. There is a hip, valley and common rafter, all down at the corner, and there are at least three different pitches to the roof. I was able to



Finding the Lengths and Bevels of Cripple Rafters.—Fig. 1.—*Diagram Showing How the Roof was Framed.*

get the lengths and bevels of all the cripples and jacks on the ground, and they came all right, but I had to send up the stuff on the beams and men with poles to get the lengths and bevels of the cripples marked on the plan. They said it was quite a task, but that the owner of the building wanted the roof in that shape. Of course, the hips are not true, but he wanted them run to a point. I wanted to run the valleys equal distances from the hips but he would not have it. There are two of these houses just outside of Paterson. The second sketch shows a plan of the roof as I thought it should have been.

Party Fence on the Building Line.

From C. H. S., *Washington, D. C.*—Can the editor or any of the readers tell me the correct way to put a party

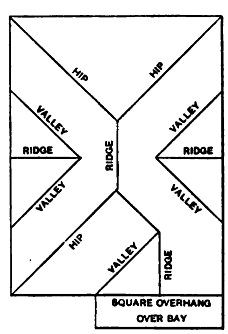


Fig. 2.—Diagram Showing How "J. W. S." thought the Roof Should be Framed.

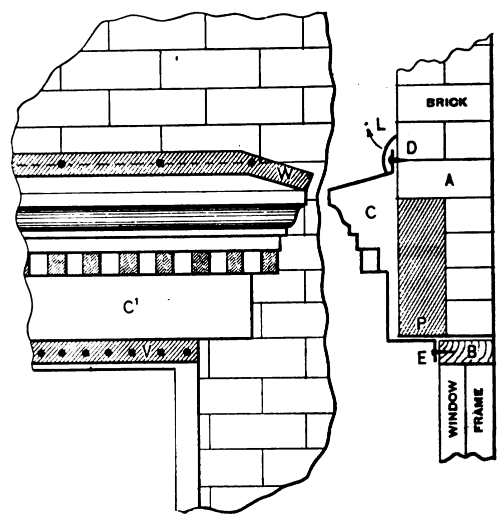
fence on the building line? Should the boards be placed on the line or should the whole thickness of the fence, measured at the posts, be taken, and half of this placed on each side? Is there a law on the subject? I have never found any one who could answer this question positively.

Note.—The question raised by our correspondent would seem to be one governed by the ordinary principles of common sense, and the rights of the owners of the party fence would seem generally to depend upon the mutual agreement made between them. The nature of the agreement would doubtless vary in different localities, but in the absence of any general or particular custom it might be stated that the party fence should be placed so that one-half of it, so far as possible, rests on the dividing line. There can be no doubt that such would be the determination of any court in the absence of either an express agreement to the contrary or of well established custom. We shall be glad, however, to have those of our readers who have had to do with matters of this kind relate their experiences for the benefit of the correspondent making the inquiry.

Fastening Metal Window Caps.

From T. R., *Canada.*—Please inform me through the columns of *Carpentry and Building* the best method of fastening metal window caps over windows.

Answer.—Referring to the section in the accompanying illustration, let A represent the brick wall, and B the



Fastening Metal Window Caps.—Section and Partial Elevation.

window frame. C represents the section of the window cap, having a flange bent upward at D and another flange bent downward, as shown at E, while C' shows part of the elevation corresponding to the section. When putting up the window cap, the bottom E should be raised until it is snug against the bottom of the lintel P, and is then tacked by means of a nail driven through the top flange D into the brick wall. Now use a level and set the window cap perfectly level, after which nail the top flange, as shown in elevation by W in the brick joints. The lower flange V in elevation is then nailed closely to the wooden frame, as is indicated by the dots. It will now become necessary to obtain a water tight joint between the top flange D in section and the brick wall A, which is done by using paint skins or what is known as roofers' cement. This is put on as indicated by the line L, in section, by means of a small trowel and so as to have a smooth surface when finished.

IT is stated that Poughkeepsie has a building which is probably the oldest one on the Hudson River. It is at the corner of Washington and Delafield streets and was erected, according to the tradition, in 1718. It is being repaired to prevent falling into decay. The plaster on the walls is 6 inches thick and the laths are hand cut, about 2 inches in thickness. It is safe to say that that house, even if antiquated, is a warm one to live in during the winter.

SHADOWS IN PERSPECTIVE DRAWING.

THE science of putting in shadows in perspective drawings, or rendering the effect, as it is called, may well be studied by those who desire to acquaint themselves with an advanced stage of the subject of architectural drawing. In some of the art schools of Europe "shadows" form an important feature of the course of study pursued, but in many places less importance is attached to the subject and the ordinary draftsman inserts the necessary shadows according to his own taste and oftentimes with little regard for rules or fitness. The suggestions which are here presented from an English source will no doubt prove of interest to those of our readers who have closely followed the serial article on drawing completed in the last issue.

Shadows in perspective follow to a degree the same rules as for geometrical shadows, combined with the rules of perspective. In geometrical shadows the sun is at P; the planes before the observer being parallel to the plane of the picture, and the general angles being right angles. The rays of light arrive at any angles we may desire to the horizontal plane, but they are at the same time parallel to the picture plane and front planes of the drawing—say the direction R L. The planes directly facing the source of light are, of course, brilliantly lighted; for instance, the gable of the house, the surfaces turned against the source of light, as the walls of the courtyard, being in natural shadow. The planes facing the spectator and parallel to the picture planes receive the ray of light, but are less brilliantly lighted. From the angle a of the wall of the courtyard we draw the shadow line a a' parallel to the direction of the rays of light R L. This shadow is intercepted by the ground line at the point a. From the point a' we draw indefinitely a line, a' b. The shadow line from the angle b and its intersec-

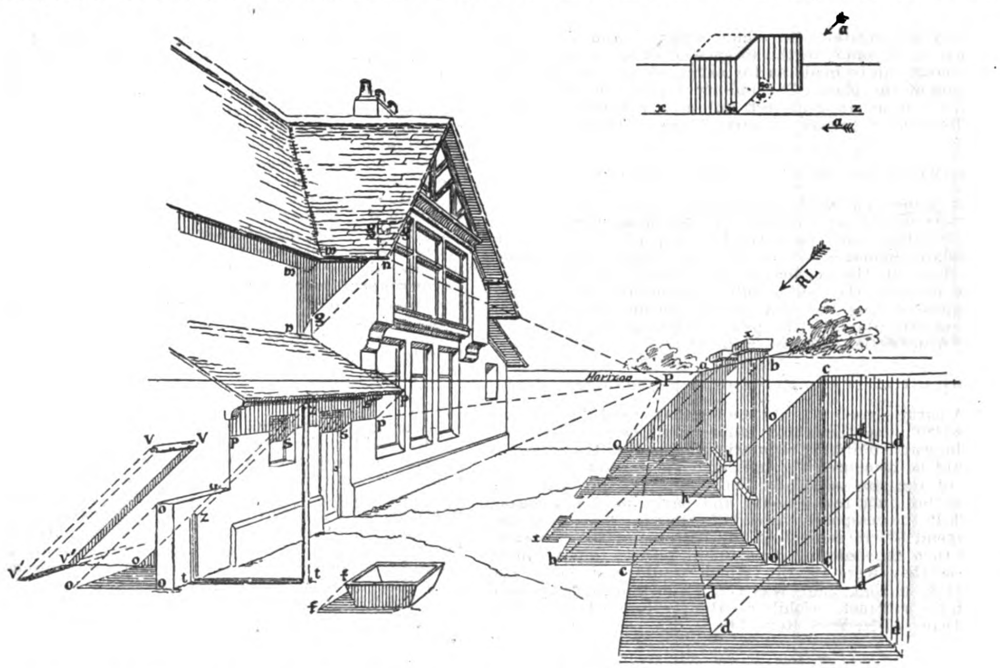


Fig. 1.—View in which the Rays of Light are Parallel to the Picture Plane and the General Angles are Right Angles.

Shadows in Perspective Drawing.

taken as being the source of light, the rays of light being parallel to each other, and arriving at a fixed angle of 45 degrees with the horizontal and vertical planes. In perspective shadows, however, the case is somewhat different. Taking the sun as the source of light, the direction of the rays may be varied according to the nature of the perspective and the taste of the draftsman. We will take three cases for the direction of the rays of light:

1. The rays of light arriving parallel to the picture plane. 2. The source of light being before the observer. 3. The rays coming from behind the observer.

For each of these three cases it is necessary to study the portion of the objects on which the rays of light fall. 1. On front planes and right angles. 2. On oblique planes and vertical lines. 3. On oblique planes and oblique lines. 4. On inclined planes.

Take the case in which the rays of light arrive parallel to the picture plane, as indicated in elevation and plan by the arrows a a parallel to x z in the illustration. Also the case of front surfaces and right angles, as indicated by the figure.

Now it is desired to put in the shadows of Fig. 1. It is drawn in parallel perspective, with one vanishing point tion with the line a' b gives us the point b where the shadow a' b of the crest of the wall a' b terminates. A horizontal parallel to the horizon line from the ground point o of the angle b should also meet the line a' b at b, thus further assuring us of the correctness of this point. From the angle c we draw the shadow line c c. The shadow is cast on the front surface of the wall as far as the point o on the angle b o. The point of the intersection c with the line c b parallel to the picture plane gives us the shadow of the point c on the gound; a continuous line on the vanishing point through c determines the shadow of the crest of the wall. The opening or doorway d d allows the light to pass; from the points d d on the outer portion of the soffit of the doorway where the light strikes, the parallels to the direction of light, and the points of intersection with the ground line from d d, determine the surface of light, d d d d, allowed to pass through the open doorway.

For the shadows of the building, parallel to the direction R L, from the points m, p, s, g, &c., will determine the shadows thrown against the walls by the projecting eaves. From these points obtained lines must be drawn to the vanishing point. For the shadow of the projecting portion of wall *o o*, we draw the shadow line *o o*; the intersection with the ground lines, and the line drawn from the vanishing point determines the shadow. From the base of the post *z t* we draw parallels to the picture plane *t t*, meeting the wall ground line at *t*; the intersection of the vertical raised from *t* with the shadow lines from the summit of the post at *z* will give us the shadow on the ground and wall. Similarly for the projecting beam *v v*, the rays of light from *v* on the wall meet the ground line at *v'*, the intersection of the line drawn from *v* to the vanishing point and the shadow lines from the projecting end of the beam determines the shadow of *v v* on the ground and wall planes. The remaining shadows, as the opening and capping of the gateway at *x* and *h*, the box *f f*, &c., are left for the ingenuity of the student. It will be noticed that the shadows follow the same laws of perspective as the building, the shadows always converging to the vanishing point P. The student should, for practice sake, vary the angle and direction of the rays of light R L as far as regards the horizontal plane, respecting, however, for the present, the parallelism to the picture plane.

(To be continued.)

LAW IN THE BUILDING TRADES.

WHEN A BUILDER CANNOT COLLECT FOR PREPARING PLANS.

Where a contract for a fixed amount is entered into between the owner of property and a builder, according to certain specifications, to which a plan is annexed, as explanatory of same, in the absence of an agreement for it, no charge can be made as for extra services in the preparation of the plan. The builder appears in such transaction, not as an architect, but as a contractor.—Maas *vs.* Hernandez, Supreme Court La., 19 Southern Reporter, 269.

DAMAGES FOR DELAY IN COMPLETION OF BUILDING.

A clause in a building contract providing that the contractors should pay a certain sum for delay in completing the building must be treated as a penalty, and not as liquidated damages, where the only damage suffered was the delay in the occupation of the new house, the difference between the rental value thereof and of the house occupied during the delay being considerably less than the sum stipulated to be paid.—Jennings *vs.* Willer, Ct. Civ. App. Texas, 32 S. W. Rep., 24

SUBSTANTIAL PERFORMANCE OF A BUILDING CONTRACT.

A party agreed to build the foundations of three houses for $3480; that the bottom stone should be laid according to the usual building regulations; and that the cesspools should be cemented throughout. The bottom stone was not of the size called for, nor in accordance with the usual building regulations; and party used dry mason work in the cesspools, instead of cement. The owner had to spend $30 in cementing the bottoms of the cesspools, and then the building department refused to pass them, unless they were rebuilt, which would cost $90. The court held that there was not a substantial compliance with the contract.—Cahill *vs.* Heuser, Sup. Ct. App. Div. 1st Dept., 37 N. Y. S. Rep., 736.

ELEVATOR PART OF BUILDING.

Where the orginal plans of a large building provided for an elevator, and the contract for the construction of the elevator was let when contracts for other work were let, the elevator was a substantial part of the building, and the building was not completed, so that limitations for filing mechanic's liens (under the laws of California) would run until it was finished.—Coss *vs.* McDonough, Sup. Ct. Cal., 44 Pacific Rep., 325.

LIEN NOT INVALIDATED BY CLAIM INCLUDING OTHER MATERIAL.

The fact that a claim of lien for material used in a building includes material used in a sidewalk around the lot on which the building is located will not invalidate the lien, where an itemized statement in the claim renders it possible to determine the exact amount used in the construction of the walk, and the precise amount charged for same.—Harrisburg Lumber Company *vs.* Washburn, Sup. Ct. Oregon, 44 Pacific Rep., 390.

SUB-CONTRACTOR BOUND BY THE CONTRACT WITH THE OWNER.

The Supreme Court of Iowa recently said: "We hold that the owner may make such a contract as he sees fit, so long as it is legal, and may make any provisions as to the time and manner of payment he chooses, and such contract he has the absolute right to comply with, in all respects, regardless of his knowledge of sub-contractors, and that they have furnished labor or material which has gone into said building, unless he has by the terms of his contract reserved the right to discharge the claims of sub-contractors from the fund which would otherwise be due to the principal contractor. If this be not so, then the right to contract, without let or hindrance, so long as the thing contracted to be done is legal, is a barren right—is a right to be exercised only subject to the will of the Legislature, which may ingraft upon the contract of parties obligations to third parties (sub-contractors) which said contractors never dreamed of. In our judgment the Legislature has no such power of interference with the right of private contract, and it cannot thus create obligations against one party and in favor of another, in plain violation of the contract. This view, we think, is the proper and just one as to the meaning and effect of the mechanic's lien law when applied to a case where the facts are as shown here. We are aware that this is a step in advance of former holdings where the question of the knowledge of the owner as to sub-contractors and their claims has been deemed material; but such knowledge is immaterial when the contract provides as to the times payments shall be made thereunder, and they are so made, and there is no provision in the contract for the owners using money due the contractor in discharging his obligations to the sub contractors.—Epeneter *vs.* Montgomery County, 67 N. W. Reporter, 93.

"STRIKES" AND BUILDING CONTRACTS.

While a building contract provides for the completion of the building by a specified time, "contingent upon strikes and boycotts," it protects the contractor against liability for unavoidable delay so far as it is due to strikes, and the strikes referred to are not limited to such as occur in the shops of the contractor. A strike having occurred in a shop where certain material had been contracted for by the contractor, he was not liable for not having placed his order elsewhere.—Milliken *vs.* Keppler, Supreme Ct. App. Div., 38 N. Y. S. Reporter, 738.

OBSTRUCTION ON SIDEWALK DURING REPAIRS.

In an action for personal injuries, where it appeared that a party had been injured by slipping on some gravel and bits of wood on a sidewalk in front of a building, that workmen were employed on the roof of the building, and the gravel and chips were falling from it, and there was nothing to show that they had encumbered the walk any great length of time, or that there had been unreasonable delay in removing them, such evidence is not sufficient to warrant a finding of negligence against the owner of the building.—O'Reilly *vs.* Long Island R. Co., Supreme Ct. App. Div., 38 N. Y. S. Reporter, 779.

DISCREPANCIES IN PLANS AND SPECIFICATIONS.

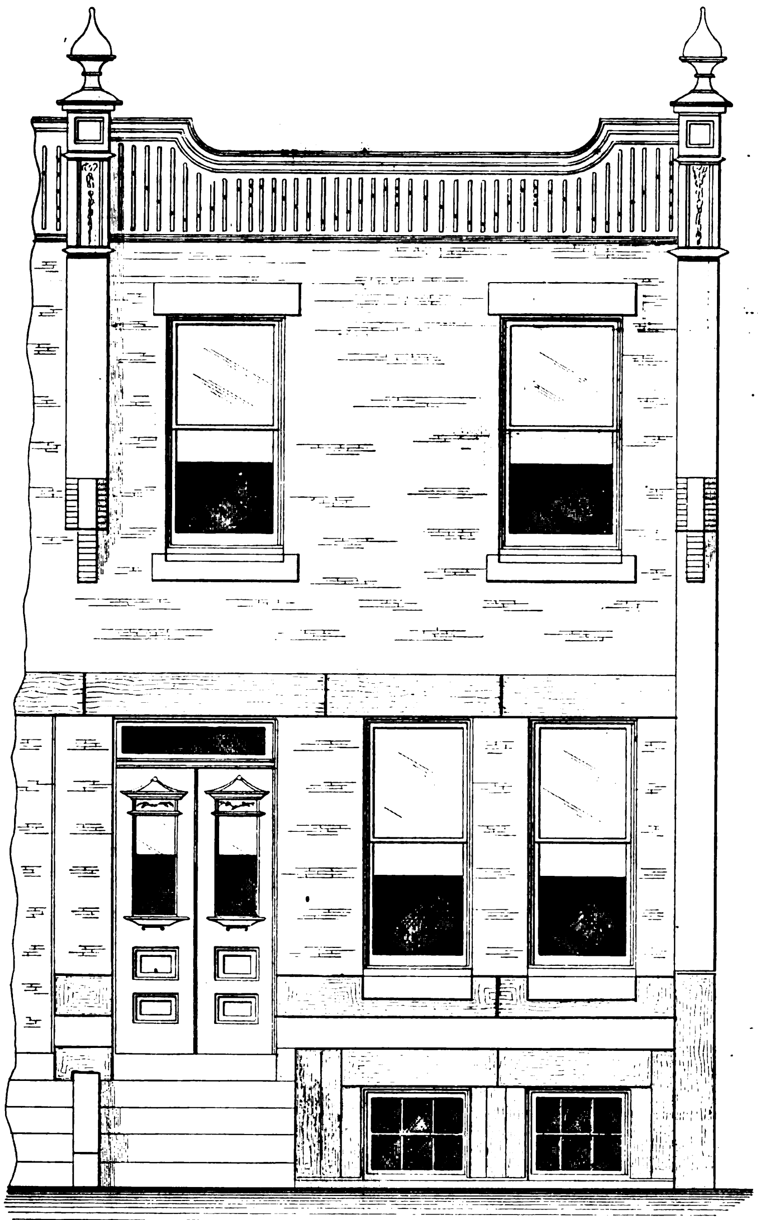
Where the plans and specifications of a building were accessible to the builder before he made the contract, and an examination of them would have shown that there were apparent discrepancies in them, he is bound by a provision of the contract that if any discrepancies are found to exist between the plans, working drawings and specifications, the architect shall decide as to their true intent and meaning. And the fact that such architects drew the plans and specifications, and were to receive a compensation of 5 per cent. of the total cost of the building, will not warrant an inference of fraud in their decision.—Kelley *vs.* Muskegon, Sup. Ct. Mich., 68 N. W. Reporter, 282.

WHAT MUST BE SHOWN AS TO EXTRA WORK.

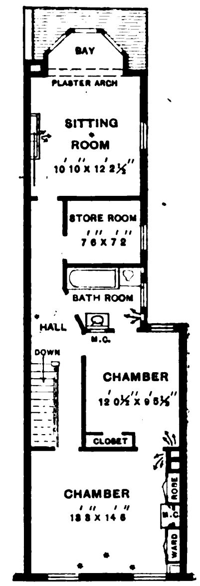
A builder claiming remuneration, over and above the contract price of a building, for certain labor and material, as having been furnished for extra work, must establish with reasonable certainty that they were used for that particular purpose.—Maas *vs.* Hernandez, Supreme Court La., 19 Southern Reporter, 270.

DESIGN OF A SMALL CITY HOUSE.

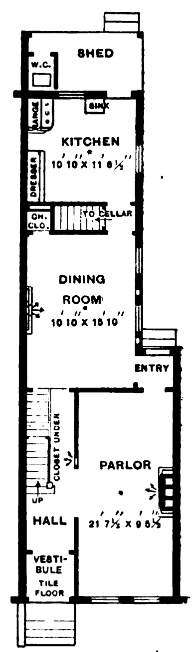
THE subject of the illustrations which we have pleasure in presenting to the attention of our readers is a small city house, of which there are now ten in course of erection at Thirteenth street and Rising Sun Lane, Philadelphia, Pa. The house here shown contains seven rooms and bath and covers an area of 15 feet 7 inches by 59 feet, exclusive of the shed at the rear. There is a cellar 7 feet in the clear under the entire building, with walls of local stone 18 inches thick and a concrete and cement floor 4 inches thick. The walls of the house are of brick 9 inches thick, the front being faced with red press and buff brick and the rear walls with stretchers. The front is trimmed with Wyoming Valley blue and Connecticut brown stone and has a galvanized iron cornice sanded in imitation of stone. The hight of the first story is 9 feet 11 inches in the clear, and the second story 9 feet in the clear. The first floor joists are 3 x 9 inch hemlock, and the second floor joist 3 x 8 inch, placed 2 feet on centers, while the ceiling joists are 2 x 3 inch hemlock. The roof is covered with 1-inch hemlock boards 12 inches wide, these in turn being covered with tin, having standing lock seam where possible. All the partitions are built of 2 x 3 inch hemlock, placed 16 inches on centers, with 3 x 4 inch hemlock at all corners and openings. All the windows have box frames with pockets, and the sashes are hung upon pulleys with weights and cord. Those used at the



Front Elevation.—Scale, ¼ Inch to the Foot.

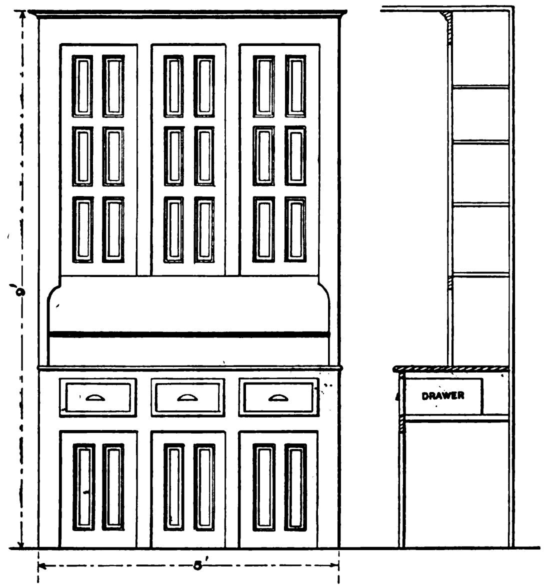


Second Floor.

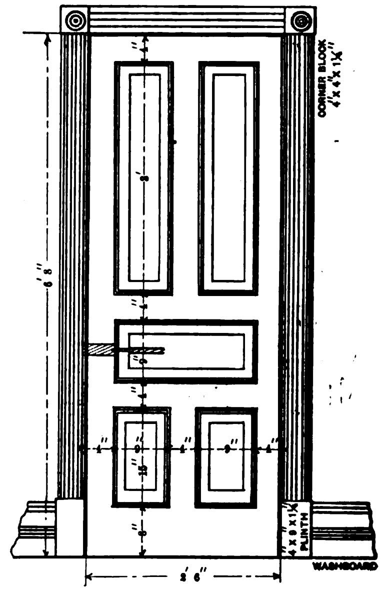


First Floor.

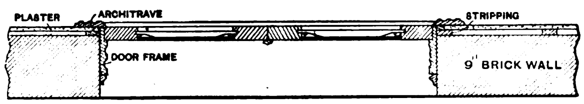
Design of a Small City House.—E. Allen Wilson, Architect, Philadelphia, Pa.—Floor Plans.—Scale, 1-16 *Inch to the Foot.*



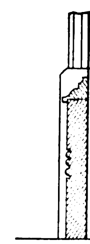
Elevation and Section of Kitchen Dresser.—Scale, ⅜ Inch to the Foot.



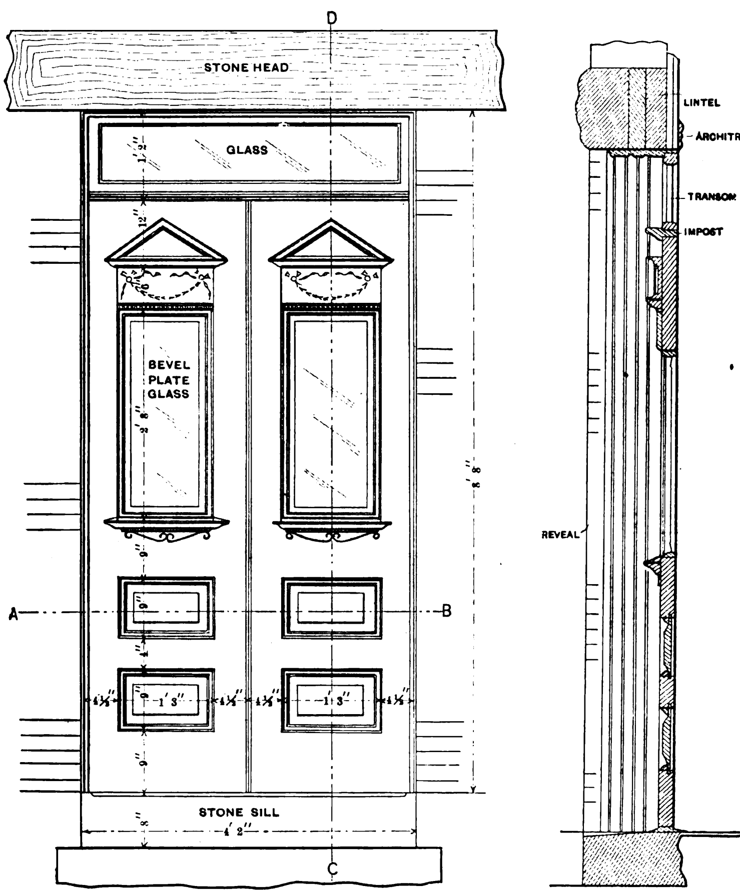
Elevation of an Interior Door and Trim.—Scale, ⅛ Inch to the Foot.



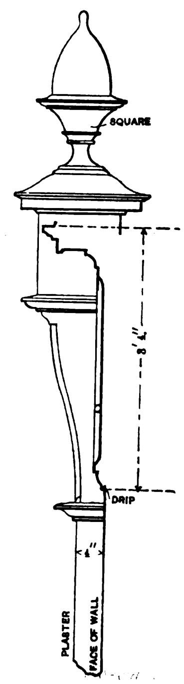
Section of Front Door on Line A B.—Scale, ⅛ Inch to the Foot.



Detail of Baseboard.—Scale, 1½ Inches to the Foot.



Elevation of Front Door and Section on Line C D.—Scale, ⅛ Inch to the Foot.

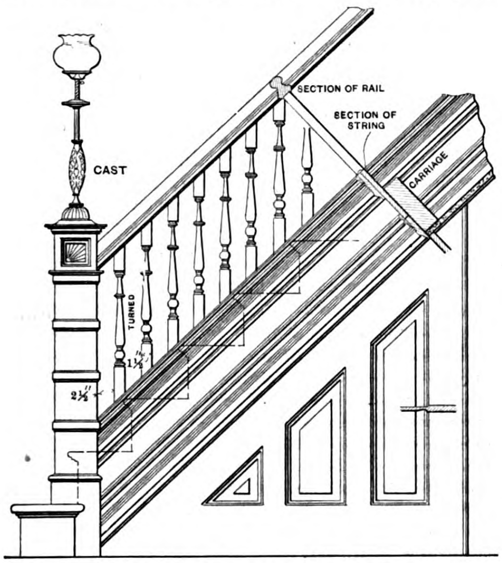


Detail of Galvanized Iron Cornice.—Scale, ⅛ Inch to the Foot.

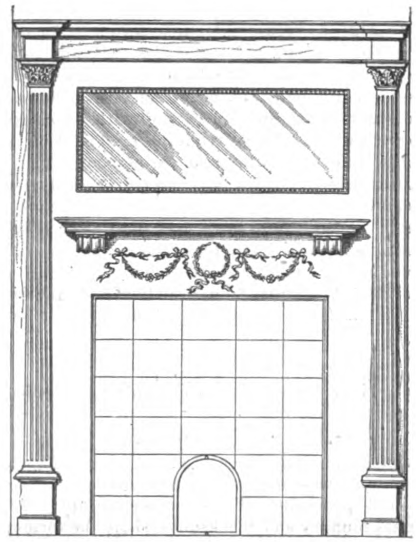
Miscellaneous Interior and Exterior Details of a Small City House.

front of the house have reveal frames with inside folding blinds, and at the rear of the house plank front frames with outside shutters on the first story, and outside blinds at the second story. Details showing the construction of these are presented on another page. The floors are laid with $\frac{7}{8}$-inch yellow pine flooring. The plastering throughout is three-coat work, finished for papering. In the parlor, hall and sitting room are plaster cornices, and in the vestibule, parlor, dining room and sitting room are plaster centers. All doorways are cased with plain jambs and rebate strips, and the doors are, for the most part, of stock design, being of five panels and $1\frac{1}{2}$ inches thick.

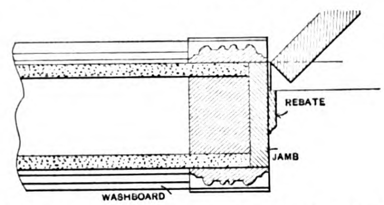
The front doors, which are $1\frac{3}{4}$ inches thick, have molded frames with impost and transom, the top panels and the doors plinth blocks. On the second floor there is a 5-inch molded washboard with 1-inch mold and 3-inch architrave, with corner and plinth blocks. The kitchen



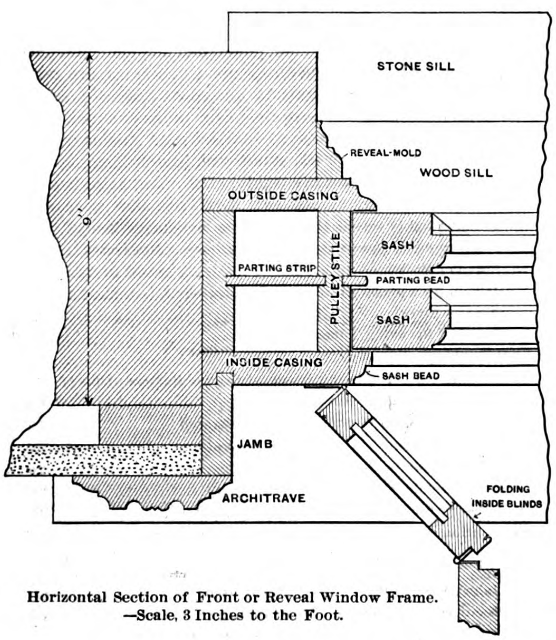
Detail of Main Stairs.—Scale, ½ Inch to the Foot.



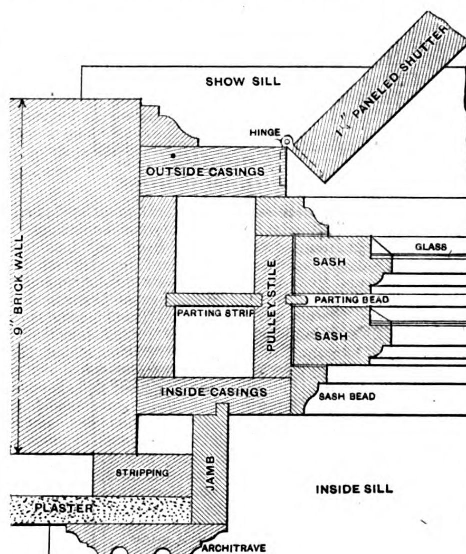
Elevation of Parlor Mantel.—Scale, ½ Inch to the Foot.



Section through Door Frame.—Scale, 1½ Inches to the Foot.



Horizontal Section of Front or Reveal Window Frame. —Scale, 3 Inches to the Foot.



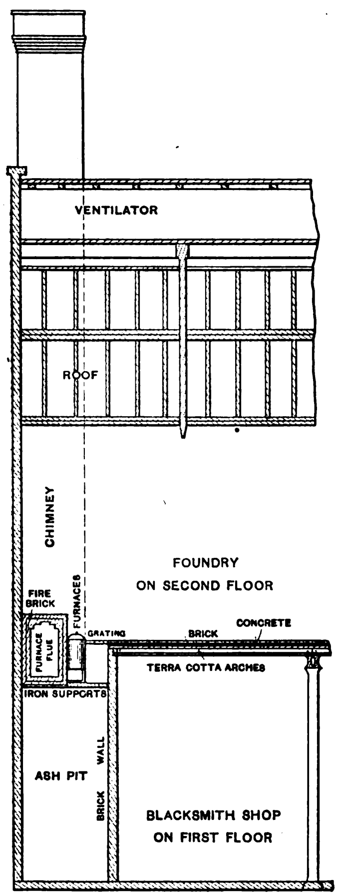
Horizontal Section of Rear or Plank Front Window Frame.—Scale, 3 Inches to the Foot.

Miscellaneous Details of a Small City House.

carrying beveled plate glass. The interior trim is 7-inch molded washboard with $1\frac{1}{4}$ inch mold on top. On the first floor the architrave around the doors and windows is 4 inches wide, all doors and windows having corner blocks and bathroom are wainscoted with $\frac{7}{8}$-inch beaded boards with molded cap and wood mantels are furnished for the parlor, dining and sitting rooms, which have tile fire boards and hearths. All interior finish is of chestnut finished natural. The house is piped for heating and is provided with a hot air furnace, which is connected with every room except the kitchen and storeroom. The house is also piped for gas and wired for electric lighting. The plumbing is first class in all respects, being properly trapped and ventilated, the vents extending through the roof. The house has hydrant and water closet outside, as shown on the main floor plan. The bathroom is provided with exposed plumbing, consisting of steel bathtub, open porcelain water closet and washstand with Tennessee marble top with nickel plated trimmings. The best grades of bronze hardware are used throughout. The vestibule and sitting room doors have leaded stained glass of neat design in the top panels, while other doors have embossed glass. The vestibule has a floor of tile and is wainscoted 4 feet high in tile. The ten houses in process of erection, according to the plans here shown, are being put up by George H. Blackmire from drawings prepared by E. Allen Wilson, architect, of 401 Bourse Building, Philadelphia, Pa.

New Design for Foundry Building.

In a building recently erected for use as a foundry some features were incorporated that are of special interest to builders and contractors as well as to members of the trade generally. The structure is employed for use as a brass foundry and blacksmith shop, the former occupy-



New Design for Foundry Building.—Sectional View Showing Construction Employed.

ing the second floor of the building, which was put up by a concern in Detroit, Mich., making a specialty of plumbers' goods, stove ornaments, &c.

The entire building is fire proof, consisting of steel and brick, including even the floors. The floor of the second story, as shown in the sectional view, is made of terra cotta arches with a covering of several inches of concrete, on top of which is a brick pavement. A very solid and substantial floor is thus secured on which the operations of the foundry can be conducted with absolutely no fear of fire.

The leading feature of this building, however, is in the arrangement of the furnaces for melting metal. They are placed in a long row extending across the building. The sectional view shows them supported on iron cross pieces placed a sufficient distance below the floor to bring the top of them nearly on a level with the floor. This enables a large space underneath to be used as an ash pit, a brick wall separating it from the blacksmith shop. The advantages of this arrangement are obvious. The ashes dropped are so far out of the way of the workmen in the foundry that they cause no inconvenience whatever. The furnaces do not have to be disturbed to get the ashes out, and there is no discomfort from the heat. The ashes can remain in the pit until it is nearly full, which requires months, when they can be carted away by old metal dealers who purchase them to save such scrap as may have spilled from the furnaces. The location of the foundry on the second floor further makes it easily lighted and ventilated.

CONTENTS.

CONVENTION OF THE NATIONAL ASSOCIATION OF BUILDERS.

THE tenth annual convention of the National Association of Builders has proven to be one of the most significant in the history of the organization. The meeting which was held in Buffalo on September 15, 16, 17 and 18 was marked by many features which were unique in its history. Never before has the situation surrounding builders throughout the country been so clearly defined or so carefully presented, and the work of the delegates was based upon a better recognition than has ever previously existed of the need for individual work in the local exchange. The relationship of the individual to the success of the local body was as clearly defined as possible by the secretary and an effort was made to secure a thorough understanding of the fact that the condition of the local exchange, of the National Association of Builders and of all organized effort is in reality but the reflection of the conditions produced by the individuals of which they are composed. The work of the meeting was carried on with unusual dispatch and all discussions were participated in by the various delegates in a manner indicative of a fitting sense of the responsibilities of the occasion.

TUESDAY MORNING.

The first session was called to order at 10 o'clock a.m., September 15, in the spacious exchange room of the Builders' Association Exchange. The hall was well filled with delegates and visitors, and the general spirit which prevailed was one of keen interest in the proceedings.

The first business on the programme was an address of welcome by Mayor Jewett, who said, in substance, that, although Buffalo has been recognized as one of the most important convention cities of New York State, no welcome was ever warmer than that extended to the members of the National Association of Builders. On behalf of the city of Buffalo he extended his hearty appreciation of the honor conferred upon the city by its selection as the place of meeting of so important an organization as the National Association. The Mayor in his brief address touched upon the abiding nature of the work of the builder and made flattering allusion to the character of the work of the association. In closing he said: "Permit me to wish you a most pleasant sojourn in this city and in the beautiful and romantic places in the near vicinity which you are to visit. I sincerely hope that you will carry away pleasant memories of Buffalo and her people, and will honor us again with your presence in the near future."

President Alfred Lythe of the Builders' Association Exchange followed His Honor the Mayor with an address of a similar tenor, extending to the delegates and visitors a hearty welcome from the members of his exchange. Mr. Lythe's remarks were brief, and the hearty welcome contained therein was most cordially received by all.

Next in order was the annual address of the president of the National Association, Charles A. Rupp. Mr. Rupp's address may be summarized as follows:

President's Address.

After his introductory remarks the president said that he believed the present convention to be the most significant in the history of the association. The general condition prevailing among the various filial bodies demonstrates the fact that at this time the utmost insistence must be given to the main question of organization, and to a thorough understanding of its uses and nature by local builders. Many of the local exchanges were referred to as being in a less efficient condition than was desired, the reason given for which was that in the early history of the association the support of the local bodies was largely due to an enthusiasm which looked for immediate and radical reformation of the disadvantageous conditions existing in the building business. This enthusiasm was not founded on a sufficient understanding of the slowness with which reformation of any kind can be secured, to warrant permanent efficiency. The pioneers of the National Association were compelled to work in such soil as they found, and it was deemed wise, in the beginning, to accept any and all local exchanges, however poorly organized and however ignorant their members might be of the true nature of the work to which they pledged themselves. Notwithstanding the fact that certain individuals in each local exchange have recognized the slowness with which all movements like that undertaken by the association must work, the majority of the members have so failed to understand the character of the work to be done, and the time required before the results expected could be realized, that the barriers in the way have seemed almost insurmountable. The number who recognize the necessity for persistent work is so small, compared with those who expect all evils to reform themselves upon the mere establishment of an exchange, that the results obtained seem inadequate to the amount of effort required. It is apparent, however, when the situation is viewed in its entirety, that practical progress has been made and that there has been a steady improvement in the conditions under which the building business is transacted since the association began its work. Ten years ago, when the National Association was formed, competition was conducted by any and all means that would secure a contract, and while it is still a fact that competition is conducted in many localities under conditions little short of farcical, the National Association has defined the principles which should govern and has taken away from the unscrupulous builder the excuse of ignorance as to what constitutes honest and legitimate business practice. Where ten years ago there was no rule by which builders could be measured, to-day through the association there is a rule which represents the best thought of the builders of the country, by which every member of the fraternity may be measured. The extent to which this rule is applied must not be confused with the value of the work which created that rule, and no builder can defy that rule without openly acknowledging that he prefers to conduct his business by means which are deemed unfair by his fellows.

After reciting the various features of the work undertaken by the association and emphasizing the fact that the work has been performed for the benefit of builders everywhere with unremitting insistence, the president said: "It argues little understanding of the real situation for builders to expect that by the simple formulation and dissemination of principles beneficial in themselves, humanity, as represented by the builder, would immediately reform itself. Old conditions and false notions must be outgrown, and it is self evident that they can be much better and more quickly outgrown if the evils and mistakes are distinctly pointed out and perpetually held up to view. The work of the National Association is largely limited to pointing out the damaging conditions existing in the building business and to defining and disseminating methods for their elimination. Results must manifest themselves slowly, because manifestation must depend upon the recognition by the individual of the personal advantage that would follow the adoption and application of the principles advocated. Results must not be expected to manifest themselves either in specific returns, or in a day, but should be left to take care of themselves; for, it being admitted that the present state of the building trades needs improvement, the work of the National Association should be carried on without hope of the specific results which follow a business venture, but upon the knowledge that that work is the right and only thing to do."

Work of the Association.

In referring to the work of the association he said: "If the conditions which surround the builder need betterment, and the need of that betterment is recognized by the fraternity at large, the machine (the National Association) by which that betterment may be secured should be maintained regardless of the fact that the results of its maintenance manifest themselves slowly. The fact that the National Association offers the best means for bringing about better conditions is sufficient motive to prompt the builders to its support. Some of the local exchanges seem to expect that the national body will not only supply them with plans and methods by which improvement may be effected, but that it will also supply the understanding and energy necessary to insure the successful application of those plans and methods. In some cases exchanges seem to expect that even action itself should be supplied them. However well calculated to insure success the principles of the National Association may be, they are useless to the individual or to the local exchange unless they are used by them. It is the function of the National Association to define, and it is the function of the local organization, and therefore of the individual, to use that which is defined. The extent to which the local exchange is profitable to its members indicates the extent of understanding among those members of the principles advocated by the National Association. If the exchange is inefficient, then it must be expected that the understanding of the principles advocated by the national body is limited, for the success of the local body depends upon the effort of the individuals of which it is composed. Exchanges that, from lack of understanding, have produced only limited results, are likely to expect the National Association by its recommendations to inject into them that vital quality which shall make its principles instantly operative and beneficial, and for lack of this vital quality attribute their failure to the National Association instead of to the lack of comprehension on the part of the individual as to what the functions of organization really are. True, and therefore permanent, results will be secured only when a sufficient number of builders recognize what true results are with sufficient clearness to insure the adoption of the means necessary to their establishment. The policy of the National Association is recommendatory, and its work must be accomplished through the voluntary co-operation of those who believe in the wisdom of using the principles it defines.

"It is impossible for the National Association to enforce the principles it defines, as enforcement is generally understood, because of the nature of the organizations of which it is composed. Its local exchanges are made up of all the various branches of the building business and it would be impossible for the National Association to lay down hard and fast laws for the government alike of carpenters, plasterers, masons, roofers and others. The National Association points out the principles which should govern the transaction of all branches of building; but it is the duty of each separate trade to adapt those principles to its uses and then to enforce them.

Damaging Conditions.

"Damaging conditions still menace and injure the builder in whatever branch of the business he may be interested, and it is self evident that these damaging and injurious conditions should be, so far as possible, utterly obliterated. No organization or body of men has ever undertaken in this country a systematic effort to point out exactly what these damaging and injurious conditions are, except the National Association of Builders; therefore it is equally self evident that the purpose underlying its work is so practical and so beneficial, and is so well calculated to give builders everywhere the means with which to meet and overcome these damaging and injurious conditions, that the work undertaken must be perpetuated.

How Results May Be Reached.

"All must recognize that the evils of which builders complain are national evils, and exist alike (though perhaps in varying forms) in every city in the country, and all must also recognize that the work of this body is of a national character, and that benefit depends solely and entirely upon the application of the results of the work by the individual for his own protection. Specific results can only be expected from the action of the individual as represented in the local exchange; but the fact must never be lost sight of that where the most beneficial results have been obtained the motive and understanding upon which the individual, and therefore the local exchange, has acted have been supplied by this association. The National Association seeks the enforcement of its principles solely by presenting their truth and value so clearly and so insistently that builders will, in time, recognize the inevitable benefits of their adoption. When that condition of recognition is reached the principles defined by the National Association will virtually enforce themselves; but never otherwise. It must be admitted that the work of the association shows results in the general improvement, positive though slow, that has followed and must continue to follow the unceasing effort to point out to the builder the manner in which he is being damaged and the means for his protection.

"The work of the National Association will, if unremittingly performed, take away every excuse the builder of to-day has for not dealing honorably in every particular with all persons with whom he transacts his business. He will no longer be able to plead ignorance; he will no longer be able to excuse himself on the ground of custom; he will no longer be able to enter competition except under fair and honorable methods, without branding himself as being opposed to such methods. Our need is great; every builder throughout the country recognizes, in the daily difficulties by which he is beset, the crying need of better conditions in every relationship under which his business is transacted; therefore the need of our work is great, and it should be pursued with that fidelity to principle and that sincerity of purpose which the welfare of the great building interests of this country deserves."

President Rupp was listened to with the closest attention from beginning to end, and at the close of his address the delegates burst into hearty applause, demonstrating clearly their appreciation of the appropriateness of what he had to say and the efficient manner of its presentation. The morning session closed with the appointment of the following gentlemen as a Committee on Credentials: Noble H. Crager, Baltimore, Md.; Warren A. Conover, New York City; R. W. Lesley, Philadelphia, Pa.; James A. Hogan, Chicago, Ill.

TUESDAY AFTERNOON.

The first business of the afternoon session was the report of the Committee on Credentials, which showed representation from exchanges in thirteen cities. The names of the delegates are as follows:

BALTIMORE, MD.
Noble H. Crager, Israel Griffith, Joseph H. Hellen,

BOSTON, MASS.
E. Noyes Whitcomb, Charles A. Dodge, Patrick Johnson, George W. Morrison, John A. Emery, George M. Tufts.

BUFFALO, N. Y.
John Feist, Charles Geiger, Joseph Lannen,

CHICAGO, ILL.
William Grace, T. A. Dungan, Henry Appel, Herman Mueller, Edward B. Myers, James A. Hogan, John Rawle, W. H. Alsip, John A. Boland, George Tapper.

DETROIT, MICH.
Richard Helson.

LOWELL, MASS.
Frank L. Weaver, Charles P. Conant,

MILWAUKEE, WIS.
L. A. Clas, C. A. Sercomb,

NEW YORK CITY, N. Y.
Stephen M. Wright, Warren A. Conover, Charles A. Cowen. John L. Hamilton, John J. Roberts,

PHILADELPHIA, PA.
Stacy Reeves, William Harkness, Robert W. Lesley. William B. Irvine. George Watson,

ROCHESTER, N. Y.
Justice Herbert Grant, Thomas W. Finucane.

ST. LOUIS, MO.
Thomas J. Ward, Patrick Mulcahy, William J. Baker, Jeremiah Sheehan.

WILMINGTON, DEL.
A. S. Reed.

WORCESTER, MASS.
George H. Cutting, Franklin B. White.

Next in order was the appointment of the Committee on Time and Place of Next Convention and Nomination of Officers. As is customary, this committee was appointed by the chair, and the gentlemen named by President Rupp were: Stephen M. Wright, New York City; J. H. Grant, Rochester; W. J. Baker, St. Louis; T. A. Dungan, Chicago; Stacy Reeves, Philadelphia; L. A. Clas, Milwaukee, and E. Noyes Whitcomb, Boston.

Immediately after the appointment of this committee the secretary presented his annual report, the length of which was so great that he stated he would omit the reading of certain portions, awaiting its appearance in print for a full presentation of his views and advice upon the situation. The full report, however, is summarized as follows:

Secretary's Report

The secretary began his address with the statement that he should depart somewhat from the stereotyped form of recital of doings connected with his department, and make his statement less of a report and more a discussion of the situation which confronts the association at this time.

Since the Baltimore Convention four of the exchanges that were then in affiliation have sent in notices of withdrawal—namely, Cleveland, Ohio, Lynn, Mass., St. Paul, Minn., and Providence, R. I. The exchange in Portland, Maine, has not notified us officially of its withdrawal, but as it has not paid its pro rata assessment it cannot be counted as with us. These defections leave us with the associations in Baltimore, Boston, Buffalo, Chicago, Detroit, Lowell, Milwaukee, New York, Philadelphia, Rochester, St. Louis, Wilmington, and Worcester in affiliation, a total of 12. Of the associations which have withdrawn—those of Cleveland, Lynn, and St. Paul report themselves as having drifted into a state of innocuous desuetude or have been wholly abandoned. The Providence Exchange gave no especial reason for withdrawal, and we have nothing to indicate their reasons except the report of their meeting in local newspapers, which may or may not be reliable, so I refrain from quoting it.

The total number of organizations which have affiliated with the National from the start to date is 50. The largest number of organizations which have in any one year given support to the work of the national body was 35 in the year 1890. Of the total number, the following have from time to time fallen away from us: The exchanges of Albany, Brooklyn, Butte City, Charleston, Chattanooga, Cincinnati, Cleveland, Columbus, Denver, Grand Rapids, Hartford, Indianapolis, Kansas City, Louisville, Lynn, Minneapolis, Nashville, New Orleans, Omaha, Peoria, Pittsburgh, Portland, Oregon, Pueblo, Providence, Saginaw, San Antonio, San Francisco, St. Joseph, St. Paul, Scranton, Sioux City, Syracuse, Troy, Washington, Wheeling and Waco.

During the past four months an exhaustive system of correspondence has been carried on with affiliated and unaffiliated associations, and individual builders on record with us as being interested in the establishment of builders' exchanges, in the hope of eliciting sufficient interest in the National Association and its work to insure the attendance of as many builders as possible at this convention as visitors. The condition of affairs as developed by this correspondence, which represents between 2000 and 3000 letters, is one which indicates that there is little true understanding among the builders throughout the country of the real character of a builders' exchange, or the manner in which it may be made beneficial to the fraternity. In a large number of instances exchanges which have been established have been created with such a limited understanding of the true means to bring the purposes desired into operation that their life has not exceeded six months or a year at most, and so from exchange after exchange has come the report "gone out of existence," or "going to pieces rapidly," or "no interest among the members, can't get a quorum at any meeting," "builders here no good," and so on to the end of the chapter.

The physical condition indicated by what I have thus far laid before you, physical condition of the national as well as the local bodies, for the condition of the national is but a reflection of the condition of the locals, furnishes me with a text for my address to you to-day and is my excuse for making this, my annual statement, more in the form of an argument on the essential features of true and effective organization than a stereotyped annual report.

Errors in Organization.

The secretary next proceeded to an exhaustive discussion of the errors in organization of builders' exchanges, which may be summarized at follows:

The manner in which the majority of exchanges in this country up to the present time have been established has virtually invited failure. Action in establishing them has almost invariably been hasty and ill advised; has been conducted upon such lines that the same elements which existed before organization exist within the membership after establishment in precisely the same proportions, and thus make matters really worse than before through giving the apparent approval of the organization to bad men and bad methods. The ordinary exchange has been established upon the recognition by the few of the value of associated effort--but these few have almost invariably made the mistake of concluding that organization must represent the many, irrespective of their character. In almost every case the first effort has been to secure the membership of every builder in a city or town, irrespective of their fitness or of their understanding of the results which organization can secure or the methods by which such results can be reached. When this initial attempt at organization is carried out in this idea and every builder in a given city is a member of the exchange, the desirable and undesirable characteristics of the individuals exist in exactly the same proportions that they did before the organization was established.

It is absurd to assume that the mere establishment of an organization will give those who seek the protection and welfare of the fraternity any new power over those who do not, so long as the weak and the unreliable, the bad and the indifferent are taken into the organization on the same footing as the good and honorable. Such an indiscriminate organization is incapable of sound management, for it utterly destroys any distinction between those who are honorable in their methods and skillful in their work and those who are not. An exchange which does not offer some inducement to the best men of a given city to become identified with its interests cannot hope for success, and it is self-evident that the best men of a given city will find no inducement to membership in an exchange which includes among its members the worst as well as the best.

The disintegration of those exchanges which formerly belonged to the National Association and those which were never identified with it is the best possible proof of the lack of understanding upon the part of the individual builder as to what organization should be. The need of a fuller understanding of what constitutes the sound basis upon which local exchanges should be established is absolute, and there is, to my mind, no means of bringing about an understnding of what constitutes a sound basis for organization among builders in this country to-day, except through some such medium as the National Association of Builders. This association since its inception has steadily worked to define what a sound basis for organization really is, and the continual failures of those exchanges that have been unsuccessful simply points out with greater distinctness the need for the work we are trying to do. Their failures in no way change or disprove the truth of the principles defined, and in no way weaken their value; the main lesson to be learned from their experience is that our work must be carried forward with greater insistence than ever, to the end that a better understanding on the part of builders everywhere may eventually be secured.

In speaking upon the relation of an exchange to the national body, the secretary said:

When an exchange has become affiliated and has signified its desire to support the work for which the association was established, it must be borne in mind that affiliation implies something more than a mere representation in the conventions and the payment of a per capita tax. The purpose for which the exchanges have affiliated is the improvement of all the conditions under which the building business is transacted; and unless each filial body does its share in pointing out to its fellow filial bodies, through the National Association, the evils from which its members suffer, and brings forward, in general conference (such as this), its suggestions for improvement, the purpose of affiliation can never be effected.

Affiliation.

In considering affiliation, almost the first question asked by an exchange is, unhappily, What will it cost? and the next, What benefits will we secure from membership? Never in the history of our associated work for builders, so far as the secretary is aware, has an exchange asked: "What can we do to help protect ourselves and our brother builders against the evils from which we suffer?" The attitude taken by exchanges when considering affiliation seems to indicate that the members believe that the National Association has something to sell, and that an initiation fee and annual dues constitute a sort of purchase money for which they are to receive some marketable commodity. This attitude further implies that the "purchase money" represents a profit to the National; that the transaction is a purely commercial one in which the exchange is a buyer and the National Association a seller, and that in the transaction the exchange is simply looking for a good bargain. Now while it cannot be questioned that the good resulting from the National Association work makes it a good bargain for an exchange, inasmuch as better general conditions for the individuals eventuate therefrom, still so long as an exchange views affiliation solely from the standpoint of making a "good bargain" for the exchange by getting something without further effort than paying a pro rata assessment for current expenses, so long would it better abstain from considering the question; for, should it gain membership while in such an attitude of mind toward associated effort, its influence would be detrimental rather than helpful to the progress of the work.

Mandatory Power of a National Association.

The complaint has been made with more or less frequency that the work of the National Association is limited because the association has not the power to enforce its conclusions upon the exchanges of which it is composed. Humanity is not so constructed that action, which for its value depends upon the recognition by the individual of the right of that action, can be set in motion and sustained by force. Instantly force is applied the motive of action no longer rests in the proper place—that is, the motive no longer rests in a conviction that the thing to be done should be done because it is right. Action taken under compulsion means, of necessity, reluctance and therefore inefficiency. A national movement, while based upon the general desire for the improvement of the body politic, is entirely different in method of operation from a local movement. In an organization such as the National Association, which is composed not of one trade but of many trades, action must of necessity be limited to general lines definitive and educational in their character. The experience of the Master Plumbers' Association of the United States has been cited as one that seems to indicate the possibility of a successful mandatory, compulsory national association; but compare the National Association of Master Plumbers with the National Association of Builders and it will be found that the whole situation is entirely different. The Master Plumbers' Association is a body representing one particular interest, dealing principally with the purchase of one particular set of materials, and the field is limited thereby in such a manner that those composing the constructive part of the trade —that is, the plumbers—can control those composing the manufacturing part of the trade. By this means the logical outcome is that the plumbers are able to control the sale of material, and therefore to a certain extent to dictate terms of competition. This enables them to do away with certain features of competition, which the National Association of Builders from its character is not constituted to accomplish. Mandatory action may be possible, subject to certain limitations, in a local builders' exchange which is composed of all the separate trades that constitute the building business, owing to its local character. Mandatory action is proper and possible, and should be put into operation for the protection of each of the separate trades represented in an exchange.

In considering the future of the National Association, the secretary stated that he felt that having given ten of the best years of his life to the organization he was entitled to honorary retirement, and suggested that he be permitted to retire to an honorary secretaryship without salary, and that Mr. D. B. Garnsey, who has been his able assistant for seven years, be given the active secretaryship

Continuing, he said with reference to the future:

We have now had ten years of experience and are able to determine exactly the causes which affect us beneficially or otherwise, and are able to recognize the conditions necessary to the success of the work we are trying to do. The exchanges which have been and are still represented in the association were accepted as members, irrespective of their ability to perform their share of the work, or their fitness to carry out the principles we have enunciated; and all have learned that local organizations must be carefully founded and must have an adequate understanding of the principles involved in organization before any degree of success can be hoped for. The exchanges which have failed to comprehend the true character of organization have dropped out of our ranks and in many cases out of existence and left us smaller in numbers, it is true, but with an organization better equipped for the work than at any time in its history.

The failure of so many local exchanges is the most distinct and positive emphasis that could be laid upon the fact that there is a specific need for our work; for those failures show clearly how little the real value of organization has been understood. The conditions to be met, at the outset, were largely speculative, and while it was hoped that the establishment of the association and the dissemination of the principles upon which it was founded would recommend themselves to builders, there was no reason for assuming that they would be sufficiently understood or extensively enough applied to insure success without years of hard and often undervalued work. The enthusiasm which prevailed in the beginning has naturally waned, because organizations generally contain few real workers, and the building fraternity in this respect is no different from humanity in any other walk of life.

The builder in a given city is likely to accept the conditions by which he is surrounded as being incapable of improvement, especially after a faulty attempt at their correction, because he fails to recognize that the faults lie, not in the conditions but in the manner of the attempt at their correction. The National Association—that is, builders from all over the country—recognize that all conditions are capable of improvement, and that no local condition is so hopeless that its betterment is not possible, and is enabled, by its larger experience, to point out the fault that has prevented the success of attempts at improvement.

How clearly defined then, and how insistent is the duty of the National Association to supply the need which it so fully recognizes, even though the local builder may believe that the conditions by which he is surrounded are incapable of improvement. The very fact that he believes such to be the condition is the surest evidence that he needs the work of the National Association, and no matter how indifferent he may be to that work the need of the work is still as apparent as ever.

Existing Conditions.

Builders in many localities have become so discouraged with the conditions under which they are compelled to transact their business that the successful intervention of organization for their help seems to them impossible. In many cases they have tried organization as they have understood it, and found it wanting. It is the duty of the National Association, first, to secure in the individual a recognition of the fact that organization as he has understood it is not organization as advocated by the National Association; and next, that until a sufficient number of representative, responsible and honorable individuals in any city recognize their obligations to others, the organizations which they compose must, of necessity, be limited in power to produce benefit and inefficient as a means of protection.

It is most unfair to expect the National Association to explain and make clear to every builder, in the limit of ten years, the true nature of organization and the manner in which he, individually, may help to make it effective, or to get the various local bodies to adopt the wisest form of organization. Builders must recognize that the fault does not lie in the National Association; for in reality the association is simply the voice of builders all over the country who have given earnest thought to the needs of the fraternity, and who for the better dissemination of their conclusions have formed what is called the National Association of Builders. In blaming the National Association builders are not blaming an organization, but are attempting to shift their individual responsibility on to those members of the fraternity who are striving to formulate principles and methods for protection and advancement when they ought really to blame themselves.

In closing, the secretary said:

In reality, however, it is immaterial whether the blame should rest upon the individual, or even whether there is any blame to be attached to any one; because all recognize that the conditions by which builders are surrounded are damaging and injurious, and therefore that they need correction; and all also recognize that the best thought of the builders of the country is the best means for formulating the methods by which the needed corrections are to be secured. The National Association is the means whereby the best thought of the builders of the country may be attained; hence there is no question as to the value of its work or the need of its maintenance.

The manner in which we must work must be that which will soonest bring about an understanding in the minds of all of every man's responsibility to the fraternity and to his fellows individually; and that manner seems to be based upon some course which will place in the hands of the individual builders everywhere the best possible explanation of their needs and the best possible means for their correction. This work must be done unceasingly; it must be done because it is needed, and it must be done so sincerely and disinterestedly that it shall appeal to builders everywhere as a work for the benefit of all and in which no individual will profit in any manner at the expense of his fellows. The work must be carried on in such a form that it will draw to it the loyalty and support of builders everywhere, adding allegiance from day to day and from year to year, until at last sufficient strength shall have been gathered to control the conditions by which builders are surrounded and to reduce damaging and injurious customs so destructive to progress to their lowest terms.

Report of Treasurer.

The annual report of the treasurer showed that while the year was begun with a balance in the treasury of about $3000, the amount at present on hand was slightly below $1000 after the per capita tax had been collected and the expense of maintaining the organization during the past year had been deducted.

Subjects for Discussion.

Next in order was the consideration of the following requests presented by the Master Builders' Association of Boston:

1. That the National Association of Builders take action in support of the movement to create an expert commission to have charge of all architectural work of the U. S. Government.

2. That the National Association of Builders recommend all filial bodies to secure an amendment to the building laws of their various cities looking toward the creation of boards of appeal.

3. That the National Association of Builders recommend the Joint Committee on Uniform Contract to secure an amendment to the Uniform Contract, so that payments shall be called for under the contract in gold, rather than in "current funds," as the said contract now reads.

The foregoing recomemndations were taken up in order, and the first was adopted. Considerable discussion was indulged in before a thorough understanding was established of the effect of the second request. After an extended consideration of the subject in which the National Secretary presented his experience as a member of such a board of appeal, the request of the Master Builders' Association of Boston was unanimously adopted. Under the third head, the proposition to alter the Uniform Contract so that payments should be called for in gold instead of in current funds was laid on the table without debate. Several of the delegates were anxious to avoid the introduction of political discussions into the business of the meeting, and several offered motions to lay the matter upon the table. This matter being disposed of, the only remaining business of the morning was the presentation and reference of resolutions. These resolutions will appear in the report of the Committee on Resolutions in the report of the last session of the convention.

WEDNESDAY, SEPTEMBER 16.

The first business on the docket was the consideration of the amendments proposed to the constitution looking to the establishment of State associations of builders upon the lines outlined in the amendments proposed, but lost at the last annual convention. Considerable discussion followed the introduction, participated in by Messrs. Grace of Chicago, Leeley of Philadelphia, Hellen of Baltimore, Sayward of Boston and others. On motion, however, it was finally decided to refer the whole subject to a committee composed of one member of each local exchange in affiliation, the committee to present its report at the next convention, and further action in relation to the proposed amendments was deferred until that time. The committee was ordered to be appointed by the chair. The remainder of the session was devoted to the consideration of the questions, "Are organizations of builders, either local or national, desirable? If so, what are the functions of such bodies, and should the value of organization be measured by or dependent upon specific results only?"

The time remaining for the consideration of these questions was so short that further discussion was postponed until the session of Friday morning.

FRIDAY, SEPTEMBER 18.

The consideration of questions in relation to builders' exchanges laid over from the preceding session was taken up as the first order of business. The general result of the discussion proved conclusively the value of local exchanges as efficient adjuncts to the transaction of the building business. Many of the delegates entered freely into the consideration, the result of which, as as whole, was a better definition of the responsibilities of the individual for the success or failure of such organizations.

Next in order was the report of the Committee on Resolutions, preceding the presentation of which the following telegram was read:

William H. Sayward, secretary of National Association of Builders:

The delegates of the ninth annual convention of the United Brotherhood of Carpenters and Joiners unanimously send greetings to your convention and to your association. We trust our respective affiliated bodies may arrange to establish amicable agreements from year to year to mutually render strikes and unpleasant complications entirely unnecessary, and substitute conciliations and arbitrations.

(Signed) PATRICK J. MCGUIRE, Secretary.

The regular business of the convention was suspended and the following was adopted and ordered sent by telegraph to the Brotherhood:

The National Association of Builders in convention assembled acknowledges receipt of your greetings and begs to say in reply that the association will continue to use its most earnest efforts to secure amicable relations between employers and workmen, to the end that, through the peaceful operation of arbitration, strikes and lockouts may be avoided.

Resolutions.

The report of the Committee on Resolutions was next taken up. The resolutions of most general interest were those relating to an effort to establish a committee whose duty should be the annual conference with delegates from labor organizations for the purpose of fixing a universal apprenticeship system for general adoption by all concerned. The committee recommended that this matter be referred to the local exchanges, which recommendation, after an amendment to the original resolutions had been presented but rejected, was finally adopted

A resolution providing for exchange members visiting other organizations to be supplied with membership tickets entitling them to recognition by the sister organizations composing the national body was adopted.

Following the report of the Committee on Resolutions a communication from the Builders and Traders' Exchange of Chicago was read, consisting of a letter from the Illinois Chapter of the American Institute of Architects in support of the project already outlined in the request from the Master Builders' Association of Boston, that the National Association consider the advisability of establishing an expert commission to have charge of all architectural work of the Government. The tenor of the letter may be indicated by the following extract:

The Illinois Chapter highly appreciates the intention of the National Association to make this question a part of the programme for the annual convention, and sincerly trusts that its influence will be exerted to further the work that has been done during several years past by the officers of the American Institute of Architects. We bespeak especially the powerful influence and co-operation of your exchange. What has been done by the architectural profession thus far has nearly reached consummation, but the most important work will have to be done during the second session of the Fifty-fourth Congress.

The communication goes on to refer to legislation already had upon the subject, presenting copies of bills now pending and those that have been acted upon in the past by the United States Congress. The entire communication, together with the exhibits attached, was received with every mark of interest and attention, affirmative action having already been taken on the subject.

Report of Committee on Nomination of Officers.

As the next business on the programme, the Committee on Time and Place and Nomination of Officers made its report as follows:

Gentlemen: Your Committee on Time and Place and Nomination of Officers respectfully reports that:

Several meetings of the committee have been held, to which all delegates desiring to be heard on matters relating to its jurisdiction have been invited, and all matters submitted to it, together with those naturally within the scope of its duty, have been carefully considered, and as a result of its deliberations your committee recommends that the next annual convention be held in the city of Detroit, Mich., on the second Tuesday of September, 1897.

For president your committee nominates James Meathe of Detroit, Mich.; for first vice-president, Thomas R. Bentley of Milwaukee, Wis.; for second vice-president, William H. Alsip of Chicago, Ill.

Continuing, the report of the committee expressed the serious concern of the members in selecting a candidate for the secretaryship in view of the present secretary's request to be retired from active service to an honorary office. The committee laid great stress upon the reluctance felt in no longer being able to present the name of William H. Sayward, but that in consideration of his request would nominate D. Brooks Garnsey of Boston as his successor.

For treasurer the committee nominated George Tapper of Chicago, Ill., making flattering reference to his long service in that office.

The report closed with a statement of thanks to the Mayor and Chamber of Commerce, Denver, and to the Governor of Colorado for the invitation to hold its next convention in that city, which for obvious reasons could not be accepted.

The report of the committee was signed by Stephen M. Wright, chairman, Stacy Reeves, Louis A. Clas, Richard Helson and T. A. Dungan. The other two members of the committee concurred in the report, but were not present at the time it was prepared for signature.

The committee also stated that a communication had been received from the Builders and Traders' Exchange of Chicago, asking that the convention in 1899 be held in that city.

After the presentation of the report, William Grace of Chicago presented another nominee as the choice of the Chicago exchange for the secretaryship—namely, J. C. Almendinger of Buffalo, N. Y. William H. Alsip seconded the nomination in somewhat lengthy remarks and he was further seconded by Mr Sercomb of Milwaukee, Wis.

Delegate Franklin M. Harris of Philadelphia immediately followed with a most moving appeal to the National Secretary, Mr. Sayward, to reconsider his request to be retired and permit his name to be used again. Mr. Harris' remarks were received with prolonged applause, and together with the personal urgency of many delegates, Mr. Sayward was finally prevailed upon to permit his name to again be used as a candidate for the office he has fulfilled with such signal success ever since the inception of the association. He was immediately nominated by acclamation and seconded by voices from all parts of the room, and upon motion the president was instructed to cast the unanimous vote of the convention for Wm. H.

Sayward of Boston, Mass., as secretary. The president fulfilled this duty amid the applause of all present.

The report of the Committee on Time and Place was then adopted as a whole with the substitution of Mr. Sayward's name as secretary.

Mr. Wright's Address.

Immediately upon the adoption of the report, Stephen M. Wright advanced to the platform and proceeded to deliver one of the most effective and moving addresses ever presented in any convention of the National Association of Builders, in which he rehearsed the sincere love and respect in which Mr. Sayward had ever been held by builders throughout the country, whether members of the exchanges composing the National Association or not. Throughout Mr. Wright's entire address the utmost attention prevailed, and when his real purpose was discovered by the presentation of a beautiful solitaire diamond stud as a slight manifestation of the love and esteem of the members of the association the delegates broke into cheers and applause.

Mr. Sayward, visibly affected by the testimonial of regard, responded to the cordial expressions of esteem offered by Mr. Wright and for the sentiment typified in the beautiful gift, and promised that he would continue to give to the builders throughout the country that sincerity of effort and earnestness of purpose with which he had always endeavored to fulfill his obligations.

Board of Directors.

Next in order was the naming of the directors of the various filial bodies, which are as follows :

BALTIMORE, MD. S. B. Sexton.	PHILADELPHIA, PA. Stacy Reeves.
BOSTON, MASS. E. Noyes Whitcomb.	ROCHESTER, N. Y. J. J. L. Freiderich.
DETROIT, MICH. Alexander Chapoton.	ST LOUIS, MO. P. J. Moynahan.
MILWAUKEE, WIS. C. A. Sercomb.	WORCESTER, MASS. M. T. Roach.
NEW YORK. Charles A. Cowen.	BUFFALO, N. Y. John Feist.

The Delegate at Large from Wilmington being the only delegate did not feel at liberty to name the director from his exchange, and he was therefore requested to bring the matter before his organization for early action.

Per Capita Tax.

The fixing of the per capita tax for the ensuing year was next in order, and a motion that it be fixed at $8 was unanimously carried.

At this point a resolution was introduced by Stacy Reeves of Philadelphia, pointing out that the lavish entertainment of delegates and visitors to the annual conventions tendered by the exchanges which have been the hosts of the organization up to the present time is practically prohibitive of an invitation for a convention from the smaller organizations. The resolution asked that it be the sense of the convention that hereafter entertainment of delegates and visitors meeting in annual convention should be restricted to as inexpensive a manner as possible. The resolution was adopted.

License for Architects and Builders.

The following resolution was read by the secretary as being a communication from the National Association of Building Inspectors, then in session in the same building, as indicative of action taken by that organization :

Resolved, That it is the opinion of the National Association of Building Inspectors that public safety demands that persons practicing the profession and trade of architect, civil engineer and builder should do so under license, to the end that those who practice such responsible professions and trades should first show their fitness to do so ; therefore, we recommend the passage of State laws leading to the accomplishment of this end.

The last formal resolution offered was that presented by the secretary on behalf of all visitors to the convention, whether delegates or not, to the effect that the various features of entertainment prepared by the Builders' Association Exchange of Buffalo had been participated in by all with the keenest appreciation and delight. Especial reference was made to the magnificent opportunity afforded for viewing the Niagara Falls, rapids and whirlpool, the impressive character of which could not be more effectively or delightfully shown than by the course adopted by the entertainers. Specific thanks were returned for the several features of entertainment on behalf of all and the thanks of the convention were extended to the press of Buffalo.

Upon invitation from the chair, ex-presidents of the National Association Edward E. Scribner, Anthony Ittner and Noble H. Creager addressed the delegates. A number of informal speeches were made by various delegates representing the filial bodies, expressive of individual appreciation of the delightful manner in which all had been entertained and those present had also the pleasure of listening to a brief address from O. N. Bartholemew of Springfield, Ohio, who expressed his satisfaction at the method of operation of the association and hoped that before the next convention occurred his exchange might be identified with its membership.

Entertainment.

The utmost credit is due to the entire Builders' Association Exchange, but especially to the committee in charge, for the thorough and efficient manner in which the several most excellently selected features of entertainment were carried out. Delegations from the exchange were assigned to each delegation of visitors and at no time during the convention was any stranger without the personal services and attention of one or more members of the Buffalo Exchange. The theater party at the Star Theater on Tuesday night was a most enjoyable affair, the whole house being reserved by the members of the exchange for their visitors. The feature of the evening was the introduction of a topical song full of humorous references to the prominent members of the association and of the local exchange. The carriage ride on Wednesday afternoon provided an excellent opportunity for showing all the beauties of the city and bringing home to the visitors its progressive character and especially the nature of its buildings and parks.

The all day trip to Niagara Falls included a delightful sail down Niagara River and a trolley ride down the Canadian shore on the cilffs bordering the Falls and rapids, and a ride by the Gorge Railway up the American side close to the water's edge. The manner in which this unique feature in the history of entertainment in the National Association was conducted reflects the greatest credit upon those under whose auspices it was given. Upon arrival at the city of Niagara Falls on the American side an elaborate banquet was served which proved, if not so grandly impressive, at least one of the delightful features of a memorable day. The party after the banquet proceeded to return by trolley and steamer, arriving after a pleasant sail by moonlight at Buffalo about 8.30 in the evening. The banquet served for the ladies of the visiting delegation at the Iroquois Hotel on Friday afternoon, September 18, was a thorough success in every way and was especially enjoyed by the ladies On the same evening a reception and smoker to the gentlemen afforded a fitting climax to the lavish entertainment with which all were received.

Every delegate and visitor departed from Buffalo filled with gratitude and full of expressions of appreciation of the hospitality of their entertainers.

Brick Walls for Dwelling Houses.

It is the common practice to use salmon brick in all inside work of walls for dwelling houses, says J. W. Crary, Jr. Then these walls are "furred" and "lathed," so that the plastering will keep dry. Now, this is a great blunder for a wise builder to make. A 9-inch wall, built of good hard brick, in the proper way, without "furring," is better than a 13-inch wall built in the common way with it. If the brick are hard and strong, and laid well in the best kind of mortar, the inside course can be set on edge, three courses on edge, then a "header" to bind. This leaves a hollow space between the outer and inner part of the wall, which is a complete non-conductor of heat, cold or water from the outside part of the wall. Not only that ; the expense and nuisance of "furring" and lathing is avoided, and the plastering is put on the brick, and, while adding strength to the wall, is as dry as if put on "laths."

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This is followed by a section given to the Geometrical Measurement of Roof Surfaces with numerous illustrations and examples. It embraces a new and simple system of framing curved roofs, also the simplest methods of roof framing of every description, with practical examples thoroughly illustrating nearly every conceivable form of roof and showing many points never before presented.

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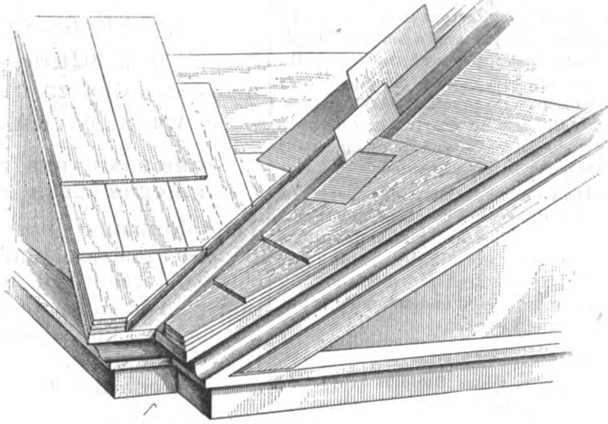
NOVELTIES.

Jahn's Perfect Roof Valley.

Robert Jahn of the firm of Robert Jahn & Co., Scotch Plains, N. J., has been allowed a patent on a form of roof valley for which certain important advantages are claimed. A clear idea of the construction and special features of this valley can be gained from an inspection of the accompanying illustrations, Fig 1 showing a perspective view of a roof valley with the shingles partly laid, while Fig. 2 is a cross section through the valley, showing the lock for holding the flashings The particular features of this system of roofing are the insertion of flashings into the valley strip and holding them there without nails. At the same time the flashings are so bent over the shingles or slates as to make, it is said, a perfectly water tight joint and prevent leakage from rain or snow, or the formation of ice with the accompanying destruction of roofing material. The valley strip is formed, as shown clearly in the engravings, with a lock at each side flattened down toward the center line of the valley. These flattened seams form slots into which the flashings are slid, and the lock is so tight that a snug joint is made without the use of any solder or nails.



Novelties.—Jahn's Perfect Roof Valley.—Fig. 1.—Perspective View of Valley

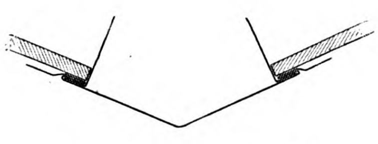


Fig. 2.—Cross Section through Valley.

In laying the Jahn perfect valley, the valley strip is nailed along each edge to the roof. Then the next piece is fastened on in the same way, and so on to the ridge, the joint being made by sliding between the locks not less than 2½ inches and the part hammered down smooth. When ready to do the shingling or slating, a flashing is cut to the proper miter and the edge inserted in the lock of the valley. Then, in the case of shingles, two rows of shingles are laid at the eaves and the flashing bent back over them. On top of these the third shingle is fastened, and then, before laying the next row, a second flashing is inserted, overlapping the first, in the way shown in Fig. 1. In this way both sides of the valley are flashed their entire length, the shingles being put on in their regular courses and the flashings bent over and held between them, as shown in the engravings.

Roofers will readily understand how a tight, strong finish is secured in this manner. The manufacturers especially allude to the advantage in cases where the adjoining roofs between which the valley runs are at a different pitch. In such a case, as illustrated in the engraving, where the left hand shows a roof of steeper grade, a sudden flow of water rushes down the steep roof and completely floods the side of the valley next the flatter portion. Unless the shingles or slates are very well protected in such a case the water will be driven beyond the line of the valley strip and gain entrance through the roof. Robert Jahn & Co. furnish the valley in sheets 7 feet long, the tin being painted two coats on both sides before the valley is formed. With shingled roofs supposed to be laid from 5 to 6 inches to the weather 400 flashings 4 x 10 inches are furnished with every 100 feet of valley, and with slate roofs laid from 8 to 9 inches to the weather 250 flashings 5 x 14 inches are furnished with every 100 feet of valley. The Jahn perfect roofing valley is supplied in both tin and sheet copper, the latter, it is pointed out, making a practically indestructible valley.

Security Sash Balance.

The sash balance shown in Fig. 3 of the engravings is offered by the Richmond Safety Gate Company, Richmond, Ind. Among the points of excellence claimed by the makers for the balance are the following: That it requires no pockets or pulleys in the pulley stiles; that it is simple, durable and effective; that it is free from noise; that it can be made strong or weak by the use of an adjusting key; that it is made in sizes to balance sash of any weight from 4 to 100 pounds; that frames cost less where the balance is used than when made for weights and cords, and that there is but one cord to each sash, one end of which is secured at one corner of the sash and the other end at the other corner, while the middle of the cord is in the middle of the balance; consequently no slipping can occur.

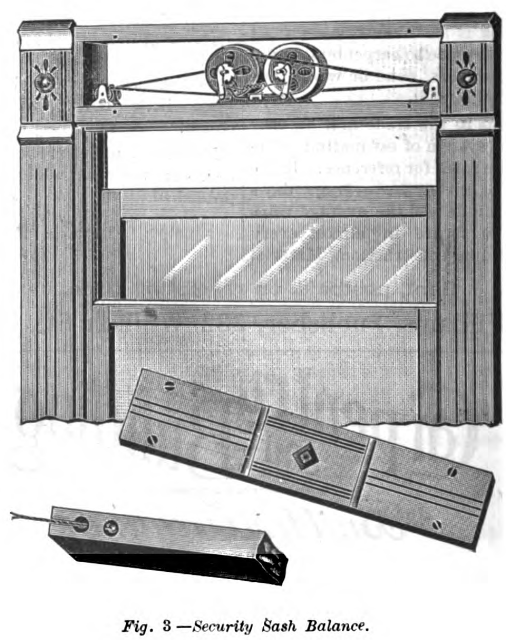


Fig. 3.—Security Sash Balance.

THE 1896-97 SEASON of the trade school attached to the Pratt Institute, Brooklyn, N. Y., has reopened, the day classes meeting on Monday, September 21, and the evening classes on Wednesday, the 23d. We are advised that the outlook is favorable for a large attendance of pupils this season, the applications received being well up to the average, and, in the case of some of the classes, larger in number than they have been hitherto so long before the opening of the school. Good progress is being made with the new trade school building, which, it is hoped, will be completed and equipped ready to receive pupils at the opening of the season. The structure is a two-story brick building adjoining the present Department of Science and Technology. It is substantially built and will be furnished throughout with the most improved tools and apparatus necessary for use in connection with the various trades.

The Standard Sectional Heating Boiler.

The trade will be interested in the illustrations we present herewith of the Standard sectional heating boiler, recently brought out by Giblin & Co., Utica, N. Y. A broken view of the Standard boiler adapted to hot water is shown in Fig. 4 of the cuts, while Fig. 5 illustrates the different sections. As shown in the illustrations, the boiler is built up of vertical sections connected to a header that runs horizontally along the top between the forks of the sections and from which the water and steam pipes are taken. At the bottom of each water leg on either side there are connections between the sections and the returns are carried in at this line, as shown in Fig. 4. The sections, it will be seen by reference to Fig. 5, are of different shape, the first with an opening in the front corresponding to the fire door, while in the second section the water legs terminate at the bottom, leaving space for the ash pit, and the third section illustrated is for the rear of the ash pit, giving a water surface to the back. The fire travel is indicated in Fig. 4. The flames and products of combustion rising from the fire are carried back through the channels formed by the vertical water ways to the rear of the boiler. From there they are deflected toward the front, passing through the similar side channels, and finally travel back again, below, through the water legs to the smoke pipe. In this way an extensive surface is secured, and at the same time the gases, when at their highest temperature, strike the hottest water. It will be noticed that there is a very large flue area in the boiler and extensive crown sheet surfaces. Furthermore the rising columns of hot water are naturally deflected toward the header at the top, giving a sure circulation. The manufacturers point out that it is constructed without extended drums, so there is no chance of them acting as radiators in the cellar and abstracting the heat from the boiler. The surface in direct contact with the fire, it will be noted, is especially large. A particular feature of the boilers is the grate, which is similar to that used in the furnaces of Giblin & Co., which has proved so effective during the past 12 years, and has thus by experience been shown to possess many excellent points. The connections between the sections are iron screw joints, there being no packing used. The boiler is very tastefully decorated, being not overburdened with ornament, but finished in a simple and leading design, which gives a very attractive appearance to the front. The boilers are made in eight sizes, having a capacity in steam of from 600 to 1800 square feet of radiation, and in water of from 1150 to 3500 square feet of radiation.

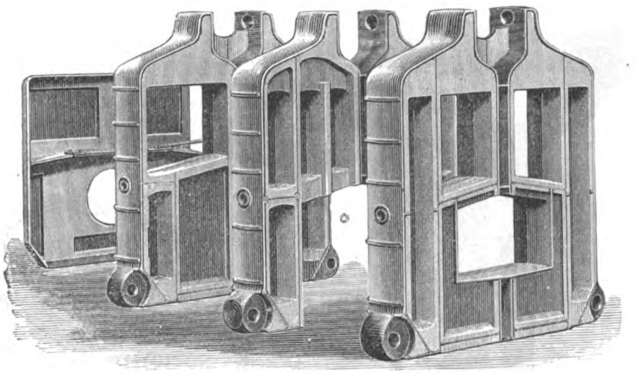
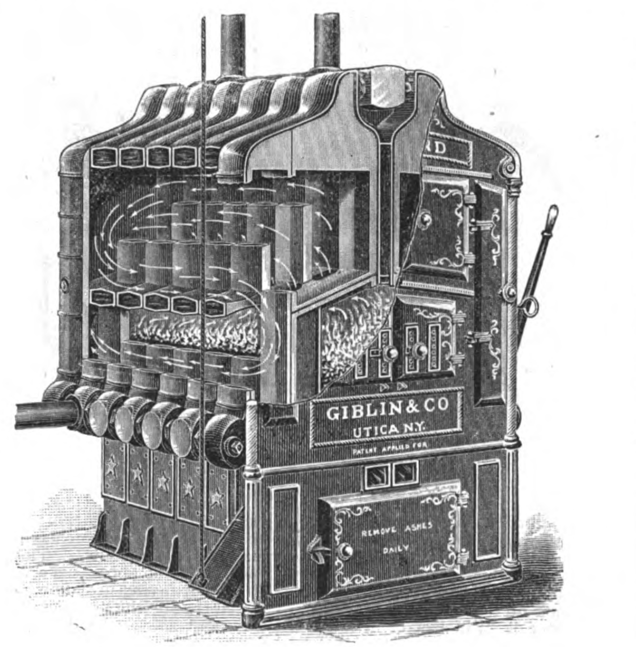


Fig. 5 —General View of Separate Sections.



Novelties.—The Standard Sectional Heating Boiler.—Fig. 4 —Broken View of Hot Water Boiler.

THE EDWARD MILLER CORNICE & ROOFING COMPANY, at Tacoma, Wash., have bought the stock of the Tacoma Cornice, Furnace & Roofing Company, including copper, sheet iron, furnaces, registers and machinery, and removed the same to their enlarged quarters at 940-942 Railroad street.

Standard Nail Puller.

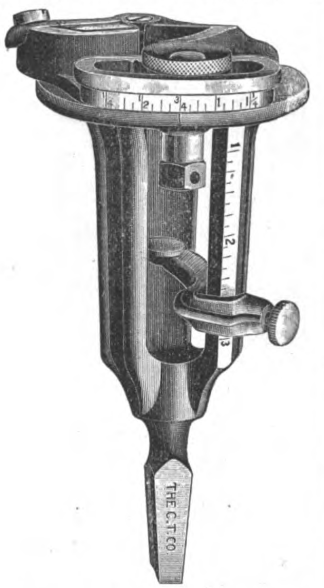
Thos. F. Stevenson of 39 Cortlandt street, New York, is putting on the market the nail puller shown in Fig. 6 of the cuts. The ram and the upright entering the ram are oval in shape, to prevent the puller rolling off the counter or inclined surfaces. The upright and foot are made from special steel, with the points of the grip properly tempered. The foot is held in place on the upright by a large pivotal rivet 15-32 inch in diameter, to keep the grip points in perfect alignment. The spring which operates the foot is let into the upright immediately above the rivet, on the opposite side from that shown in the cut, and can be renewed if broken. Immediately below the ram, though not shown in the cut, is a rubber band 3-16 x 3-16 inch in size, below which the upright is grasped by the hand. It also serves as a buffer to prevent the hand being squeezed between the ram and upright when using the tool. The steel parts of the puller are fire finished, and the ram is japanned, so as not to rust or dull. The manufacturers remark that in addition to drawing fence staples and nails from cases the puller will draw nails from hoops, that the spring cannot break and that it permits an unobstructed view of

Fig 6 —Standard Nail Puller.

the nail. The tool is made in one size only, this being 18 inches in length and weighing 4 pounds.

Adjustable Hollow Auger No. 3.

The Cincinnati Tool Company, Cincinnati, Ohio, have added to their line of hollow augers the tool shown in Fig. 7 of the illustrations. The frame is made of malleable iron, the tool cutting any size tenon from ¼ to 1¼



Novelties - Fig 7.—Adjustable Hollow Auger No. 3.

inches. The scale on the jaw gauges the size of the tenon and the scale on the frame gauges the length of the tenon. The tool is referred to as finely finished, and as being thoroughly tested before leaving the factory. The augers are packed one in a box, with full directions for setting and using.

Roller Bearing Steel Door Hanger.

A roller bearing steel door hanger, put on the market by the McKinney

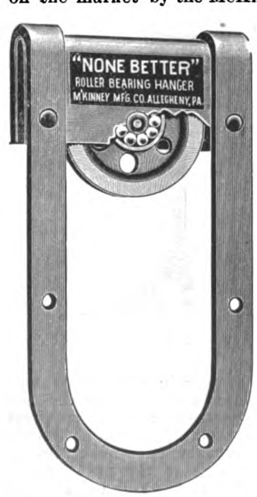


Fig. 8.—Roller Bearing Steel Door Hanger.

Mfg. Company of Allegheny, Pa., is that shown in Fig. 8 of the cuts. The hanger is fully covered and is provided with cold rolled steel axles and anti-friction rollers. The manufacturers claim that the hangers are positively anti-friction on any length of track; that they are strong enough to hang the heaviest doors, and that it is practically impossible for them to get out of order. The point is made that the ability of the hanger to run on any length of track does away with the necessity of carrying a large stock by jobbers.

New No. 6 Band Resawing Machine.

The Egan Company of 221-241 West Front street, Cincinnati, Ohio, are calling the attention of the trade to a new band resawing machine, which they have placed on the market and which is illustrated in Fig. 9 of the cuts.

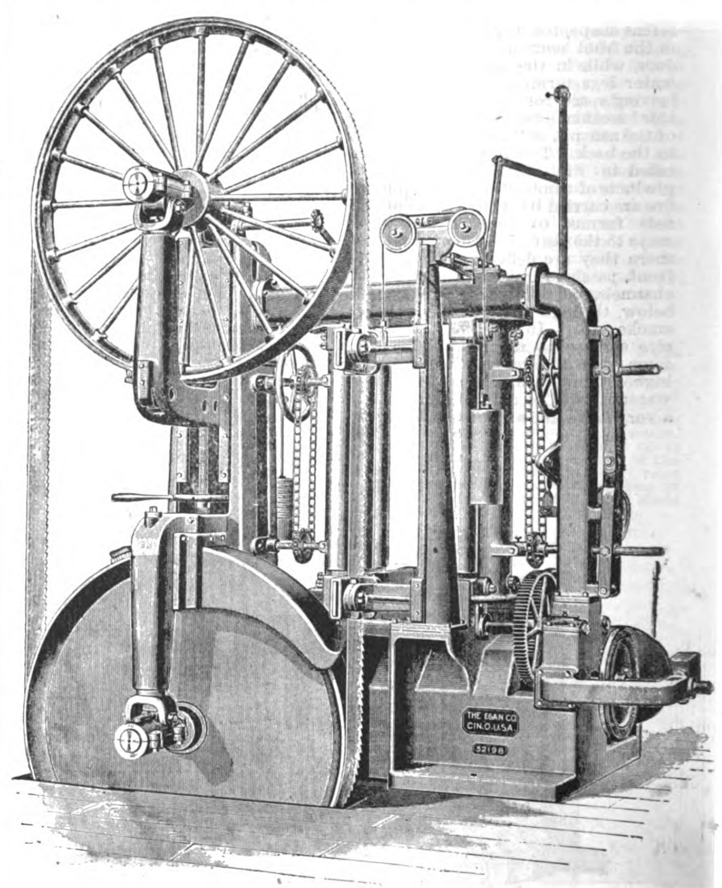
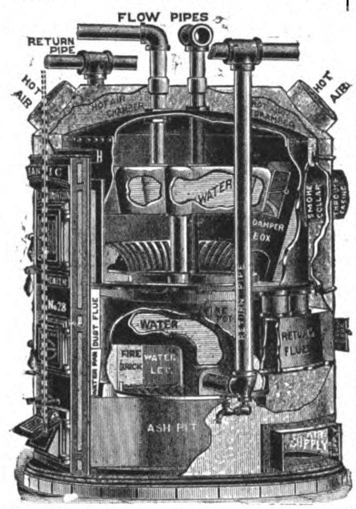


Fig. 9.—New No. 6 Band Resawing Machine.

The machine is adapted for various kinds of work and is referred to as being of great capacity, easily operated and not liable to get out of order. It is stated that the machine will resaw stock up to 48 inches wide and to the center of 24 inches, or will cut a thin sheet or board from the side of a timber 12 inches thick. The wheels of the machine are 80 inches in diameter, the rim and hub of the upper one being cast of solid metal round spokes of steel, placed in such a position as to insure the greatest amount of strength and at the same time give it lightness. The lower wheel is cast solid, that is, with a web instead of spokes, thus increasing the weight and momentum and causing less circulation of air, so that friction is reduced and allows the dust to be removed more readily. The feed consists of two pairs of rolls of large diameter, each pair being operated independently of the other. The graduated feed at all times is under the control of the operator and enables him to increase or diminish it by moving one lever. The patent roller guides of new design are referred to as being very effective in operation, the upper one being connected to an upright bracket moving up and down on planed ways and counterbalanced by a suitable weight. The driving pulley is 42 inches in diameter and should make 355 revolutions per minute.

The Atlantic Combination and Ventilating Heater.

The Portland Stove Foundry Company, Portland, Maine, are offering to the trade the Atlantic hot water and warm air combination ventilating heater, in which they have recently made improvements. The general features of the apparatus are shown in the accompanying broken view, Fig. 10, which reveals the location of the water ways and shows the direction of the products of combustion. The brick lining extends from the under side of the water ring to the grate, so that a low fire can be easily and continuously kept. The water surfaces are all vertical and self cleaning and so arranged, it is said, as to give exceptional heating capacity. The flow and return pipes are 2½ inches in size, so as to give easy circulation and facilitate piping. The hot air supply is secured by the heated outer walls inside the galvanized casing. It is pointed out that the smoke pipe collar and feed door frame project through the casing and thus prevent the escape of gas into the hot air chamber. It will be noticed that the products of combustion entirely surround the coils, which are thus exposed to a high heat as well as to the direct rays of the fire. The fire pot ring carries a large amount of heating surface in the hottest part of the fire. A dust flue is provided to carry away all floating dust while cleaning the grate. Particular attention is directed to the large size of the steel radiator, which gives space in which to use a great amount of water



Novelties—Fig. 10.—Broken View of Atlantic Combination and Ventilating Heater, Showing Interior Construction.

heating surface. The makers claim that the indirect draft holds the heat in the combustion chamber and about the water sections, and to this fact they ascribe, in a large measure, its great economy. The heaters are made with 20, 24 and 28 inch fire pot, and are rated to carry from 175 to 1250 feet of radiation, though we are advised that one heater is now in use to which are attached 25 radiators carrying over 1500 feet of heating surface and giving very satisfactory results.

The D. & M. Cast Enameled Water Closet.

The trade will be interested in the illustration, Fig. 11, which presents

Fig 11.—The D. & M. Cast Enameled Water Closet.

a general view of a washout closet made by Dawes & Myler, New Brighton, Pa. The special feature of this apparatus is the material of which it is made, it being of cast iron and enameled inside and outside. The manufacturers point out that the closet has a number of advantages compared with earthenware, which the trade will generally appreciate. The closets are durable and there is no danger of cracking on account of freezing or by reason of the settling of the floors, which results in cracking the earthenware closets at the inlet.

TRADE NOTES.

THE STORM MFG. COMPANY, Newark, N. J., have issued a catalogue illustrating the New York safety dumb waiter and Eclipse Dumb waiter checks; also No. 400 and Manhattan dumb waiters, Humphrey hand elevator, No. 40 hand power elevator, carriage, sidewalk and passenger elevators, &c.

THE F. A. REQUARTH COMPANY of Dayton, Ohio, send us the customary card calendar for the month of September, printed and arranged in the same form as those which have previously been distributed to cover the earlier months of the year.

THE ARTIST-ARTISAN INSTITUTE, 140 West Twenty-third street, New York, will reopen its classes on October 1.

NOTWITHSTANDING the dullness which just now pervades all trades from the largest manufacturer down to the smallest retailer, the sheet metal firm of Rasner & Dinger, Pittsburgh, Pa., keep busily occupied on sheet copper and galvanized iron. Their building, at the corner of Second avenue and Ferry street, is admirably adapted for their business. It is a handsome brick structure, 80 x 50 feet in plan, and the company kept a strip of land, 20 feet wide, along the whole depth of the building and thus secured to every floor ample light on three sides. In a city as dark as Pittsburgh sometimes is, this provision for plenty of daylight is particularly valuable. The basement of the building is used for storage purposes, and there also is the boiler and horizontal engine for running the elevator an operating the power machinery on the upper floors. On the first floor is the office, the remaining space being devoted to storage and shipping purposes. On the second floor is the drafting room and the machinery, comprising a number of Vulcan special tools for hammering, bending and cutting, which permit the work to be done at the least expense of time and energy. Above this floor is the soldering department and on the top floor is the pipe department, communication with the different floors being had by means of an elevator of very large size, which allows them to carry all bulky architectural sheet metal work.

THE CONTRACT for the new copper pitched roof for the buildings of the San Francisco Orphan Asylum has been awarded to the Pacific Sheet Metal Works, San Francisco, Cal., for $3223. It is said that it will be the largest copper roof in the city.

THE YOUNGSTOWN IRON & ROOFING COMPANY, Youngstown, Ohio, are working on a heavy contract for Union metal corner bead for plaster corners for F. L. Union of Boston. The company are adding a galvanizing plant to their works at Haselton.

"WARNER LOCKS" is the title which appears in embossed letters upon dark green covers of a neat catalogue sent out by the Warner Lock Company, Manhattan Building, Chicago, Ill. The printing of the pamphlet is in two colors, the cuts occupying the right hand pages and the text the facing pages. The lines of goods shown cover rim night latches, the Standard, Model and burglar proof mortise locks and burglar proof rim dead locks. The Warner locks are referred to as being simple in construction, durable in operation and made with the same precision as high grade gun locks. They are turned out by expensive machinery and every part is uniform. They are constructed of the best quality of polished cold rolled steel and are referred to as a "radical advance in lock construction." Different sizes are turned out in order to meet varying requirements, and the goods are packed in convenient boxes to facilitate handling. Reference is made in the pamphlet to escutcheons and knobs, of which several varieties are shown. The make up of the pamphlet is exceedingly neat, and carpenters and builders will probably find it valuable as a work of reference.

THE ROEBLING SYSTEM of fire proofing is briefly described in a neat little pamphlet issued by John A. Roebling's Sons Company, 117 to 119 Liberty street, New York City, special attention being given to the results of tests and the names of a number of prominent buildings in which the Roebling system is used.

ALL DEPARTMENTS of the Wheeling Corrugating Company's plant, at Wheeling, West Va., are being operated, and a large quantity of corrugated iron and pressed ceilings is being turned out. The new addition to the works is very nearly completed.

WE ARE ADVISED by the Colliery Engineer Company, Scranton, Pa., proprietors of the International Correspondence Schools, that the fire in the Coal Exchange Building, at Scranton, which partially destroyed their business offices, on August 30, has not caused any interruption in the business of the schools, and students are being enrolled and instructed as usual. Fortunately, the company's printing plant was in another building, and they had reserves of all instruction and question papers, drawing plates and other supplies and stationery used in the schools in still another building, so that their business will not be seriously interfered with. Moreover, the records of students and important files were kept in safes and have been preserved. New quarters have been secured for the schools on the eighth, ninth and tenth floors of the fire proof Mears Building in Scranton, where the full force of instructors were at work within three days after the fire. The new offices are even more convenient and commodious than those which were in use before the fire, and the company expect to occupy them until the completion of their own buildings, now being erected on Wyoming avenue, Scranton.

THE SLATE ROOFERS of Pittsburgh, Braddock and Beaver Valley, Pa., have organized an association known as the Pittsburgh Slate Roofers' Association, of which Scott A. White of Pittsburgh is the secretary.

F. P. BURCAW of 2529 Showaker street, Philadelphia, Pa., has issued a descriptive circular and price-list of the Burcaw concave lock and positive drop bottom weather strips which he manufactures. The goods are described in a clear and comprehensive manner and illustrations are presented showing their construction and operation. Mr. Burcaw states that as the strips have no rubber or felt about them to get hard they are not affected by salt air, and they can, therefore, be used with entire satisfaction in buildings near the seashore. The last page of the circular is devoted to a price-list of the goods and terms under which they are sold. The concave strips are made in poplar, white pine and yellow pine, all stained ready for use. The bottom strips are painted brown. A complete set of the weather strips will, we understand, be sent on receipt of 75 cents to any address.

A SMALL PAMPHLET entitled "On the Roof" is issued by William Connors, Troy, N. Y., in the interests of his American Seal roof paints and American Seal roof cement.

JOSEPH F. FORDERER announces that the Forderer Cornice Works have been removed to the Pacific Metal Works Building, 8 and 10 Natoma street, San Francisco, Cal., where in his new quarters he will maintain the high standard of the old works in the manufacture of architectural sheet metal cornices, copper and zinc ornaments, and tile, slate and metal roofing.

THE AVERY TRADE SCHOOL, in Allegheny, Pa., will open October 1, with Thomas Swan in charge as principal. Wood working, masonry, plumbing and painting will be taught in the school.

OTIS BROTHERS & CO., 38 Park row, New York City, are about erecting on Atherton street, Yonkers, N. Y., a brick structure 30 x 209 feet in size, which will be used as a foundry cleaning room. Its cost is placed at $10,000.

CLAYTON BROS. of Bristol, Conn., have just put on the market what they call the Oscillator door bell. The construction of this bell is such that electrical effects are reproduced by an exceedingly simple mechanical movement, 17 consecutive strokes being obtained to each half turn of the lever handle, which can be completely revolved either way. There are no springs and very little to get out of order. The gongs have a clear, resonant tone and the escutcheons are ornamental.

E. T. BARNUM WIRE & IRON WORKS, Detroit, Mich., have just completed another large contract for steel jail cells for the county of Archulta, Col. The firm make a specialty of jail and prison work in connection with their extensive line of builders' iron and wire work, counter railing, grilles, iron fences, vault doors, stable fixtures, &c. Illustrated catalogues showing the different lines are issued to the trade.

CONNECTICUT VALLEY MFG. COMPANY, Centerbrook, Conn., are putting on the market an anti-rust blue twist Jennings bit, which they refer to as superior in quality to the ordinary Jennings pattern bits. It is said to be meeting with favor from the trade.

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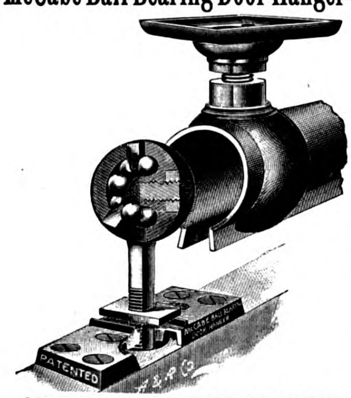
We issue many price-lists and catalogues; mention which one you want.

McCabe Ball Bearing Door Hanger.



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NOVEMBER, 1896.

Nine Months' Building Operations.

It will probably not surprise those who have closely followed the course of events in local building matters to learn that the amount of new work projected in New York City during the first nine months of the present year was not equal to that of the corresponding period of a year ago, although the total, both as regards the number of buildings projected and their estimated cost, is far ahead of the same periods of 1893 and 1894. This large gain may, in part, be explained by the number of costly office buildings which have lately been put up, and also by the notable activity in the district lying just above the Harlem River. The cheapness of labor and materials during the past year or two has also played its part in the increased activity which has resulted, and which has helped to make profitable such undertakings as the erection of the towering office buildings which are to be found either completed or now under way in the lower portions of the city. Taking the figures covering the first nine months of the present year, it is found that 2558 buildings were projected, estimated to cost $61,386,775, as against 3131 buildings, estimated to cost $69,663,417, for the corresponding period of 1895, and 1873 buildings, estimated to cost $38,665,-522, for the first nine months of 1894. Practically one-half the estimated cost of the buildings projected this year, or to be exact $30,223,005, represents office buildings, hotels, churches, stores, &c., for which there were filed with the Bureau of Buildings plans for 241. There were 957 flats and tenements projected, estimated to cost $20,075,250, and 999 private dwellings, involving an outlay of $7,046,495. An interesting feature in connection with the figures covering the period named is that out of a total of 2558 buildings projected, 1283 were designed to be erected in the Twenty-third and Twenty-fourth wards of the city. Of this number 423 were flats and tenements and 642 were private dwellings, these figures showing in a marked degree the rapidity with which the district above the Harlem River is being built up.

American Institute of Architects.

As the forms of this issue of the paper are being made ready for the press the American Institute of Architects are holding their thirtieth annual convention in the rooms of the Engineering Association of the South, at Nashville, Tenn. The first session was held on Tuesday, October 20, the convention being called to order by George B. Post, the well-known architect, of New York City. The programme shows an interesting order of business, one of the features being a series of papers, for which arrangements were made by the Committee on Education, discussing "The Influence of Steel Construction and of Plate Glass on the Development of Modern Style." The authors of these papers are prominent architects of the East and West, and a discussion of the subject in the way they are qualified to handle it cannot fail to prove both interesting and instructive. One of the other papers bears on the subject of "National Architecture," by W. M. Aiken, Supervising Architect, United States Treasury Department. The morning and afternoon sessions were continuous with the exception of a short recess for luncheon. On Tuesday evening there was a reception complimentary to the American Institute of Architects, and on Thursday evening a banquet was tendered at the Maxwell House. Thursday afternoon was reserved for a visit to the Tennessee Centennial and Exposition grounds and other places of interest.

Opening of the Trade Schools.

What may be called the trade school season is now fairly under way. Most of the institutions of this character in this part of the country have again resumed operations, and the reports we receive all point to a very promising season of work in prospect for the fall and winter. The enrollments of pupils are generally well up to the average in point of numbers, notwithstanding the hard times which have befallen business in general. The carpentry classes seem, as usual, to attract a large share of patronage. As the immense advantages offered by these classes to young men desirous of entering or already engaged in the building trades become more fully appreciated, the list of applicants for instruction grows and swells yearly. The only wonder is that more classes in carpentry have not been started. Every large center of population could easily support at least one such institution, and no doubt the time will come when such will be the case. Meanwhile an increasing number of young men are coming East, often at great expense, from every part of the United States and Canada, to partake of the benefits which they find in the trade schools here and which they have no means of securing anywhere near their homes.

Central Block Electric Lighting.

The development of electric light and power plants, confining their operations to but one city block, is an interesting feature in this field. The great central stations, established for the purpose of furnishing electrical energy to an entire city or to large sections of a city, have not always proved satisfactory to their customers. The cost of service is often so heavy as to be almost prohibitory to those who would like to use electricity, but are obliged to study economy. The profits made by electric generating plants have caused competitive projects to be contemplated, but it is not always easy to secure a municipal franchise, which must be granted to enable streets to be crossed, either overhead or underground. In the early days of electric lighting it was also necessary to install quite a large plant in order to secure satisfactory mechanical and commercial results. This formed another safeguard to the large central supply stations. Gas engines are now being constructed of sufficient power and speed to operate electric generators successfully. Their adaptation to this service has opened up a special field in which the experiments thus far made have proved quite captivating to those who are acquainted with the financial results. Electric plants have been installed, depending on gas engines, which not only supplied much cheaper and greatly improved service to a comparatively small establishment than had previously been furnished by a central station, but developed sufficient surplus energy to enable service to be supplied to adjoining buildings, thus still further reducing the cost.

Advantages of a Gas Engine.

As a gas engine requires no steam boiler, no space for the storage of coal, no handling of ashes and no expert engineer, its installation and operation present important advantages over a steam engine rated at the same capacity, especially in the heart of a city. Gas is now being furnished at a low price almost everywhere, and its cost is steadily being lowered with the improvement of gas making appliances and processes. Those who introduce an electric plant of this kind to furnish light and power to themselves and their neighbors in the same block are able to operate without securing a franchise or permission from a city council, as they cross no streets and perhaps expose no wires on the outside of buildings. A very successful installation of this kind is in operation in Chicago in immediate connection with a restaurant. The gas engine not only furnishes power for an electric light plant in this and adjoining buildings, but also operates an ammonia refrigerating apparatus, which may be considered as utilizing surplus motive power. The satisfactory results attending this and other ventures of a similar character are causing greater achievements to be projected on the same lines.

Fire Proofing Floor Openings.

In estimating risk in a fire proof building used for purposes other than offices, such as stores and warehouses, one of the most important items to be considered is the manner in which the floor openings are to be protected from each floor stock in case of fire. In these openings may be included freight or passenger elevator shafts and stairway or hallway shafts.

In buildings used for storage or manufacturing, where little attention is paid to finish of doors, trim, &c., the usual standard metal clad door and heavy wire glass windows may be used with iron jambs and lintels.

In a building in which many people are constantly moving in and out, and where taste and design are generally considered more important than protection from fire, the difficulty arises of providing proper protection.

If the hallway shaft, which may contain stairs and elevators uninclosed in fire proof shafts, is separated from each floor stock or main area by fire proof partitions with standard doors, lintels, jambs and windows, a considerable reduction may be made in charging for internal exposure. The question then arises whether this reduction in insurance would pay for the outlay necessary in putting in these doors and this trim. In most cases, says Oliver H. P. La Farge, it would pay ; because when once done the reduction is permanent. But there again arises the question, how can this be done without spoling the general refinement of design ? There seems to be a field of success for some one who will invent an absolutely fire proof material for trim and doors, including jamb, lintels, &c., which may be suitable in appearance and easily worked.

In the new building on the corner of Union Square and Seventeenth street, New York City, a new scheme has been evolved which has apparently met with the necessary approval of the insurance companies without losing anything particularly in its treatment of finish or taste in its designs.

Over each door and transom window is placed a wooden box of some design and molding. In this box is a rolling steel shutter which travels in a groove in the jamb of the door. This box is so arranged that it forms part of the general design of the door or window frame, and apparently conceals the use for which it is intended. Back of this box, extending down both sides of the door or window, between the trim and the frame studding, is placed sheet iron in strips well fastened to the studding. At night these shutters are pulled down over doors and windows, effectively closing each floor from communication with the hallway, thus shutting off the other floors in case of fire in that one.

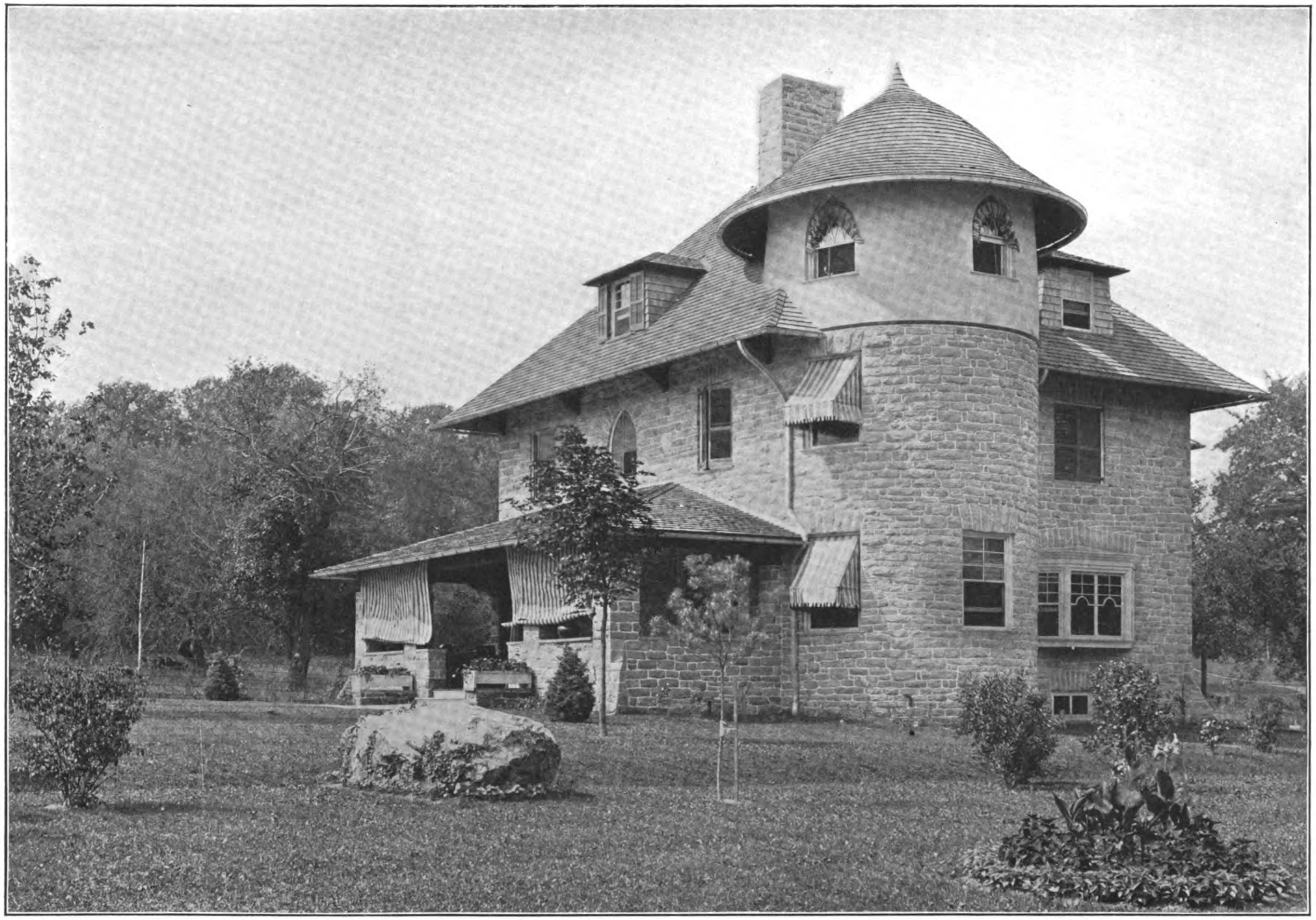
The scheme of shutters over internal openings is not particularly new, but the fact of concealing them so that their unsightliness may not be a part of the general finish is at least unusual. Of course, this has not the general advantage of an absolutely fire proof door, window and shaft. Yet if a guarantee is given that such openings are closed at night, it is quite natural to suppose that this would be an effective cut off for any fire, as long as was necessary to gain control over it.

Use of Damp Courses.

If proper steps are taken when a foundation is laid which is intended to carry a brick or stone superstructure, there will never be any dampness in the walls above the lower joists. A " damp course " of slate should be laid in the wall across the whole thickness, under the first tier of joists, and should be well bedded in with neat Portland cement. If slate cannot be obtained a thick coat of asphalt mortar may be used on top of the stone work, on which the brick work may start, and if this is well done the asphalt will prevent dampness from rising in the walls. If neither slate nor asphalt is obtainable, then it will be well to finish the top of the wall with a coat of neat Portland cement, and to lay the first two or three courses of bricks in cement mortar. This latter method is by no means a sure success, but, if adopted, it will do much toward keeping the upper walls dry. We have known sheet lead, says a writer in one of our exchanges, to be used on walls as a damp arrester, and it was a decided success, but costly, and not by any means lasting. It is said that just below the line of earth around the base of the Cathedral of Cologne sheet copper was laid on the walls for the purpose—it is supposed—of preventing dampness ascending the walls, which it has effectually done, and in the joints under the massive towers of the Cathedral where the copper was placed, the weight above has settled on the copper with such a pressure that the metal has actually oozed out of the joints and formed a solid copper bead which runs all round the foot of the towers, inside and out. No brick or stone building should be erected, particularly in the rural districts, without being fully protected by a " damp course."

Care in Piling Lumber.

Much carelessness and consequently much loss are connected with the piling of rough lumber preparatory to being used in a building. It is often the case that joists, studding, rafters, roof boarding and rough sheeting are thrown off a wagon or sleigh pell-mell without any attempt made to prevent breaking, splitting or warping, and left in an open pile, exposed to the weather, and perhaps in such a position that it would be trampled over by the workmen or others. The breaking of a joist, a stud or rafter, or the splitting of a board, or the warping or twisting of any of them out of shape, is loss that will be felt at the wind up of the work, and the multiplication of these breaks, splits and twists often make invisible gaps in the profits, and the shrewd contractor will insist on having all his stuff properly and carefully piled in the grounds, and covered with rough boards to keep out the weather, or will otherwise protect his materials. More money is made by giving prompt attention to little matters of this sort than in " rushing " the work in undue haste. A careful workman must have time to make good work, and a careful workman will, as a rule, save to his employer in material whatever it costs in extra time to do the work, besides producing work that brings honor to employer and workman.



STONE RESIDENCE OF ROBERT C. HEYL, ESQ., AT OVERBROOK, PA.

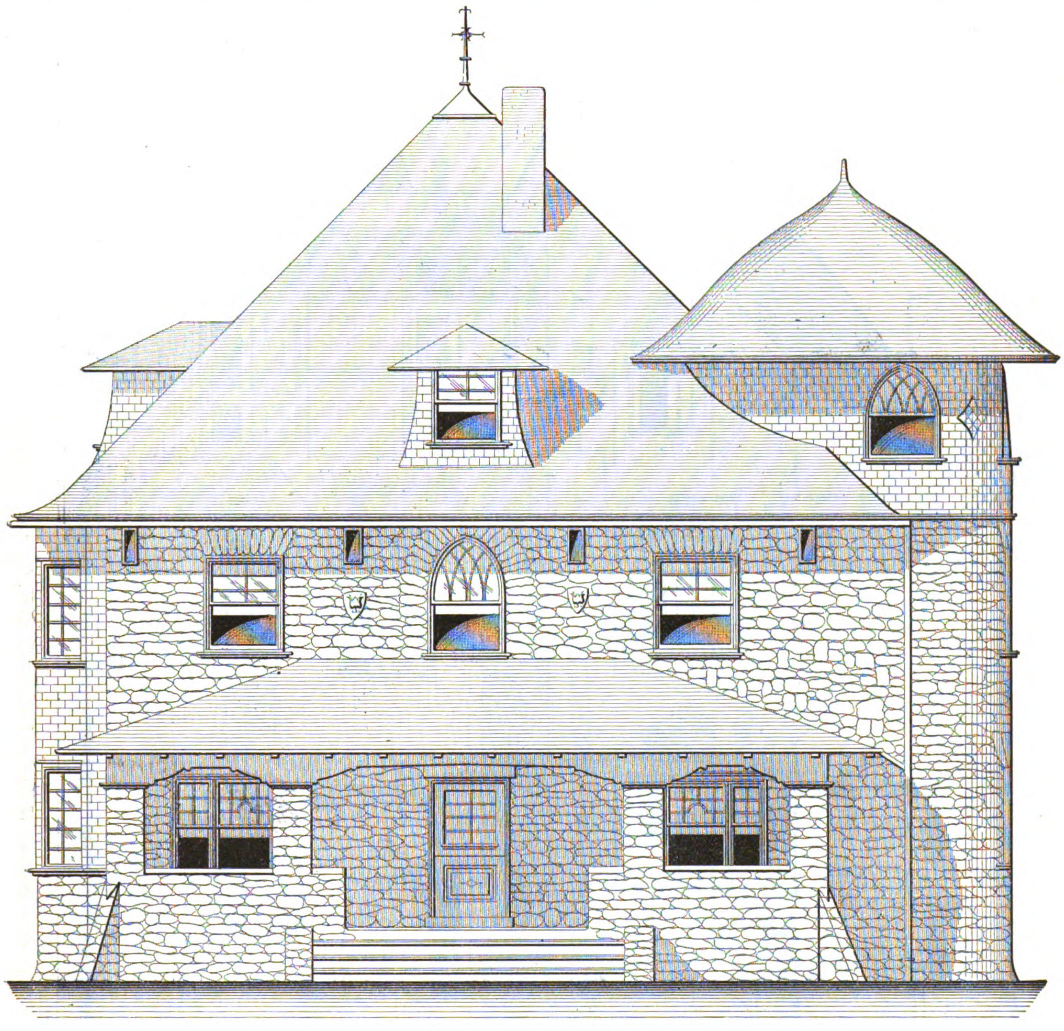
KEEN & MEAD, Architects. WENDELL & SMITH, Builders.

Supplement Carpentry and Building, November, 1896.

STONE RESIDENCE AT OVERBROOK, PA.

SOME years ago we mentioned at considerable length in these columns a notable building operation carried out by a firm of enterprising builders at Wayne and St. Davids, located on the main line of the Pennsylvania Railroad, a half hour's ride from the Quaker City. The same enterprising builders, Wendell & Smith, have since conducted operations on a similar plan at Overbrook, another beautiful suburb of Philadelphia, located pages give the reader an excellent idea of the general arrangement of the rooms and the construction employed. An inspection of the half-tone engraving shows that the house is constructed of rough faced stone with trimmings of Indiana limestone, while the roofs are covered with shingles.

Leaving the front porch the visitor enters a spacious hall, at the end of which are the main stairs, and from which the principal rooms on the first floor may be

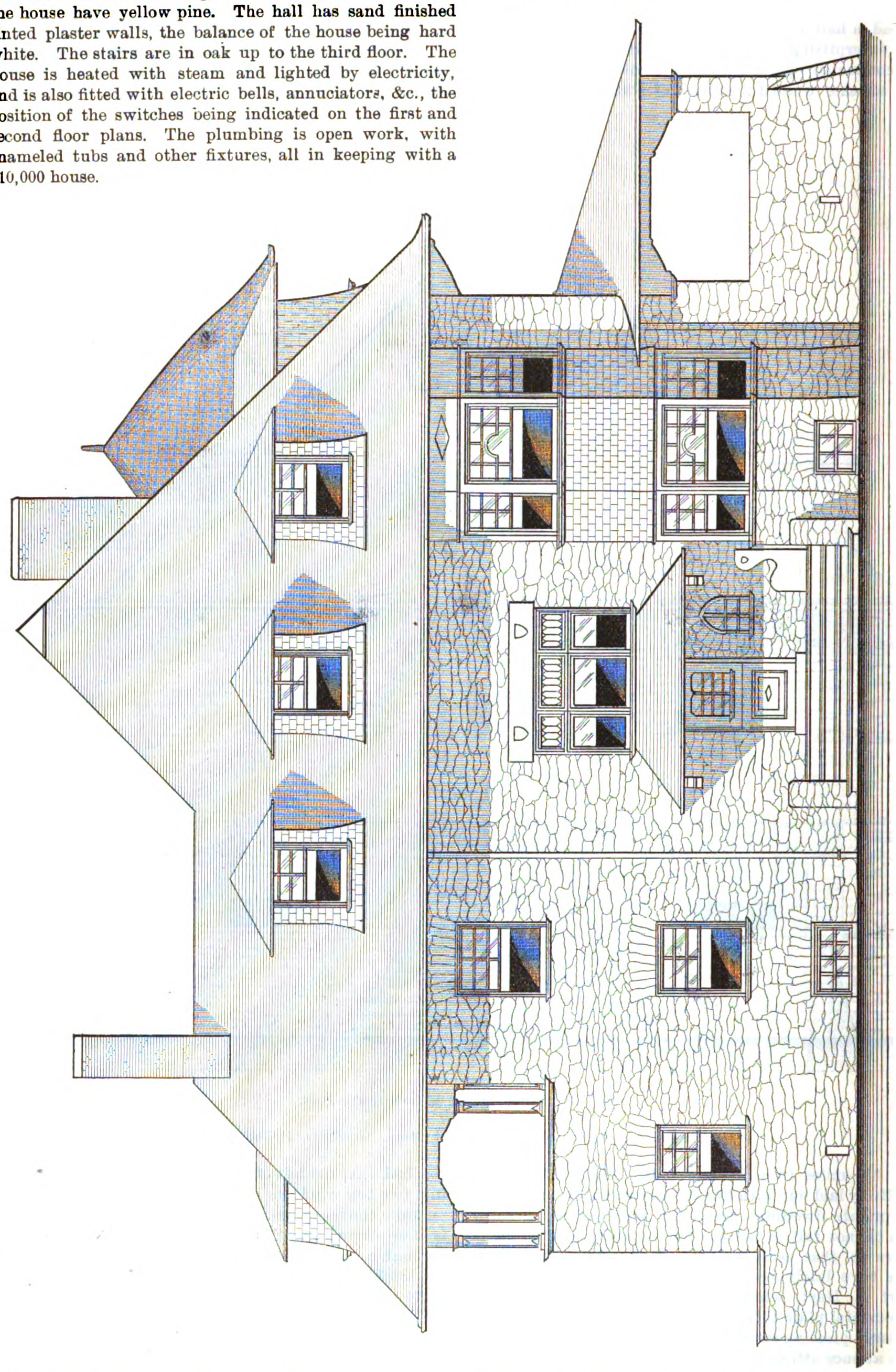


Front Elevation.—Scale, 1/8 Inch to the Foot.

Stone Residence at Overbrook, Pa.—Keen & Mead, Architects, Philadelphia, Pa.

about 5½ miles from its city hall. The tract has been beautifully laid out with fine drives and walks, and dotted with private dwellings possessing architectural features which cannot fail to attract the immediate attention of visitors to that section. One of the many residences which have lately been put up in Overbrook is that of Robert C. Heyl, which constitutes the basis of our supplemental plate this month. The design is treated in a quaintly pleasing manner, and possesses an individuality which at once attracts the eye. The striking features of the exterior are the round tower at the corner, the quaint roof effects, the many bay and dormer windows and the stone porch at the front entrance. The half-tone plate, reproduced directly from a photograph of the building, shows many of its external features, while the floor plans, elevations and details presented upon this and the following reached. At the left of the hall is a reception room, having two bay windows projecting at the front and side; opposite the reception room is the library, and beyond this is the dining room, communicating with the kitchen through a conveniently arranged pantry. In the rear of the kitchen is the laundry, provided with stationary tubs, store closet and other conveniences. A side entrance at the left side of the house enables one to reach the main stairs and the kitchen, from that point, without the necessity of passing through any of the other rooms. On the second floor are four sleeping rooms provided with ample closets and a bathroom communicating directly with the two sleeping rooms at the front of the house, and easily accessible from other points on that floor. At the rear is a loggia, a detail of which will be found on another page. The attic is divided into three bedrooms, a storeroom and a billiard room, the latter occupying the tower corner of the house.

The principal rooms on the first floor are finished in oak, while those on the second and third floors are finished in white pine, painted. The principal rooms on the first floor have oak flooring, while those of the balance of the house have yellow pine. The hall has sand finished tinted plaster walls, the balance of the house being hard white. The stairs are in oak up to the third floor. The house is heated with steam and lighted by electricity, and is also fitted with electric bells, annuciators, &c., the position of the switches being indicated on the first and second floor plans. The plumbing is open work, with enameled tubs and other fixtures, all in keeping with a $10,000 house.

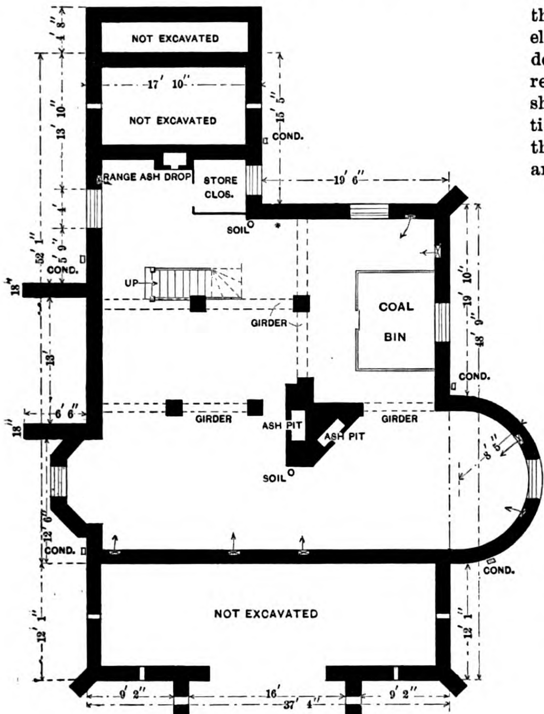


Stone Residence at Overbrook, Pa.—Side (Left) Elevation.—Scale, ⅛ Inch to the Foot.

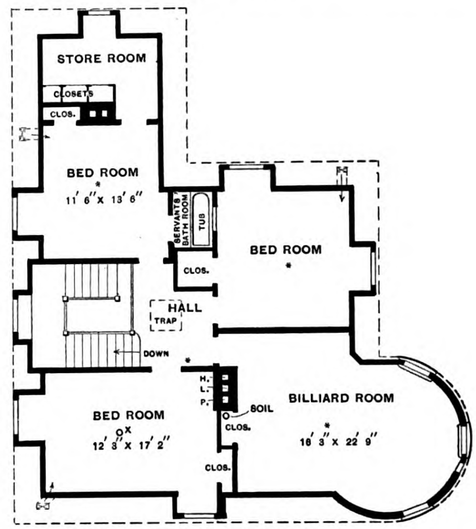
The drawings from which this stone residence was erected were prepared by Keen & Mead, architects, of Thirteenth and Walnut streets, Philadelphia, Pa., the builders being Wendell & Smith, with office at Overbrook, Pa.

Slate Cisterns.

The best of all material out of which cisterns can be made is undoubtedly slate. Lead cisterns are now practically out of date, and it has frequently happened that when worn out they have not been renewed, but have been replaced by a tinkered and botched arrangement called a galvanized iron cistern, which has been bought at the price of the old lead. This is quite unsuitable for storage purposes ; it very quickly perishes, and the water is then unfit for domestic purposes. Slate cisterns are cleaner than any other, except, of course, new earthenware and stoneware cisterns ; but these will not stand the frost so well as slate, and it has yet to be proved that they will not crack at the connections in the same way as baths often do. The greatest fault we have heard found with slate cisterns, says a writer in the *Stonemason*, is that they are jointed with red lead, and there is nothing else that will make a good job ; but any one who condemns slate cisterns on account of the small surface of red lead presented to the action of water in favor of the sheet lead cistern, cannot have fully considered the question. Of the two evils, the small surface of red lead at the edges of the slate cistern is by far the least, and as they are practically everlasting they must be much better than lead ones. We have seen slate cisterns perfectly good, and in daily use, which have been fixed in place more



Foundation.



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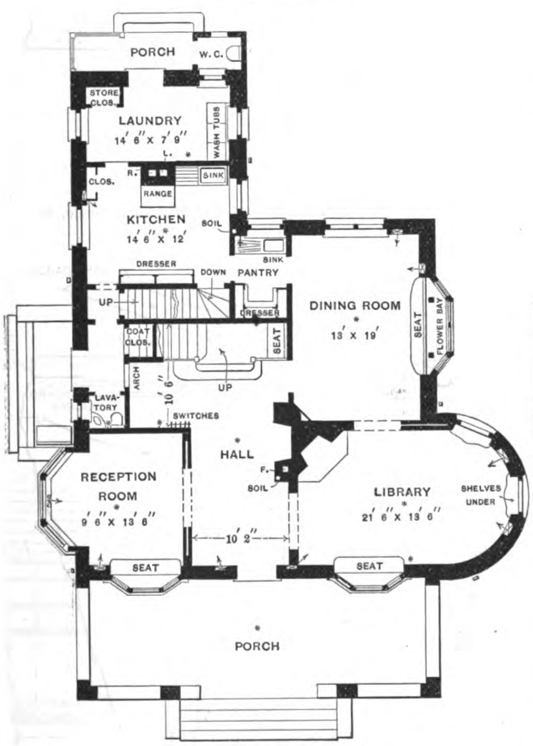
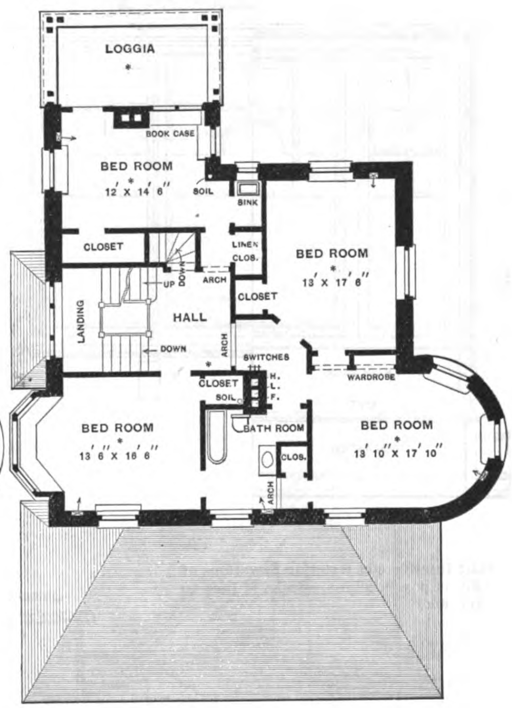
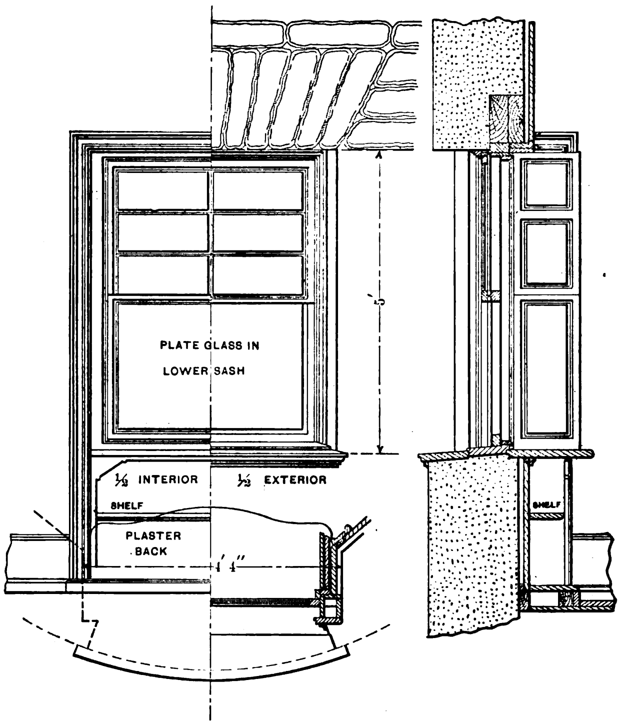


First Floor.

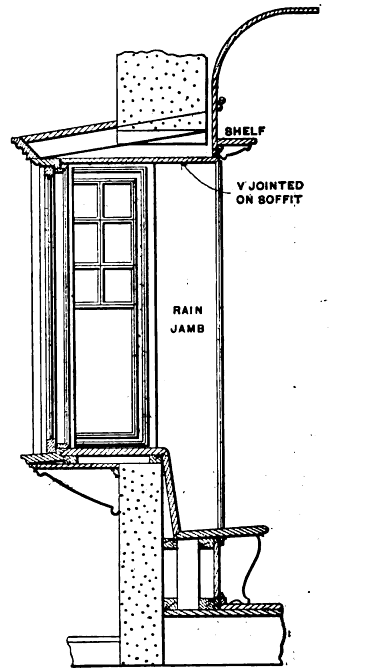


Second Floor.

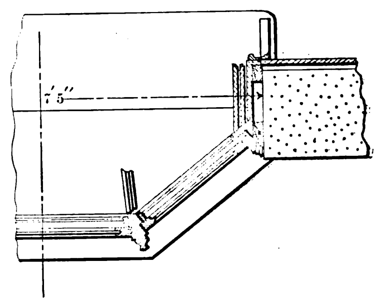
Stone Residence at Overbrook, Pa.—Floor Plans.—Scale, 1-16 *Inch to the Foot.*



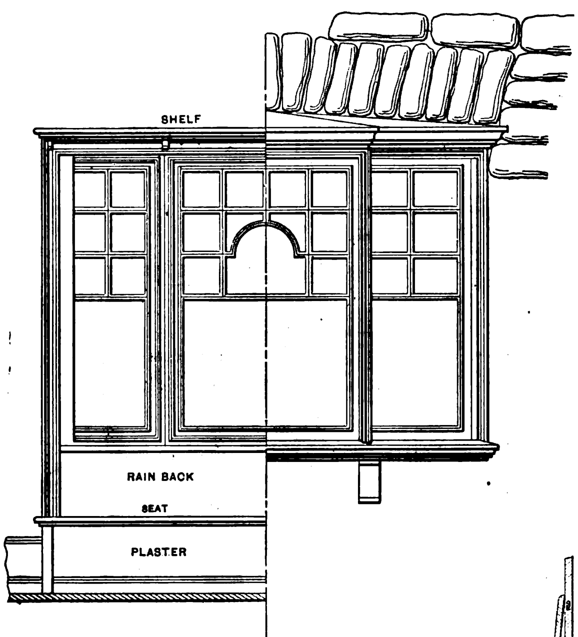
Details of First Story Windows in Tower.—Scale, ⅜ Inch to the Foot.



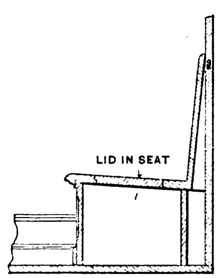
Section of Front Bay Windows.—Scale, ⅜ Inch to the Foot.



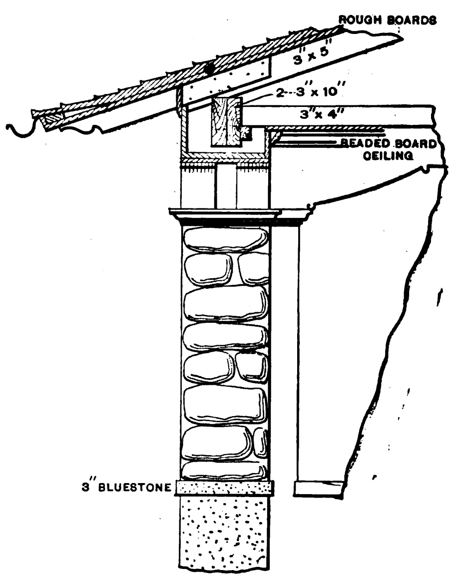
Half Plan of Front Bay Windows.—Scale, ⅜ Inch to the Foot.



Half Interior and Exterior Elevations of Front Bay Windows.—Scale, ⅜ Inch to the Foot.

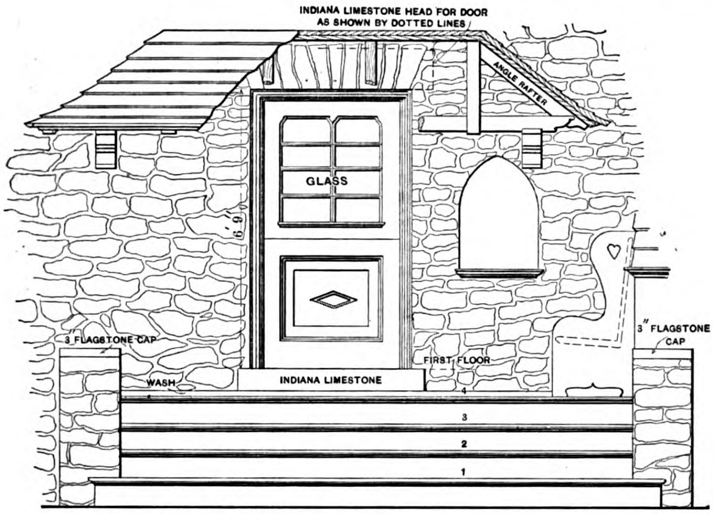


Detail of Seat on Stair Landing.—Scale, ½ Inch to the Foot.

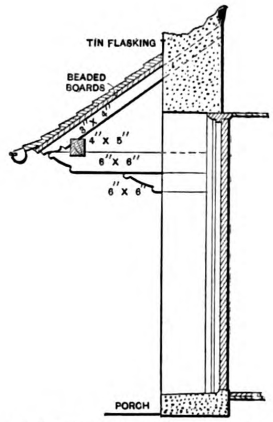


Detail of Front Porch Cornice.—Scale, ⅜ Inch to the Foot.

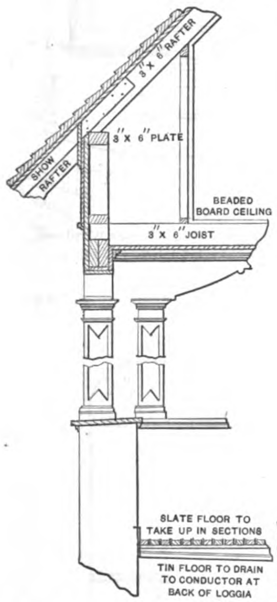
Miscellaneous Details of Stone Residence at Overbrock, Pa.



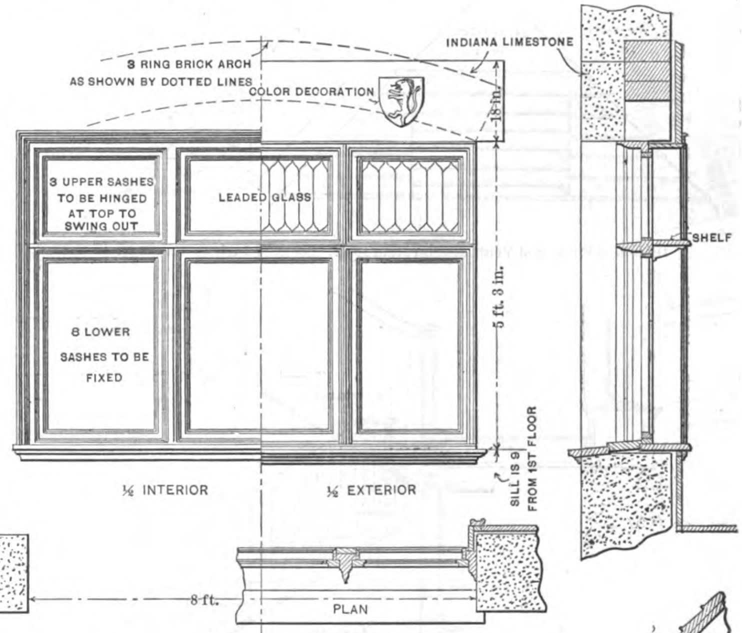
Detail of Left Side Entrance.—Scale, ¼ Inch to the Foot.



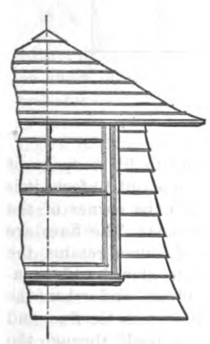
Detail of Porch at Left Side Entrance.—Scale, ¼ Inch to the Foot.



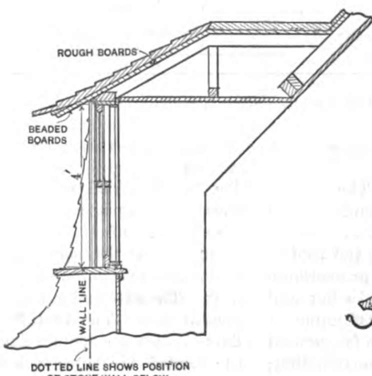
Detail of Second Story Rear Loggia.
—Scale, ¼ Inch to the Foot.



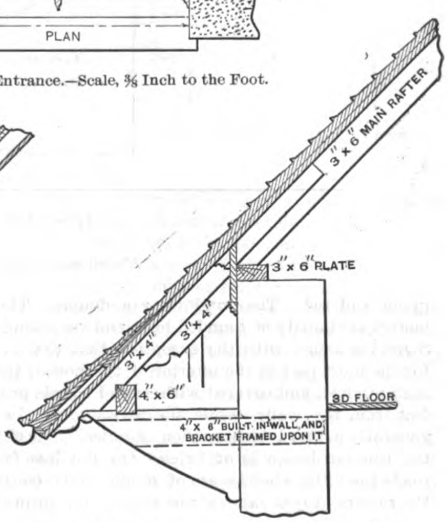
Details of Window over Left Side Entrance.—Scale, ⅜ Inch to the Foot.



Partial Elevation of Dormer Window.—Scale, ¼ Inch to the Foot.



Section of Dormer Window.—Scale, ¼ Inch to the Foot.



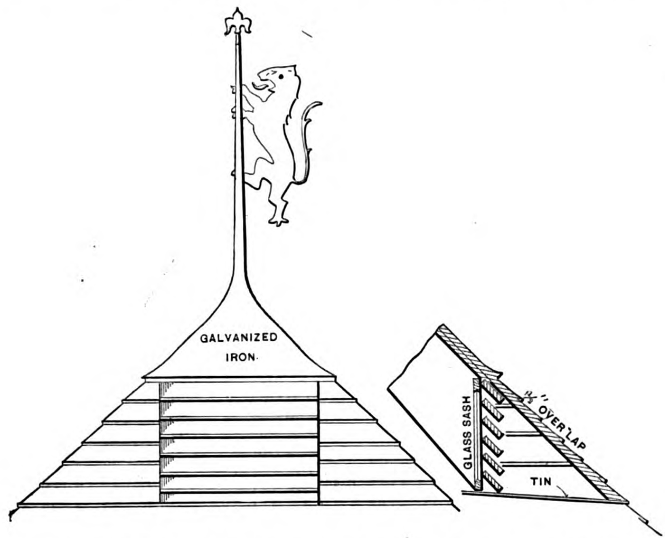
Detail of Main Cornice.—Scale, ⅜ Inch to the Foot.

Miscellaneous Details of Stone Residence at Overbrook, Pa.

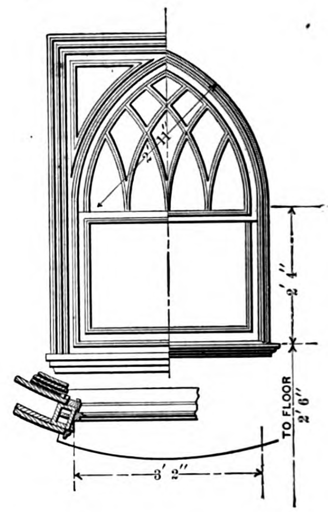
than 70 years, and it is quite certain that out of no other material can a cistern be made which will last as long and keep as sweet and clean as one which is made of slate.

Russian Houses.

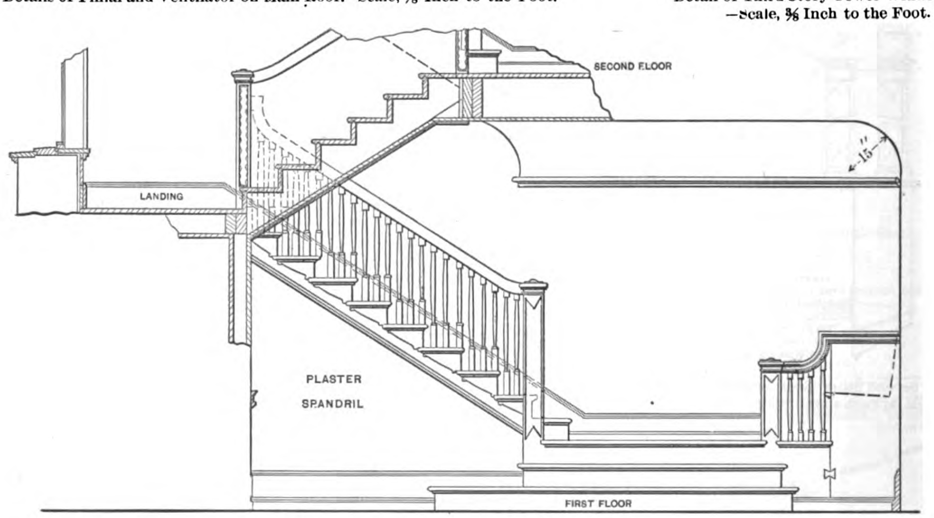
The town architecture of Russian houses, both in its effect and arrangement, resembles the architecture of Italian and French houses, except that the roofs are covered with sheet iron painted with vivid colors, mostly green and red. The windows are double. The village houses are mostly of rounded logs, and very similar to the Swiss log house, with the exception that the staircase is for the most part in the interior of the house; the roof is high pitched, and covered with sawed boards projecting 6 feet from the walls, while the Swiss roofs are flat and generally covered with wooden shingles. The chimney of the Russian house is of brick. On the less frequented roads the village houses are of much ruder construction; the rafters project above the ridge, and form by their closeness the entire covering; the projections above the ridge are sometimes cut off, and the ridge piece is introduced, on which is rudely carved the representation of the head of some animal. The Russian village generally consists of one street, presenting on each side a range of bold projecting gables. The houses are of two stories; some of the better village houses have a third story in the roof, and a colonnade with a balcony on the ground floor, and occasionally a second balcony from the attic; these balconies are always in the gable front. In the villages there is a side entrance, with a pent house roof over it, leading into the court where the sheds for the cattle are placed. The Russian stoves are well adapted for economizing heat. The flue is carried up and down so as to fill a space of about 4 feet square and to the hight of about 10 feet; it is then carried off. These stoves stand in the corner of the room, so that they can warm four rooms. The flues are built of hollow porous brick, which of course retains the heat. The external surface is of white glazed and ornamental tiles. The fuel is usually birch, and when the flame is entirely spent a damper is placed on the flue, and the heated air thus inclosed diffuses itself through the rooms. The stove requires to be heated at most for an hour in the morning, and another at night to maintain a high temperature of 50 degrees F., for instance, during the 24 hours.



Details of Finial and Ventilator on Main Roof.—Scale, ⅜ Inch to the Foot.



Detail of Third Story Tower Windows. —Scale, ⅜ Inch to the Foot.



Detail of Main Stairs.—Scale, ¼ Inch to the Foot.

Miscellaneous Details of Stone Residence at Overbrook, Pa.

PARISIAN METHODS OF BUILDING CONSTRUCTION.

IT is noticeable that during recent years an interesting change has been gradually brought about in the various methods of building construction employed in France, and more especially at Paris, where the size and importance of public buildings and the many-storied houses divided up into flats necessitate special systems of construction which possess the advantages of combining economy in cost with strength and durability. Parisian architects and builders, although far from approving the extremes to which Americans go in the employment of iron for the construction of their sky scraping buildings, are nevertheless obliged to own to the necessity and the utility of employing iron in moderation for the frame work of their buildings. Up to the present time, says a contributor to a London journal, writing from Paris, the use of iron in its ordinary form has chiefly been confined to floors, partitions and roofs, where, as a rule, its presence is masked by coverings of cement, wood or stone, except in recent examples of the new style of buildings destined for drinking halls, where the iron construction is left visible, and emphasized by means of bronze or color painting and mosaic work, or, again, in a few examples of well-known work where the architect has endeavored to obtain a decorative effect by means of iron lintels and columns. But where the use of iron is fast finding favor at Paris is in its employment in combination with other materials, such as cement or concrete, and in a special form known as the *cement armé* systems, in which iron and steel is employed in the form of thick wire, trellis or light bars, imbedded in cement or concrete. This method of construction, of which there are three different systems, has for some time been employed in the construction of various buildings of more or less importance, and has given proof of its strength and practical use, as well as its advantages when employed for floors, partitions, walls and roof, both as regards its conveniences for internal arrangements, its economy, and as regards the manner in which it lends itself to modern schemes of polychrome decoration.

Two of these systems have been employed by the architect of the new building constructed in the Rue Blanche for the Society of Civil Engineers of France, which building is rather interesting, both as regards its construction and arrangement of interior.

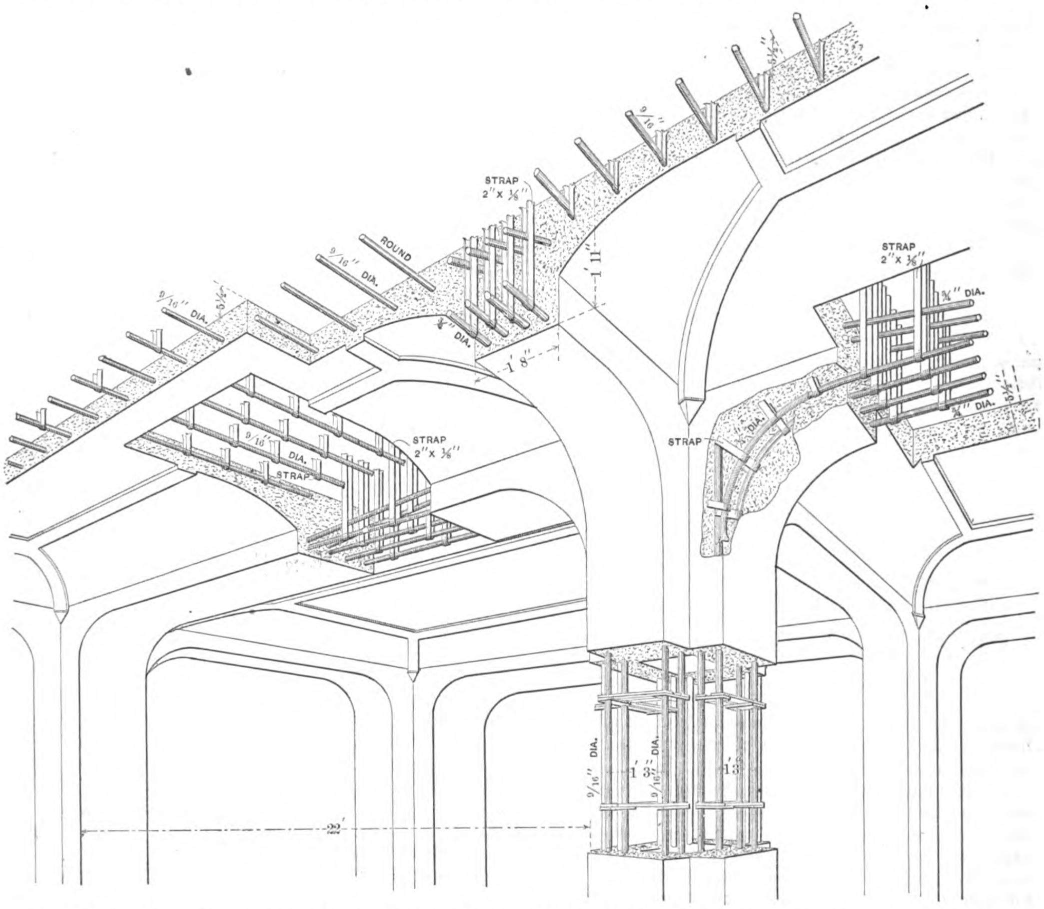


Fig. 1.—View Showing Construction of Floors, Pillars and Arches in the New Building of the Society of Civil Engineers of France.

Parisian Methods of Building Construction.

The length of the façade is 100 feet, the total depth about the same, and the hight from pavement to cornice 60 feet. The façade is built of solid stone work throughout its length and hight. The thickness of the masonry is 24 inches at the lower stories and 18 inches at the upper portion. The façade wall is really the only portion of solid masonry work in the whole building, and forms a decorative mass to the body of the building, which is constructed of a frame work of iron. The chief supports of the building proper consist of four framed iron uprights, 16 x 16 inches, rising from the basement to the roof. These uprights are solidly trussed and held together at the floor levels by strong iron girders supporting the iron joists of the upper floors and the light partitions which divide up each story. The façade wall is built according to the system always employed at Paris, and is formed of blocks of stone roughly cut at the quarries to the outside dimensions of the proposed molding and decorative work. As soon as the whole front is erected the work of cutting it into shape commences, the moldings, pilasters and all carving work being done whilst the interior is being prepared. The buildings at Paris are by this means erected much more rapidly than when the stone is dressed or molded before being put into place. Greater facilities are thus given for studying the general *ensemble* of the façade and the proper scale to be given to the moldings and decoration. The stone, is as a rule, soft when first from the quarries, but becomes hard and durable after dressing and exposure to the air. The court yard wall of the building is formed of light brick or metallic fillings between the iron uprights and the party walls.

Some of the most interesting points of the construction, besides the large use of iron, are the systems employed in the construction of the floors. The ground floor is built after the Coignet system, composed of light iron bars and cement; the first floor and its supporting pillars and arches is constructed after the Hennebique system of *cement armé;* the upper floors are formed of iron joists, filled in either with the system of light supports and plaster, much employed at Paris, or with terra cotta fillings between joists. The roof is lined internally with agglomerated cork bricks, affording protection from excessive heat or cold, and the walls of the area will be lined with opaline, a vitreous material of a bluish-white color, which in this case will insure cleanliness and afford additional light; the lavatories and water closets will also be lined with the same material.

Speaking of the Hennebique system of *cement armé* employed for the arches and floor of the first story, it will be interesting to illustrate the method by a few sketches, explaining the theory of this system, which has been put to practical proofs in a large number of buildings, chiefly for industrial purposes, in the north of France. The perspective view, Fig. 1, here presented will give an idea of the construction as employed in the building for civil engineers.

The system, as far as its principle is concerned, is excessively simple, consisting of a series of beams or joists formed of cement concrete strengthened by light iron bars imbedded in the mass of concrete, and placed in such a manner as to give to the cement the property which it especially lacks, that of resistance to the force of tension. The cement and iron beam is imperfect when compared with an iron joist or girder, for the concrete, unlike the iron web, forms an insufficient tie between the upper and lower cords of resistance, and is unable to withstand the efforts of shearing which, acting horizontally and vertically, produce a maximum strain at the two supported ends of the beam and a minimum strain at the middle of the beam.

The cement beam is therefore further strengthened by a series of iron straps, Fig. 2, which pass under the lower round bars, and are bent up on either side to nearly as far as the upper surface of the beam, and thus, in a manner similar to the web of an iron joist, form the connecting link between the lower and upper portions of the beam. These straps are spaced proportionately to the resistance necessary to withstand the effects of shearing, which increase as the ends of the beam are approached. The straps are therefore placed nearer to one another toward the ends, and spaced much farther apart at the middle of the beam. The bent upper ends of the straps are firmly supported by the upper portion of concrete under compression.

This beam or joist was thus employed at the outset of practical work with this system of *cement armé;* but an improvement was judged useful and necessary for economy and the proper strength in the case of wide spans. The sizes of the lower bars were calculated to resist the maximum effort of tension produced at one portion of the beam. It happened, therefore, that the same diameter of iron at the middle of the beam was excessive and unnecessary—an evident waste of iron and lack of economy in cost. The truss bars of round iron of the same diameter as the tension bars were added, permitting a decrease of the diameter of the tension bars, and giving to the middle portion of the beam the section of iron necessary to resist the maximum of the bending efforts. The trusses are bent upward on approaching the supported ends of the beam, and thus afford additional strength and resistance to the shearing strain.

Floors constructed after this system consist of principal beams, secondary beams or joists, and the floor panel supported by the beams and joists, as indicated in Fig. 3 of the illustrations. The principal beams or girders are composed of three or four trusses imbedded in the concrete; the number of the trusses and the section of the iron bars depend on the span and the load to be carried. Such a beam and its construction is shown in Fig. 1. In this case the number of the trusses is four, composed of ¾-inch iron bars. These girders are supported by pillars constructed of *cement armé,* but they may in ordinary cases be supported by the walls of the building. The secondary beams or joists are constructed in a similar manner; they are placed at right angles to the girders, and contain one or two trusses, the ends of which rest upon the upper portion of the concrete of the principal beam. The hourdis or floor panels between joists are usually constructed of concrete strengthened by lower tension bars only, the ends of which rest on the cement joists, and the straps connecting these bars with the upper portion of concrete under compression. In special cases of wide spans between joists or girders, truss bars are added for additional security. The thickness of the concrete for the floor panels varies from 3 to 6 inches, depending on the span; the iron bars are from 7-16 to ⅝ inch diameter.

The pillars often employed for supporting the girders are formed of a certain number of vertical bars of round iron imbedded in the mass of concrete forming the pillar, as shown in Fig. 4. The uprights are spaced and held together by the pierced iron bands placed at intervals of about

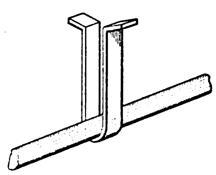


Fig. 2.—Iron Strap for Supporting rod.

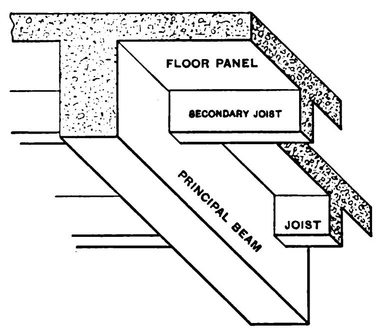


Fig. 3.—Detail of Floor Construction.

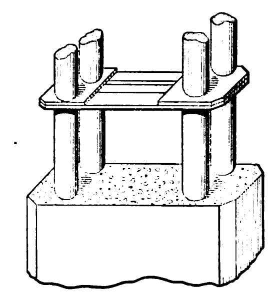


Fig. 4.—Detail Showing Construction of Pillars or Columns.

Parisian Methods of Building Construction.

2 feet. These iron uprights are generally from ½ to 1¼ inches diameter, calculated according to the hight of the pillar, its load, and the number of uprights employed. The pillars, beams and joists are constructed during the formation of the floor. A sort of mold is formed of planks nailed together and placed in the position required for the beam or joist; a certain thickness of concrete, composed of good cement and large gravel, is placed at the bottom of the mold, and well compressed. The tension bars are placed on this layer of concrete, and the straps and trusses arranged in their proper position. The mold is then filled in with successive layers of concrete, carefully punned around the iron bars to the desired thickness of the floor. The whole is allowed to set for three or four days before the wooden molds are withdrawn. The portion of concrete forming the floor panels is placed in layers on planks held between the joists. The tension bars are then arranged in their proper positions and spacing, and covered with cement to the required thickness, the planks being withdrawn as soon as the concrete is set.

CONSTRUCTION AND ARRANGEMENT OF STABLES.

THE subject indicated by the above title is one of no little importance to both architect and builder, whether located in city or country, and they cannot fail to be interested in what follows even though it is written from an English point of view. It consists of extracts from a paper prepared by Louis Hanks and read before a recent congress of the Sanitary Institute held at Newcastle-on-Tyne. At the outset the author stated that the planning must be largely governed by the site, as what might be an ideal scheme as applied to a conutry house, with ample space available, would be quite impossible in a crowded district or town.

In the planning of large stable buildings it is a good arrangement to have a quadrangular yard entered by an archway under or by the coachman's residence and forage store, which will form the front elevation of the scheme. On either side of the yard can be a range of stables with stalls or horse boxes, with a sick box in one corner and a washing shed in another corner. The remaining side or end will contain the coach houses with rooms over for grooms and helpers, for whom separate water closet and lavatory accommodation must be provided, distinct from that for the use of the coachman's family. The site should be a dry one on natural deep gravel, chalk rock or firm sandy soil, avoiding all artificial or made ground where possible, but any ordinary loam or clay, even the wettest, may be made suitable by proper foundations and careful subsoil drainage. Having secured a dry situation by natural or artificial means, the foundations for the walls of the stable building will be prepared by excavation and concreting, and when this is thoroughly consolidated the building operations will be proceeded with in the usual manner. White should be particularly avoided at the stall heads or sides, where a soft green, buff or gray is very nice in appearance and restful to the horses' eyes. If it can possibly be avoided, no rooms or lofts should be over the horses' standings, and the roof of the stable should be of open timber work neatly boarded, stained and varnished. If circumstances compel the use of rooms over a stable the ceiling should be in no case less than 10 feet from the floor, but a minimum hight of 11 or 12 feet should be insisted on wherever possible. The construction of the ceiling should receive more care than is usually bestowed. The best form would be a light iron and concrete floor for the loft or rooms over a stable, as this has several advantages. It is fire proof, sound proof, durable and impervious to the passage of any vitiated air from the stable below. The under side, forming the ceiling of the stable, can be smoothly cemented and painted or whitewashed. If the rooms over must be used for dwellings, under no circumstances whatever must the staircase or any shaft communicate directly with the stable, or all the vitiated air and heat will ascend thereby into the rooms above. Serious illness has been repeatedly caused in this way, and always risk and discomfort to the occupants. An external staircase, or one divided by a brick partition from the stable, should always be provided. The stable roof can be of tiles or slates, &c., and does not call for special mention, except that provision must be made for one or more exit ventilators, for foul and heated air. If there are no rooms over the stable, one or more ridge or turret ventilators must be provided, with folding or sliding louvres, which can be opened or partly closed by cords or gearing as the temperature may require.

Fresh air must be admitted in such a way that each animal gets an ample allowance without draft, as drafts do as much harm as the fresh air does good. This is best obtained by fixing an adjustable louvre or hopper ventilator in the wall at the head of each animal's stall or box, about 2 feet above the top of the stall partition. The use of a thermometer should always be insisted on in a stable or cowhouse, so that an equable temperature may be obtained, cool in summer and moderately warm in winter. Overheating is a thing to be avoided, otherwise the animals are apt to be chilled on going out. As long as they are shielded frrom damp, from the inclemency of the weather and from drafts the heat of their bodies and bedding will keep them comfortable and healthy. This question of ventilation is one of the first importance, and should receive more careful consideration than it usually does. It is often difficult in town stables to get the ventilation at heads of stalls direct from the open air, on account of adjoining buildings, and in such cases it is advisable to fix a horizontal metal shaft along the wall of stable over the heads of horses, with one end freely open to the external air and the other end continued up from far end of stable as a vertical shaft to above the roof. A current of air will always travel along this, and the inlet ventilator at head of each stall is simply fixed in this air shaft, from which air will blow in freely. The top sash in every stable window also should have one pane made to hinge or swing on centers, so as to be available for ventilation.

Floor and Drainage.

The next important point to consider is the floor, which must be hard, durable, impervious to moisture, but not slippery. Under all circumstances, whether in town or country stables, it is imperative that the entire floor be concreted to a depth of 6 inches with good cement concrete, in proportion of one of cement to six of gravel or burnt ballast, laid to proper falls for facilitating the flow of surface drainage and to keep back the ground damp. On this various kinds of paving can be laid. Great care must be taken in securing the best material, well laid and of sufficient thickness. With regard to drainage, it may be at once stated as a cardinal rule that no underground drains should be permitted in a sanitary stable. The best plan is to have the paving itself sloped with an even fall of 4-10 inch to the foot run, from sides to center of stalls and boxes and from head to heel, also the same slope from upper to lower end of stable. This will form a valley or depression down the center of each standing from head to heel, along which liquid will freely travel, to be collected by a similar shallow gutter along the heels of stalls or range of boxes, falling to the lowest point where the surface gutter will pass as a half-channel pipe through the outer wall of the stable, discharging over a trapped gully in the open air. This gully should be a large and deep one, fitted with a removable iron pan or bucket to catch any dung, straw or solid matter, which can be removed every day.

Interior Fittings.

The fittings of the stable should never be wholly of wood, as this is clumsy in appearance, easily damaged, liable to infection, insanitary and difficult to keep clean.

The heel posts or columns of stalls and loose boxes should be of stout cast iron, from 4 to 6 inches diameter, and not less than ⅝ to ¾ inch thickness, otherwise they will be fractured by a kick. They should have projecting flanged bases 12 inches square, with holes for belting to a good stone base 12 inches below the ground line, or with 18-inch long bases with a double flange for imbedding in a mass of concrete. If such base fixings are carefully made they will stand the hardest wear for years without movement. The posts should be capped with a round ball head and with rounded moldings. No sharp corners, moldings or projections can be tolerated for a moment in any stable fitting, as serious accidents have resulted from such vagaries on the part of inexpert founders ignorant of stable requirements. Every hard surface in a stable must be smooth and rounded off, even at the sacrifice of appearance. The doors of loose boxes should be strongly framed of iron and wood, with a top panel of ventilating grating, and a safety latch which the horse cannot open himself, and which offers no projection, open or shut, against which he can hurt himself. The manger should be fixed about 3 feet 6 inches from floor, or slightly lower, according to hight of horse. For private stables where loose hay is used the manger should also contain the hay rack, so that the horse can feed underhead. It is well also to have a water pot alongside, which is always handy for giving a mash, even if the horse is usually watered from a bucket. Both manger and trough should be of galvanized or enameled iron, the hay rack and top plate being galvanized or japanned. Care must be taken that the edges of all openings are rounded and curled under, or a horse will cut or chafe himself. The front edge of the manger plate must be carefully curved under or formed into a barrel for the same reason. In many cases it is a safe and neat expedient to board in the front of the manger fitting, sloping from under the curved lip right back to the wall just above floor. This prevents crib biting, prevents a horse getting his bedding pushed under the manger and prevents danger to the animal in rising from the ground. The loose box manger fitment is usually constructed on the same principles, but adapted to fit a corner of the box, although in some cases, especially in racing stables, the manger and hay rack are in separate corners. Overhead hay racks should be avoided, as a horse, in pulling down his food, gets dust and seeds in his eyes. In the case of the hard working horses it is so generally and successfully the custom to give them chopped hay and bruised corn mixture that in most cases no hay rack is used, there being one long open manger and gruel pot in each stall. The pan should be deep and wide, with cross bars at each end to prevent the food being thrown out. In some cases the pans are made to lift out for cleansing, but both plate and pan must be painted or galvanized iron. Corn bins should be of iron, with divisions, hinged lids and locks. Stable buckets should be of iron, with wood bottom rims, so as to be clean without being too noisy.

Cellar Floors.

Most people who have houses built demur at the cost of their cellar floors, and in order to lessen the expense of this part of the house the architect often resorts to cheap methods and cheap materials for the accomplishment of his purpose. Contractors—in country places particularly—following in the footsteps of the architects, in order to reduce the cost to a minimum, make use of the flimsiest methods and cheapest material to finish off their cellar floors, and the result is that very few good ones can be found outside the more expensive structures. To lay a good concrete and cement floor that will be sure to give satisfaction and prove durable and efficient means a large expenditure of both money and labor.

One of the most important requirements for a good floor is perfect drainage. If this is attained the cost of putting in a good floor may be from 25 to 50 per cent. less than if the drainage is imperfect, inasmuch as a less thickness of underpacking and concrete will be required. In order to make good work, when the drainage is not perfect, clean out the bottom of the cellar about 8 or 10 inches lower than the intended floor. Fill in with 4 or 5 inches of cobble stones, broken bricks and very coarse gravel, but before doing this it will be as well to lay on the earth a tier of common 3-inch field drain tiles as "weeping tiles." If the ground is very damp this tier should pass all round the cellar, keeping pretty close to the walls, and graded to the point or corner from which the cellar will, some day or other, be drained. Of course there must be an exit through or under the foundation wall at this low corner. On the cobble stones and broken bricks lay about 2 or 3 inches of cinders or coal ashes, preferably the former. On this lay a coat of concrete formed of 4 parts of Portland cement, 3 parts of common lime, 16 parts sand, 32 parts of broken stones or gravel and 3 parts of water. Slack the lime a few days before using. On the top of this spread a mixture of one part of Portland cement and five parts of bean sized gravel, properly mixed; then float over a coat of one part cement and two parts of clean, sharp sand. Do not make the last two coats too wet. It should not contain more than one part of water. All of the preparations containing Portland cement should be well mixed while in a dry state, and should be applied to the floor as soon as possible after the water has been added.

A cellar floor made after the foregoing direction, if properly done, will be as hard and as durable as sandstone rock. The best Portland cement should be employed for the purpose. There are many brands of American made cement equal to the requirements, and which will give as good results as the best German, French or English imported cements.

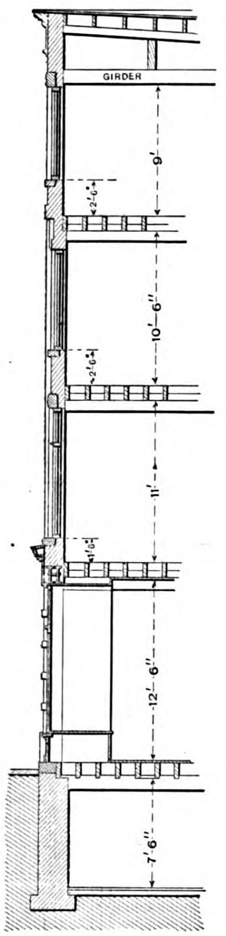
The Open Fire Place in the House.

No good house, whether of frame, brick or stone, should be without one or two fire places, and in the country villages and towns, where the contractor has much to do with designing the house, he should make it a point to impress on the owner the importance of having open fire places of some sort. When only one of these can be in a house, it should be in the dining room, as that is the place where the family will be the most of the time they are in the house together. If more than one can be used, place the others in the parlor and in the bedroom that is oftenest occupied. If the fire place is intended for wood altogether it may be built without a grate, as fire dogs or andirons may be used on a thick cement or brick hearth. It would be better, however, to build in grates in all the fire places, as then the opening would be less and the chimney draft could be better regulated. Of course in our climate open fire places cannot be depended on for heating during midwinter, but in spring and fall, when stoves are taken down, or heating by steam, hot water or hot air is discontinued, they do the work effectually. They also act as health preservers, as no device yet put in practice in domestic architecture can equal the open grate as a mode of ventilation. The whole chimney heart may be of exposed brick work. The upper portion above the shelf may drop back 4 inches, and a neat, plain cornice may project from the heart under the shelf, forming a finish, with the shelf (which should be of hardwood) of a mantel. The skillful bricklayer should be able to make a handsome brick mantel if he picks his stock, rubs their faces, lays in fine mortar and lines up his joints. In a mantel of this kind there is a big opportunity for the bricklayer to display his skill. This makes a mantel without wood, save and excepting the shelf, which may or may not have a molded edge to suit the brick work.

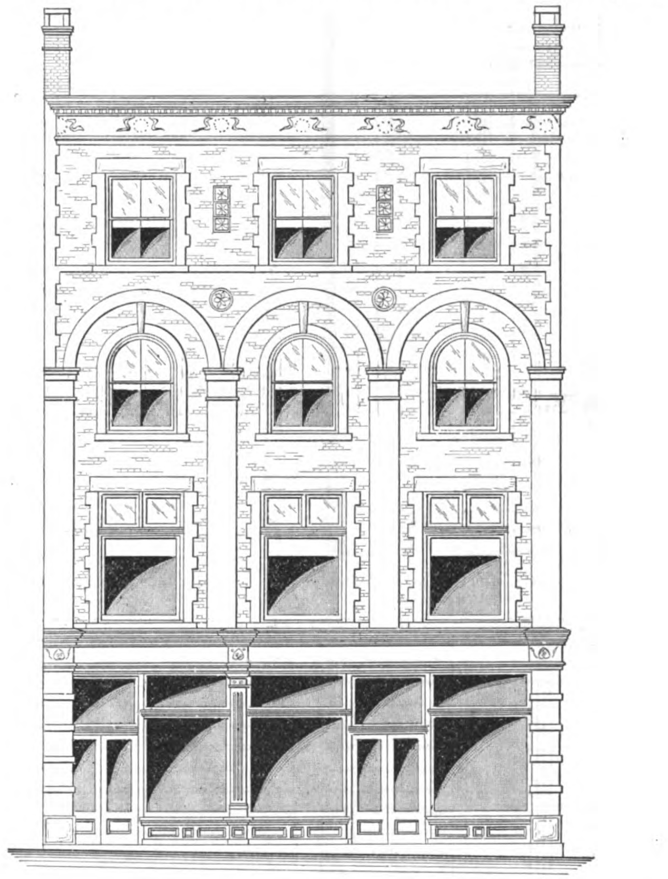
WHAT is regarded as a new record for rapid work on steam chimney building is said to have been established by a firm in Bridgeport, Conn., who put up the new stack for the New York, New Haven & Hartford Railroad Company's power house in Stamford in 10 days, 5½ hours. The chimney is 115 feet high, 13 feet in diameter at the base and contains 174,000 bricks.

DESIGN OF A STORE BUILDING.

THOSE of our readers who have in the immediate past made inquiries in regard to designs of store fronts, business structures, counters, shelving and the like, cannot fail to find much that is interesting in the subject of the illustrations presented herewith. The engravings represent the plans, elevations and details of a building erected not long ago to meet the special requirements of the business of the S. H. Berry Hardware Company of Dover, N. J. The structure covers an area 35 x 67 feet in size and stands four stories in hight. It is constructed of dark buff brick with red sandstone trimmings. In pre-



Section.



Front Elevation.—Scale, 3-32 Inch to the Foot.

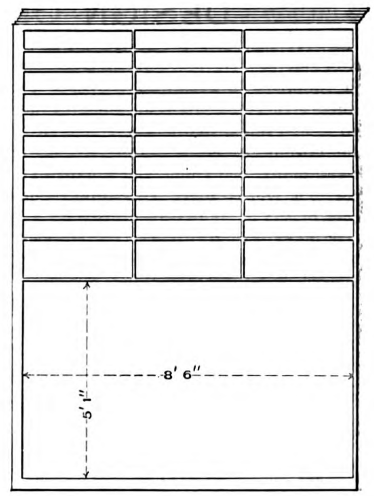
Design of a Store Building.—Paul G. Botticher, Architect, Newark, New Jersey.

paring the foundations for this building the concrete footing courses under the main walls were made 3 feet wide and 12 inches thick, the concrete being composed of one part cement, two parts coarse sand and five parts small broken stone. The cellar walls are 2 feet thick and are composed of building stone laid in mortar.

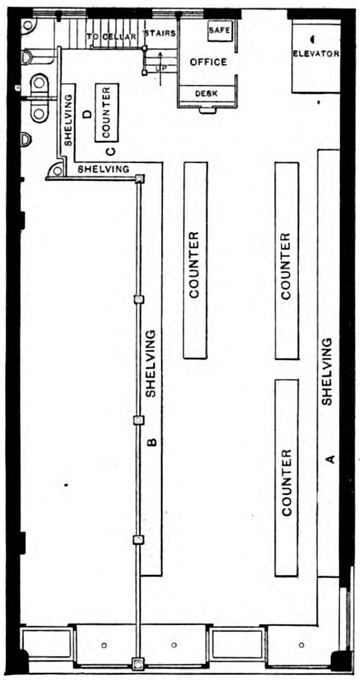
The walls of the building on the two street fronts are faced with North River brick laid in red mortar, while the window jambs, quoins, sill and string courses are faced with dark buff brick. All the cut stone work is of Belleville gray rock, finely tooled.

The timber employed is of spruce, the summer beams in the cellar being 10 x 12 inches, the girders on the second and third floor beams 10 x 14 inches, the girder under the roof beams 8 x 12 inches, the first, second and third floor beams in the long spans 3 x 12 inches and in the short spans 2 x 12 inches, all placed 16 inches from centers. The girders have 1½ x 8 inch plank cleats, spiked on each side to support the under side of the floor beams. A 6 x 6 inch plate is placed under the roof beams, following the pitch of the roof, and is supported from the girder at intervals of about 6 feet with short 6 x 6 inch posts. The roof beams are 2 x 12 in the long span and 2 x 10 in the short span, all placed 2 feet from centers. The roof is sheeted with good quality hemlock boards, planed to a thickness and nailed securely to every beam, the outer covering being first quality IC charcoal tin. The cornice on the two street fronts is of No. 24 galvanized iron. The flooring in the cellar is of 1¼ inch mill worked spruce laid on 3 x 4 inch chestnut sleepers placed 18 inches from centers. The floor is covered with 1¼ x 3 inch tongued and grooved "comb grained" Georgia pine, while the second and third stories have 1¼ x 4½ inch Georgia pine flooring. The partitions between the stores are set with 3 x 4 joist placed 2 feet from centers and have sill and plate. Both sides are covered with ⅞ x 4½ inch white pine ceiling boards. The partition between the stores is filled in with mineral wool the whole hight, and packed perfectly tight from sill to plate in all the spaces between the studding. The ceilings of the stores and toilet room have thick rosin sized sheeting paper nailed to the underside of the beams, with the joints carefully lapped, over which is placed ½ x 2½ inch white pine ceiling boards. The vertical sides of the store are ceiled with ⅞ x 4½ inch white pine ceiling boards.

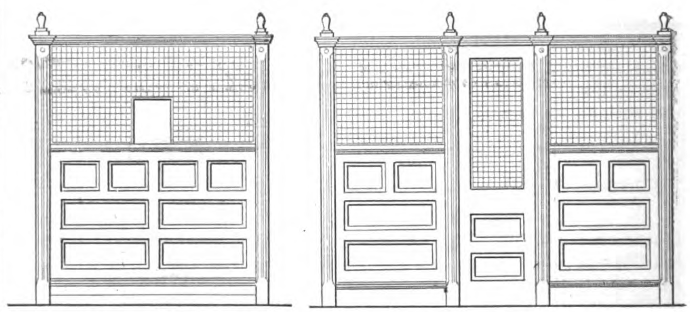
With regard to the fittings it may be stated that the drawers under the shelving have veneered fronts with rebates, the drawers running on sash rollers with suitable guides. Along the top of the lower line of drawers a division piece extends out about 4 inches, forming a foot rest, and is supported on 1¼ inch brackets. At one end of section A of the shelving are two cases with sash front, the sash being 1¼ inch thick, fitted in suitable guides and hung with patent sash balances. The inside of the cases is fitted with 14 shelves, each on ratchet strips so as to be adjustable. The sides, backs and bottoms of

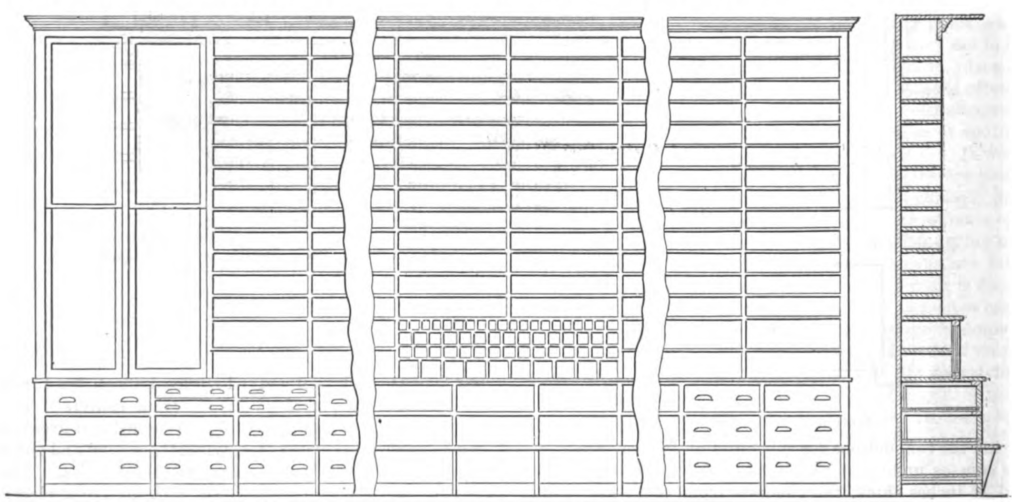


Elevation of Shelving at D.—Scale, ¼ Inch to the Foot.



Main Floor.—Scale.—1-16 Inch to the Foot.

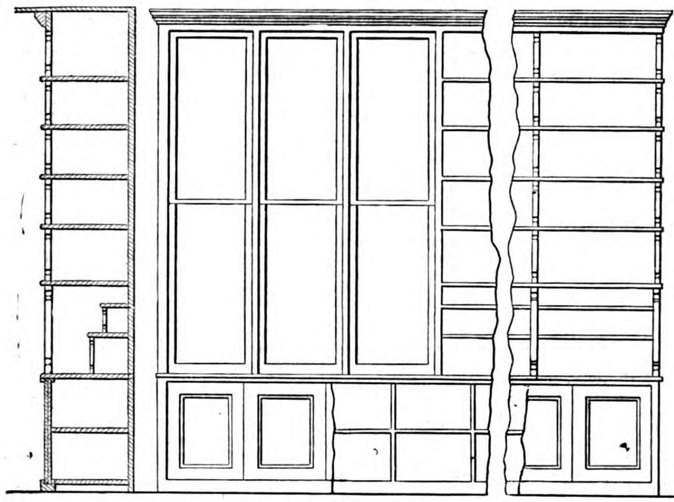

Front and Side Elevations of Office.—Scale, ¼ Inch to the Foot.


Elevation and Section of Shelving at A.—Scale, ¼ Inch to the Foot.

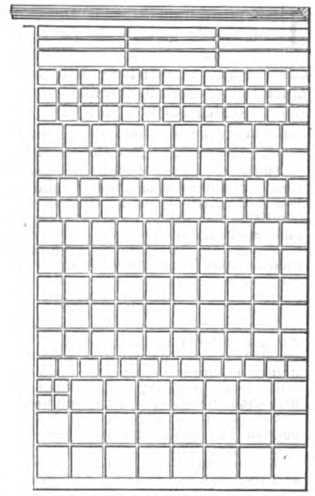
Design of a Store Building —Floor Plan and Details of Shelving.

the drawers, as well as the vertical divisions in the shelving, are of white pine. The fronts and divisions of the shelving, &c., have a facing of ash not less than ½ inch thick, glued to the pine backing. The lower portion of the shelving marked B is made with molded panel doors arranged to slide past each other in either direction. The counter shelving over the doors is of quartered oak 1¼ inches thick. The shelves inside of the doors are ⅞ inch thick and have vertical divisions 1¼ inches thick all housed in and fastened. At one end of this section are three cases with glass fronts, the sash being 1¼ inches thick. The insides of the cases are fitted with seven adjustable shelves on ratchet strips. The remaining portion of the section is arranged with open shelves ⅞ inch thick and supported with turned spindles, and finished along the top with cornice molding. All face work, such as doors, sash, drawer fronts, &c., exposed to view are of ash finish, while everything not exposed to view is of white pine.

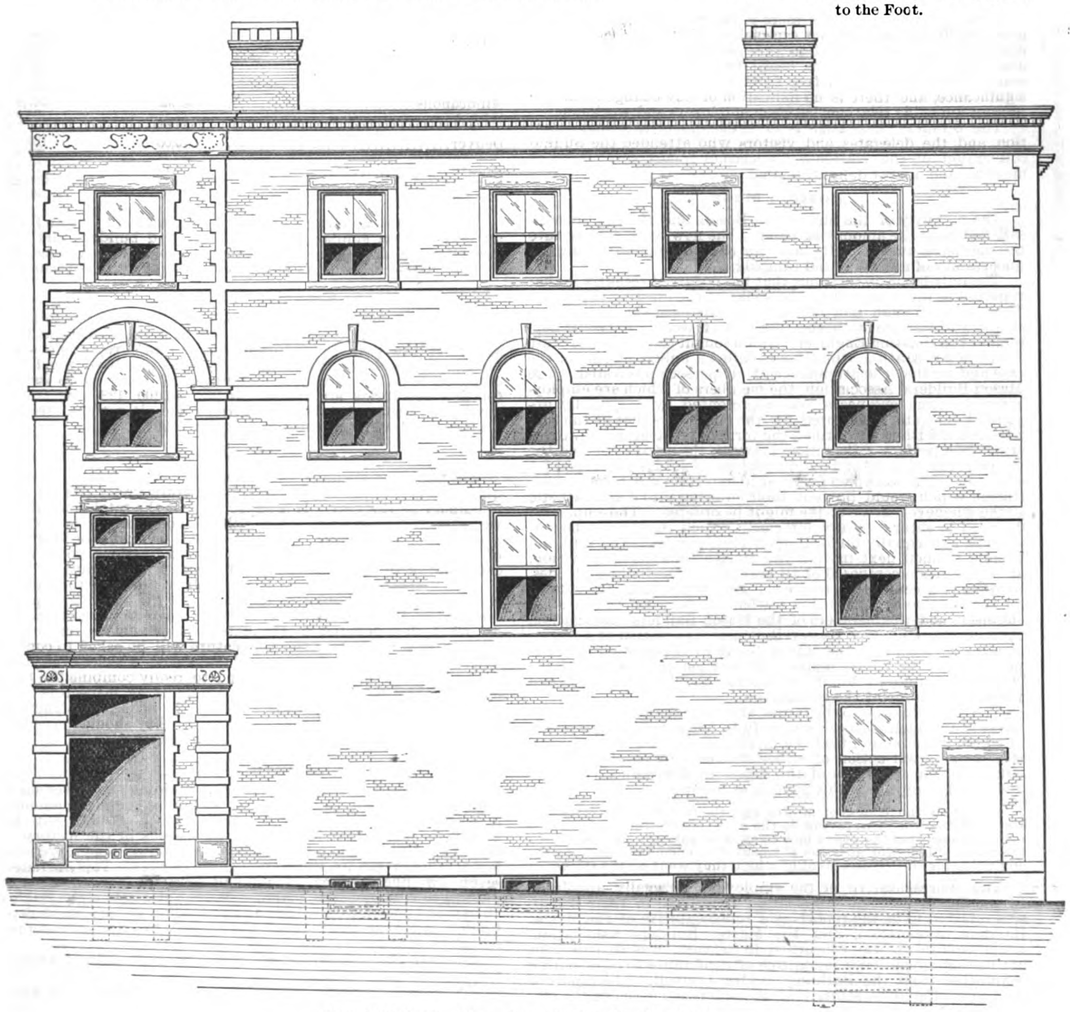
The building is fitted with a Morse elevator and each floor is connected with the office by means of speaking tubes. The building is heated by steam and lighted by electricity. Each floor is connected by roomy platform stairs and is supplied with city water. An inspection of the floor plans will show that the office is located in an inclosure at the rear of the building, as is also the elevator and toilet room, the latter containing stationary marble wash bowls, &c. The plans for the building were prepared by Paul G. Botticher, architect, of 751 Broad street, Newark, N. J.



Section and Elevation of Shelving at B.—Scale, ¼ Inch to the Foot.



Elevation of Shelving at C.—Scale, ¼ Inch to the Foot.



Side (Right) Elevation.—Scale, 3-32 Inch to the Foot.

Design of a Store Building.—Elevation and Details of Shelving.

WHAT BUILDERS ARE DOING.

THE present condition of the building trades appears to be unusually quiet, even for this season of the year. The amount of work on hand is small in comparison with other years, and relatively little new work is offered. There is much talk of work in architects' offices awaiting the outcome of the November election, but the quantity is very uncertain and can hardly be accepted as a safe indication of the amount of work to be brought into the market in the future.

Delegates to the Buffalo Convention of the National Association of Builders were almost unanimous in stating that business was dull in the several localities which they represented. This condition seemed to be more pronounced in the Western cities, and especially those of the Far West, than it was in the East.

Few labor disturbances have occurred during the past two months, and from present indications there will be little change during the remainder of the year.

Atlanta, Ga.

The amount of building being done in Atlanta at the present time, as shown by the report of the building inspector, is unusually large. The work is well distributed between the residence, manufacturing and business sections of the city, and builders and real estate dealers are reported as being well satisfied with the business situation and outlook. The Atlanta *Constitution*, in reviewing the situation in the light of the experience of the past, says in a recent issue that all points to one conclusion: That come what may, happen what will, Atlanta is here to stay, with a brave heart and determined purposes, and proposes amid the lightnings of adversity to stand erect and to challenge the admiration of the country round her.

Baltimore, Md.

General building in Baltimore is reported as being in fairly good condition, although not especially active. About the average amount of work usual to this season of the year is being done and little complaint is heard from the contractors. The season thus far has been free from labor disturbances of any significance, and there is no indication of any change from the present amicable relations between employers and workmen.

The Builders' Exchange is in its customary excellent condition, and the delegates and visitors who attended the Buffalo convention of the National Association report a satisfactory meeting and a most delightful time.

Boston, Mass.

The majority of the builders of Boston and vicinity are well satisfied with the amount on hand. The new work coming into the market is unexpectedly large for this season and during the uncertainty of a presidential campaign.

The only labor disturbance that has occurred recently is that reported in previous issues—the strike of the hoisting engineers. This strike, though still officially in existence, has long since ceased to interfere with the progress of work. Early in September the Hoisting Engineers' Union sought the aid of the State Board of Arbitration, which board called a public hearing of the case and invited the attendance of all persons interested. The Mason Builders' Association, the members of which are employers of hoisting engineers, was represented by a specially appointed delegate, who stated for the employers that at the first conference with the workmen the form of arbitration now operating with perfect satisfaction between the association and the masons', bricklayers' and building laborers' unions was urged for adoption. The workmen declined to entertain any form of arbitration which would prevent their entering into a sympathetic strike whenever such a strike might be ordered. The employers declined to enter into any agreement which should not be permanent and equally binding upon both parties. The Building Trades' Council next invited the Master Builders' Association, an organization composed of all branches of the building trades, to appoint a committee to meet a committee from the council for the purpose of affecting a settlement between the hoisting engineers and the members of the Mason Builders' Association, their employers. The Master Builders' Association at a special meeting decided that the Mason Builders' Association was the proper body to which matters in relation to a strike of the workmen employed by its members should be referred, and voted not to appoint the committee.

The State Board of Arbitration, after an exhaustive hearing of the case at which both sides were fully presented, made a report in which it was stated that the merits of the case and the justice of the initial action of either workmen or employers were outside of the functions of the board to determine. The language of the report on this point is as follows:

> Owing to the course of affairs, and the fact that the workmen struck without first applying to the State board under the law, it is unnecessary for the board now to express any opinion concerning the reasonableness or unreasonableness of the demands made by the engineers for the enforcement of which they went on the strike.

The representative of the employers, especially appointed by the Mason Builders' Association to appear in their behalf, was referred to in the report as a representative of the Master Builders' Association, and the Master Builders' Association, which was in no way concerned in the case, was censured for not having appointed a committee of conference to meet with a committee from the Building Trades' Council. The report of the board offered no solution of the difference between the employers and workmen, the only real point at issue.

Buffalo, N. Y.

The amount of building now under way in Buffalo, while not up to the record of other years, is sufficient to keep a majority of the contractors busy. The carpenters' strike, which threatened to seriously obstruct work, has drifted into a condition of inactivity, although it is reported as being still in existence.

The builders in attendance upon the convention of the National Association were delighted with the city and with the unusually perfect facilities provided by the members of the Builders' Association Exchange for visiting all the prominent buildings and points of general interest. The delegates and visitors were earnest in their praise of the city and of the entertainment received at the hands of its most hospitable builders.

At the annual meeting of the Buffalo Chapter of the American Institute of Architects the following members were unanimously elected for the ensuing year: William Lansing, president; R. A. Bethune, first vice-president; F. H. Loverin, second vice-president; Ulysses G. Orr, secretary; George Cary, treasurer.

Chicago, Ill.

During the latter part of August the union hod carriers struck for an increase from 20 to 25 cents per hour. The strike promised for a time to seriously affect all branches of building, but many of the employers compromised at 22 cents per hour, and work was gradually resumed without being seriously disturbed. It is reported that the refusal of the Bricklayers' Union, which has an arbitration agreement with the Mason Builders' Association, to enter into a sympathetic strike had much to do with preventing the strike from extending.

Building in Chicago remains about the same in volume as has been reported for several months past, and builders generally do not look for increased activity before spring.

The following interesting statement of the cost of building undertaken in August, 1896, as compared with the showing for the same month in 1895, is taken from a recent issue of the Chicago *Times-Herald:*

	August, 1895.	August, 1896.
Chicago	$3,267,000	$1,852,650
Philadelphia	2,898,732	2,800,885
Brooklyn	1,280,830	1,310,660
Cincinnati	221,777	296,520
St. Louis	2,497,690	2,786,950
New Orleans	345,760	315,605
Pittsburgh	231,314	560,800
Washington	323,050	576,826
Detroit	271,700	786,240
Minneapolis	341,620	267,918
Omaha	42,449	106,850
St. Paul	151,375	69,730
Denver	75,000	120,700
Indianapolis	295,749	276,917
Duluth	69,450	76,850
Kansas City	238,450	276,892
Los Angeles	462,955	296,274

The contracting lathers of the city are taking steps to form an organization similar to the masons' and builders' and the carpenters' and builders' associations, a preliminary meeting for the purpose of organization having been held in September.

Cleveland, Ohio.

Building is reported as being quiet in Cleveland, the total of work on hand and projected being less than the average at this season of the year. The Building Inspector's report for the month of September shows that there has not been much inclination to invest money in buildings. Permits were issued for five new brick structures, costing $85,400; 128 new frame structures, costing $94,291; 96 additions and alterations, costing $28,038; total, 229 structures, costing $207,729.

Detroit, Mich.

The building business in Detroit still continues to be very quiet, with little, if any, prospect of improvement during the remainder of the year. It is expected that the total amount invested in buildings during 1896 will fall considerably below the average of recent years. There have been no strikes or lockouts of importance for several months, and indications point to a continuation of the present state of affairs in this regard.

The State Legislature will probably be invited to make a change in the law regulating the powers of the building inspectors of Detroit. The inspectors say they have no power to carry out what they demand in the nature of provisions for public safety. It is likely that the Legislature will be asked to confer on the building inspectors many of the powers which are at present assigned to the fire marshal and to really combine the two offices for the good of the public. The building inspectors contend that they are made responsible for the proper construction of buildings, and as long as this is true they should have the power to grant the permits for building construction.

Denver, Col.

The returns from the Department of Building of Denver show a small increase for the month of September over the amount invested in buildings during the same month of 1895; but the total is far below that of the more prosperous in the history of the city. During the month of September buildings representing a value of $96,500 were erected in Denver. This included seven dwellings valued at $16,100, four business houses at $69,500, 29 miscellaneous buildings valued at $7600, eight stables at $800 and one church valued at $2500. For the month of September last year the value of the erected buildings was represented by $58,600.

There has been no strike or lockouts in the building trades of the city for many months.

The Master Builders' Association is reported as being in good financial condition, having recently contributed $150 for campaign purposes.

Indianapolis, Ind.

The Indianapolis *Journal* in a recent issue prints the following: It is stated that more building is now in progress than at any time in some months, most of the building being of fine residences. On North Meridian, North Pennsylvania and Seventh streets and in the northeastern part of the city, on all sides new buildings can be seen going up. This has increased business with the planing mills and set more bricklayers, carpenters and other mechanics at work. Most of the houses being erected range in cost from $8000 to $15,000.

Lowell, Mass.

While this issue of *Carpentry and Building* is in the press the Massachusetts State Association of Builders will hold its annual meeting in Lowell on October 28. The meeting will be held in the rooms of the Builders' Exchange, and an interesting programme of business has been prepared. All exchanges in the State have been urged to send representatives to the meeting, and it is hoped that delegates will be in attendance from all the prominent cities in the State.

The present officers of the association are: Chas. A. Vaughan, Worcester, president; Frank L. Weaver, Lowell, vice-president; Wm. H. Sayward, Boston, secretary; E. Noyes Whitcomb, Boston, treasurer.

Milwaukee, Wis.

While general business seems to be improving in Milwaukee and manufactories that have been idle for months past are starting up, the building interests seem to be recovering less rapidly than are some of the other branches of business. There are many idle workmen in the city, it being estimated that 35 per cent. more workmen out of employment have been compelled to apply to the associated charities for help thus far during 1896 than during the same period of 1895.

Among the few building contracts of importance that have been let recently is the Goll & Frank Building on East Water street, to cost about $100,000, the plans for which were exhibited, as were also plans for a high school building at Oconomowoc, in the rooms of the Builders and Traders' Exchange.

During the past month the Building Trades Council has been considering the advisability of seeking to prevent the employment of any but union workmen in the building trades of the city.

New York City.

The past month has been uneventful in the building trades, although a considerable amount of work is now in progress, it being stated that about October 1 there were 4390 buildings in process of erection. The greater portion of the work, at least so far as the money consideration is concerned, is represented by buildings intended for office and business purposes. There is, however, more or less doing in the upper part of the city in the way of erecting flats and private dwellings, the latter being especially noticeable in the district lying above the Harlem River. The total number of buildings projected during the month of September was somewhat less than for any other month this year, which is not at all surprising considering the financial and business situation. In August the number of buildings projected was 176, estimated to cost $3,427,165, but this total fell in September to 148 buildings, estimated to cost $2,894,450. Of this number 12 were office buildings, hotels, stores and churches; 62 were private dwellings, 50 were flats and tenements and 24 were miscellaneous structures.

There have been no labor disturbances of moment and the situation remains one of comparative quietude. Politics seem to absorb more attention than anything else just at present, but when the election is over matters are expected to assume a more normal condition.

Pittsburgh, Pa.

Comparatively few of the buildings planned for Pittsburgh during the last three months will be constructed until the result of the November election is known, says the Pittsburgh *Leader* of recent date. Designs have been made by the architects for buildings of every description, but the difficulty in making heavy loans and the stringent exactions as to the payment of mortgages in gold on the part of the loaners have combined to make the promoters believe that a postponement for the present is advisable. In the opinion of the contractors this condition of affairs will not continue through the winter season. The number of building permits issued during September in Pittsburgh was 212, representing an estimated investment of over $564,000.

Philadelphia, Pa.

The Master Builders' Exchange of Philadelphia is engaged in remodeling its building. The plans of the front will be changed, so that instead of the two side entrances which now exist, of rather small size, one large entrance of ample proportions will grace the front, 12 feet in width. A handsome vestibule, with polished marble sides, fancy supporting pillars and a mosaic floor, will lead to the entrance, from which a 12-foot aisle will run through the exhibition department. Large plate glass windows, eight in number, will grace the front, above which will be others of stained glass, the whole to be surmounted by an ornamental border two feet wide, which will run the entire length of the building. Heavy columns of an ornamental design will separate the windows, while the interior will be so altered by painting, plastering and decorating as to correspond with the outside.

The monthly report of the Building Inspector Bureau shows that during September 676 permits were issued, covering 1016 operations, whose total estimated cost was $1,363,610. This is an increase over the month preceding of 109 permits and 73 operations, but a decrease in the estimated cost of $1,437,275. In September of last year the permits were 661, the operations 1327 and the estimated cost $2,425,839. So far this year the work authorized amounts to $22,100,970, against $24,044,942 up to the close of September, 1895. The wards in which the greatest amount of work was authorized last month, taking the estimated cost as a criterion, were the Twenty-second, which is credited with $265,240 in the way of improvements; the Twenty-eighth, with $172,110; the Thirty-third, with $201,035, and the Thirty-fifth, with $93,770. These are all outlying wards, where building is progressing rapidly, and are in strong contrast with the other wards, where the work is estimated in figures not exceeding five. In this connection it may be stated that in the Eleventh and Seventeenth Wards work has been at a standstill, as they do not figure at all in the list of permits and operations.

The whole number of permits, operations and estimated cost of the same for the year to October 1 is given by months as follows:

1896.	Permits.	Operations.	Estimated cost.
January	357	574	$815,980
February	405	732	1,391,635
March	588	1,391	3,156,310
April	886	2,094	3,796,415
May	779	1,699	3,794,330
June	657	1,195	1,940,840
July	615	1,267	3,041,565
August	567	943	2,800,885
September	676	1,016	1,363,610
Totals	5,530	10,911	$22,100,970

St. Louis, Mo.

The building interests of St. Louis showed a slight improvement during the month of September, and builders generally are looking for an increase in activity. Considerable improvement is being done in the residential parts of the city, and especially in the erection of moderate priced dwellings.

An effort is being made to incorporate into the building contracts used by the city stipulations which shall provide for a strict enforcement of the eight-hour day and for the employment by contractors of only such workmen as prevent the occurrence of strikes and lockouts—in other words, only union men. The clause that explains the intent of the proposed change, which was drawn by the city counselor, is as follows:

It being the intention of this contract that this contractor shall not work himself, or allow others to work, more than eight hours a day on the work hereby contracted for, and shall not, by his acts, conduct, or the employment of any particular men, employees, agents, or persons on his part of the work, cause delays on his part of the work, or strikes among his men, employees, or servants, or strikes or 'walk-outs' by men, employees, agents, or persons employed by any other contractor with the city upon the work of which the work hereby contracted for forms a part.

Notes.

The following officers of the Brooklyn Chapter of the American Institute of Architects have been elected for the ensuing year: President, George L. Morse; vice-president, Isaac E. Ditmars of the firm of Shickel & Ditmars; secretary, A. G. Thomson; treasurer, H. P. Fowler.

At the annual meeting of the Minnesota Chapter of the American Institute of Architects, held in Minneapolis late in September, the following officers were elected: President, Harry W. Jones, Minneapolis; vice-president, C. H. Johnson, St. Paul; secretary and treasurer, W. S. Pardee, Minneapolis; director, Cass Gilbert, St. Paul.

Building is reported as being very dull in Wheeling, W. Va., at the present time, with little prospect of immediate improvement.

Building Inspector Nelson of Scranton, Pa., had an unusually busy month during September, owing to the large number of permits issued. The total value represented by the permits is $202,252, a sum considerably over the average monthly total. This is in part due to the large amount to be expended on the court house, the erection of an addition to the Bicycle Club House, Mr. Carter's building on Adams avenue and new workshops for the D. L. & W. Company on Washburn street.

The architects of Springfield, Mass., are agreed that building, which is now practically at a standstill, will not be resumed until spring. Light building would, of course, not be attempted to any extent during the winter, and as for the customary heavy building there will be little if any. There are many who would like to build, and who could probably do so to advantage, but they cannot get the necessary ready money.

Building permits issued in Seattle, Wash., during the month of August were as follows: Moves and repairs, cost $4390; seven one-story frames, $1590; two one-and-one-half-story frames, $1150; six two-story frames, $6250; total, 59 permits; cost, $13,380.

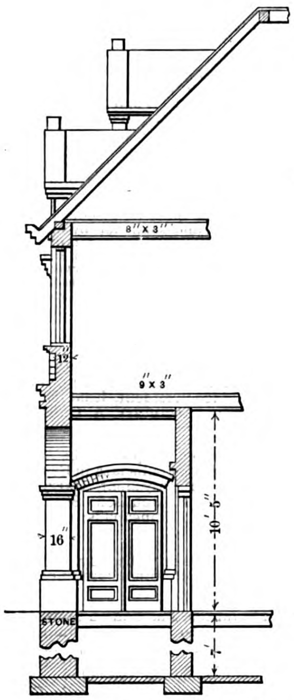
THE great Yerkes lens for the new observatory of Chicago University, on Lake Geneva, Ill., which has been made at Cambridge, Mass., is complete and ready for shipment. The lens is the largest in the world. It is 40 inches in diameter, 4 inches greater than the famous lens at the Lick Observatory, and is valued at $65,000.

A STRIKING instance of the durability of timber under certain conditions was afforded during the excavations for the foundation of the Bowling Green Building, New York City. A line of spruce piles was discovered at some distance below the surface of the ground, which, as far as we can learn, were placed in position about 150 years ago and actually formed a bulkhead, the tide then reaching this point. These piles, upon examination, were found to be perfectly sound, and to all appearances would have been just as sound and good 150 years hence.

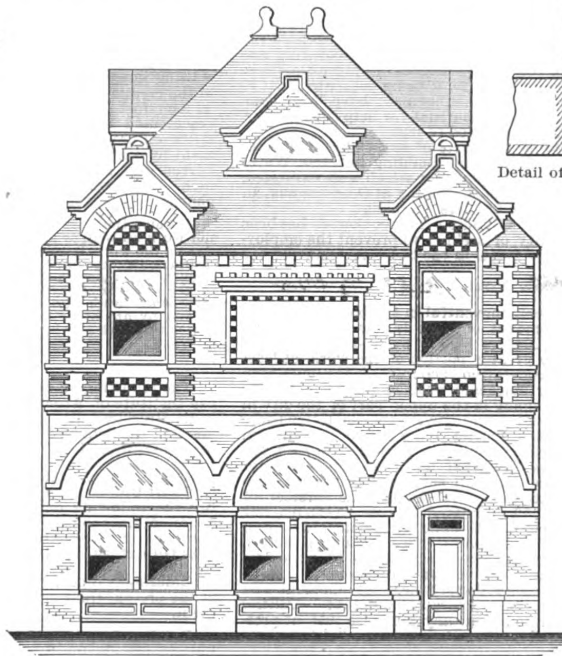
CORRESPONDENCE.

Design for a Brick Hotel.

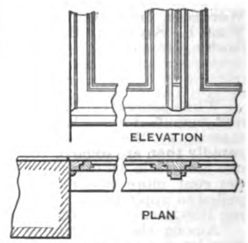
From E. A. R.—In reply to the inquiry of "G. T. H." of Berryville, Ark., I send drawings for a brick hotel two stories in hight and provided with six sleeping rooms on the second floor. As the correspondent does not give a description of the hotel for which he desires a design, I take it for granted that the building stands in a block, or, rather, is built upon at either side. The structure which I show is of brick with the exception of a wooden light shaft, over which is a skylight of the same material. The side walls are of brick 8 inches thick and the main walls are 12 inches, with the exception of the piers, which are 16 inches. All the brick openings throughout are arched as indicated on the elevation. The attic is fitted with apartments for the owner.



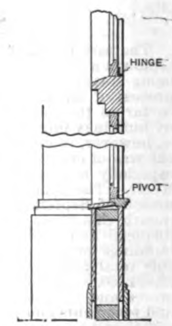
Section.—Scale, ⅛ Inch to the Foot.



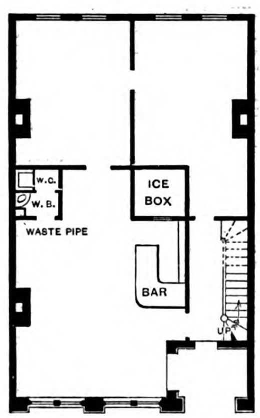
Front Elevation.—Scale, ⅛ Inch to the Foot.



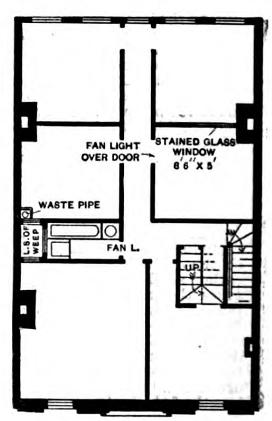
Detail of Sash.—Scale, ⅜ Inch to the Foot.



Detail of Water Table.—Scale, ⅜ Inch to the Foot.



Main Floor.



Second Floor.

Scale, 1-16 Inch to the Foot.

Design of a Brick Hotel.

Making Good Blue Prints.

From A. F., *New York City.*—In reply to the inquiry of "R. E. B.," which appeared in a recent issue of the paper, I would say that his failure to obtain good blue prints may be due to the fact that his paper was "light shot"—that is, exposed to the light before it was placed in the printing frame. Very often paper purchased is in this condition because of having been in stock for a long time. Again, while making his paper, our friend may have failed to exclude the sunlight from his room before applying the solution and exposing the paper to dry.

From F. J. C., *Allentown, Pa.*—In the October issue of the paper "R. E. B." writes about making blue prints, and states that he has not obtained satisfactory results from suggestions mentioned in the paper. I have tried the experiment with about the same result. I took the following preparation, by "J. H. K.," Raleigh, N. C.: 1¼ ounces potassium ferricyanide dissolved in 8 ounces of water, 1⅞ ounces ammonium iron citrate dissolved in 8 ounces of water. I can make good prints from paper that I buy ready prepared, but I am unable to get satisfactory results from this paper. It would be more convenient for me to make my own paper than buy it if I could do so. I hope some of the readers of *Carpentry and Building* will offer useful suggestions.

From O. A. S., *Chicago, Ill.*—In regard to "R. E. B." of Clarksville, Tenn., who complains about trouble in making blue prints, I wish to say that he may not have kept his chemicals right—that is, they may have been exposed to the daylight too much. Another thing which I have observed on the part of inexperienced people in making blue prints is that when the print is put in the wash and is not covered entirely with water at once the print comes out spotted and blurred and has various shades of the color it should possess. Care should also be taken in placing the original and the sensitized paper in the frame and in seeing that the original fits snugly to the glass, so that there is not a sign of blistering or crease, otherwise where the blisters and crease exist it will show blurred in the copy. Sometimes if the sensitized paper is old it will not copy well.

Rose Design for Wood Carving.

From H. H. F., *Grand Island, Neb.*—Will the author of the serial article on wood carving, recently completed in the paper, give me the sections of the rose of which sketch is inclosed ? The rose is intended for a table, the circular top of which is 4 feet in diameter. The rose is to come on the center leg, which is octagon, there being eight roses about halfway between the floor and the top.

Answer.—The sketch of our correspondent shown in Fig. 1 of the illustrations was forwarded to Charles J. Woodsend, who furnished the following in reply: In preparing for working this design I would suggest to the correspondent to make a sketch of the outside lines upon a piece of thin cardboard neatly cut out, and with a fine pointed pencil mark upon the block to be cut. Saw neatly to the lines, making the side that was marked upon the bottom when working. Now take a block of soft wood and screw the block to it, screwing through the back so as not to be in the way when working, or at completion showing the holes where the screws were inserted. By this means the work can be held securely to the vise or be fastened to the bench. The next step is to rough it out—that is, take off most of the surplus material until the general shape is obtained. Work gently and carefully, watching the grain so as not to sliver it. After this is done shave down to the highest points of the rose, working close and taking note of the sections so as to have the correct slope or bevel. Next mark and round out the hole in the center. This is slightly oval and canted over. Work this out neatly and clean to a finish. Now commence with the next outward row of leaves and continue until the whole of the rose is completed. Where there is any overhang cut the under side before cutting the top, there being less danger from chipping when this method is pursued. The next piece of work to be taken up is the blown rose at the bottom. It will be seen from an inspection of Fig. 1 that there is nothing to this except a few leaves and the pip. The latter is shown slightly oval, and that part within the center ring is intended to be matted—that is, broken up with a matting punch—or, if preferred, it may have smooth V-grooves cut across, running one round on the line of the inner ring, cutting the others across until they meet it and make the center look as if cut out into small diamonds. Work the leaves as the next step, taking note of the sections as to how the different curves run so that they may appear to repose gracefully in position. In Fig. 2 of the sketches will be found cross sections through the rose, while in Fig. 3 are represented the vertical sections taken on the lines indicated. I have only shown the center veinings upon the three sections, and these only to give an idea of their size and general run. The lateral or side veinings may be omitted, or just a few inserted, as may be preferred. If they are put in they should be smaller than the center veins, their presence not adding to the value of the work. Every part should be worked up as clean as possible with the gouges. Do not scrape or sandpaper the work, as a certain amount of roughness is to be preferred. Do not, however, have it so rough as to attract the eye from the rest of the design. Of course it goes without saying that the tools must be well ground and kept perfectly sharp. After the work has been completed, unscrew the block and glue the rose into the place it is to occupy.

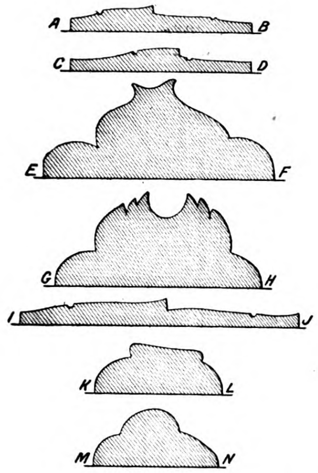


Fig. 2.—Cross Sections on Lines Indicated.

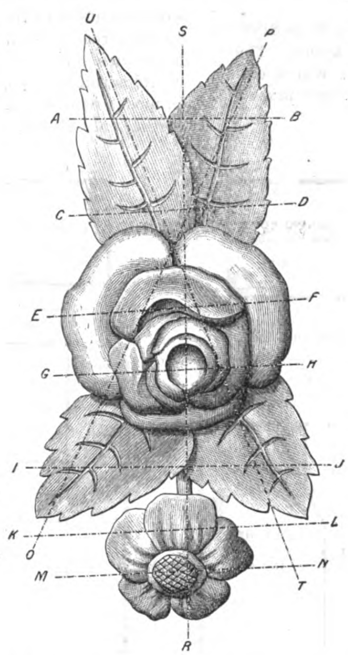


Fig. 1.—General Design of Rose as Furnished by "H. H. F."

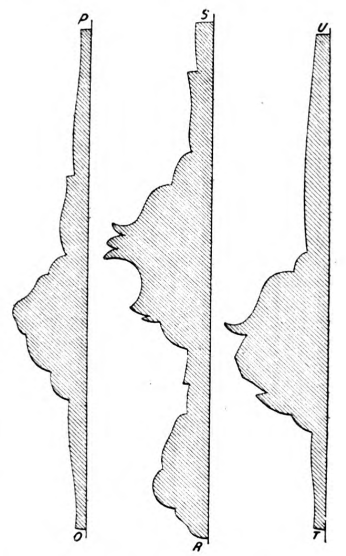


Fig. 3.—Vertical Sections on Lines Indicated.

Rose Design for Wood Carving.

Fastening Metal Window Caps.

From STEWARD & ROMAINE MFG. COMPANY, LIMITED, *Philadelphia, Pa.*—We notice in the last issue of the paper the answer to "T. R." of Canada as to the best method of fastening metal window caps over windows. We would state that an improvement over the method of nailing the top flange, as shown at W, is to fasten the same to the wall by means of small ¼-inch expansion bolts. These are being specified by many architects in the large buildings now under construction in the United States. When once put up the cap will remain until it rusts away before coming loose. We know of cases where work had to be done over after a little time, and the bolt fastening was used to perfection in place of the nailing.

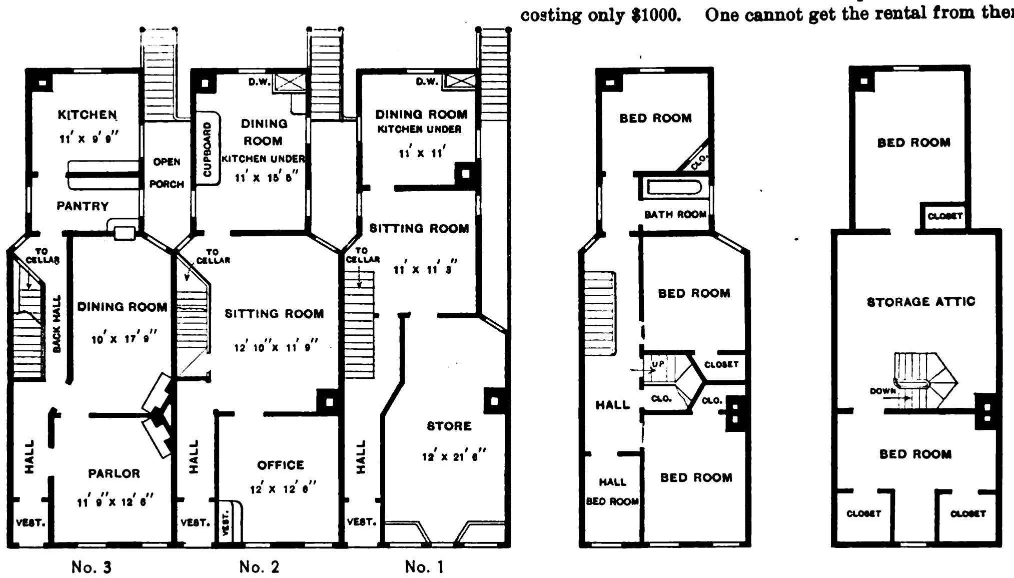
What is Meant by "Marble Hanging."

From JACK PLANE, *Winooski, Vt.*—I have a chest to construct and the specification calls for the cover or lid to be "marble hung." I do not know what that means, and I concluded to ask the architect who drew the specification for the necessary information. When I called upon him and stated the question he smiled in a peculiar sort of way.

but finally acknowledged that he himself did not know exactly what the term meant.' He knew there was such a style of hanging and inserted it in the specification, supposing that, as the builder who was to do the job was pretty well posted on all points connected with the business, he would be able to do the work without asking any questions. The result is that I am perplexed what to do, and wish that readers of the paper might tell what they know about marble hanging, so that there may be light on a subject which now seems to be enshrouded in considerable darkness.

Co-operative Houses.

From S. W. D., *Ashland, Pa.*—In the January number of the paper "A. H. D." presented a very neat sketch of a house for a city lot, and intimated that lots could be obtained for $200 each. If this is the case the plan would do well enough, the building being 22 to 23 feet wide on the 25-foot lot; but in our town we cannot touch such a lot for less than $500, and the house costing from $1000 to $1200 makes an outlay of $1700 for the workman. Therefore, taking $1700 at 6 per cent. interest, which equals $102 per year, insurance at $4, water $3.50 and taxes $15, or $866 per year, from which deduct $826.58, which leaves a balance per year of $39.42, which would about cover the repairs. Outside of that, however, the builder would have the profit of $10 or $12 per month that he would have to pay for rent if he built only a single house to live in. A close examination of these houses will show that they are very convenient, with room enough for any small family. Take, for example, house No 3. We have a parlor, dining room, pantry and kitchen, with hall, on the first floor; four bedrooms and bathroom on the second floor, each bedroom having a closet, and in the attic are two bedrooms, with large storeroom, the latter being unfinished. Each room can be heated by a stove if desired. All are light, as well as the halls, which cannot be shut off. House No. 2 is modified for a front office, while house No. 1 has a small store at the front, with a basement kitchen. Hence we see that the builder being the owner, on an investment of about $4500 he, acting as his own superintendent in the construction of the buildings, would have his rent free, while by the plan of only building one house on a single lot, after an investment of $1700, a man would actually be paying $10 per month rent for his house. In most towns lots are too valuable to put on them houses costing only $1000. One cannot get the rental from them



Second Floor of House No. 3. Third Floor of House No. 3.

Floor Plans of Houses Nos. 1, 2 and 3. Scale, 1-16 Inch to the Foot.

Co-operative Houses.—Plans Accompanying Letter of "S. W. D."

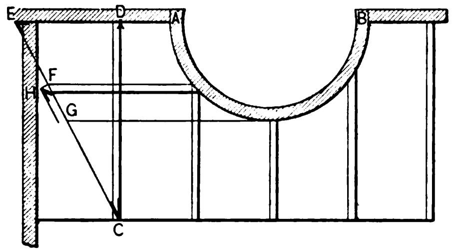
makes a total of $124.50 for the year, or $10.37 per month rental, which he is actually paying for the house in which he lives, besides the cost of keeping the house in repair and his living. Now, if our workman is a carpenter and builder I believe a scheme of co-operative houses, the plans of which I present herewith, would give him a good home to live in rent free, besides paying the interest on the investment, as well as insurance, water and taxes, and if he doubled the number of houses would bring in quite a little revenue. There is no experiment about it, but has proved to be all right, and in fact, out here are the best paying properties for the money invested. I have not the space to go wholly into this matter, but will give a few figures for consideration:

Two lots, 25 x 125 feet, at $600 equals	$1,200.00
Three houses, as per accompanying plans, equals	3,250.00
Total outlay	$4,450.00
This sum at 6 per cent. interest equals	$267 00
Insurance	10.83
Water	10.50
Taxes	38.25
Cost per year	$326.58
The rental of house No. 3 per month is	$10.50
The rental of house No. 2 and office per month is	13.50
The rental of store in house No. 1 per month is	6.50
Total, per month	$30.50

to pay for the investment. I would be glad to hear from builders on this subject.

Damp Cellars.

From DEWDROP, *Indianapolis, Ind.*—I am tempted to write a few lines of caution to those who are asked how to prevent dampness in cellars during the summer. All of us have been puzzled more or less how to account for summer dampness in cellars which are well above water line, have good cement floors and in the winter are apt to be too dry when the furnace is sending out its usual heat in the basement. The cause of this dampness is plain enough when one has carefully considered it, being nothing more nor less than the condensation of moisture from the warm outside air when it comes in contact with the cool cellar floor or the cool walls or the cool water pipes or the cool iron of the furnace or the cool anything in the cool basement. I was not long since called in by a despairing housekeeper who had tried everything to keep her cellar dry except keeping the cellar windows shut. She believed in ventilating her cellar in all kinds of weather, and the damper it got during the summer, the more she ventilated. Every cellar window was screened to keep out the flies, and the yard and basement door had a screen door fitted to it also. She was a careful housekeeper. When I was called there, every window and the door were open, and as it was a very hot day the cellar was dripping, reeking, oozing and almost running away in streams and puddles and trickling drops. Even the plastered ceiling seemed wet enough to fall off. With an imploring look she said, "What is the matter? Where does the water come from?" I said that under the circumstances, with the very warm air outside, it would be miraculous if the cellar did not sweat at every pore. I told her to wait until the first cool weather came, and then as soon as the cellar dried to shut every window and door tight and keep



Lengths of Rafters for Porch Roof.—Sketch Accompanying Letter of "W. J. V."

them shut until another cool spell came. I told her to keep her cellar shut always during warm weather and ventilate it in cool weather, and it would be as nearly dry as a cellar ever gets.

Lengths of Rafters for Porch Roof.

From W. J. V., *Janesville, Wis.*—In a recent issue of the paper "B. F. J." of Aliquippa, Pa., asked the readers of the paper to give him information in regard to obtaining the lengths of rafters for a portico, there being a circular bay window projecting from the front of the building. If I understand the question correctly, I think the drawing which I send herewith will answer it. Referring to the sketch, which represents a plan of the porch roof with the circular bay window A B, we will let C D represent the seat of the main rafter, D E the hight or the rise of the rafter and C E the length of the rafter. The length of the next short rafter is represented by C F, and that of the shortest rafter by C G. The bevel at E is the plumb cut, the bevel at C the foot cut and the bevel at H the top of the rafter.

Design for a Poultry House.

From INCUBATOR, *Indiana.*—In the words of one who has given the subject of caring for poultry a great deal of considerate attention, "the poultry houses to be found on average farms are a disgrace to an intelligent humanity."

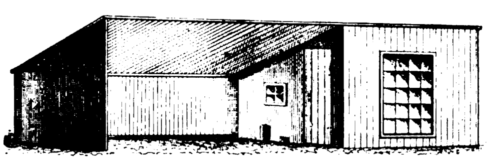


Fig. 1.—General View.

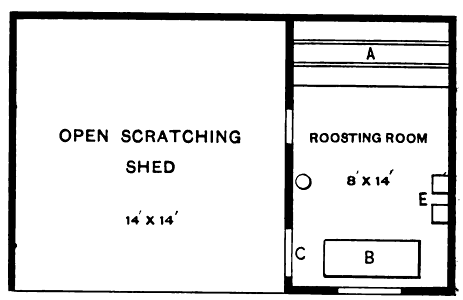


Fig. 2.—Floor Plan.—Scale, ⅛ Inch to the Foot.

Design for Poultry House.

This condition of affairs is inexcusable and is largely due no doubt to neglect, pure and simple. There have been published in past issues of the paper several articles from correspondents dealing with the subject of poultry houses, and with a view to adding to what has already been said I offer a few suggestions which may possibly be found of service both to those desirous of keeping poultry and to those who may be called upon to construct poultry houses. The sketches which are presented represent a general view and plan of a house of this kind. The house is built of rough boards covered with good roofing paper; the roosting room is lined so as to keep it as warm as possible, and the sills are placed about 6 inches above the ground, the space being filled in with fine dry dirt. In the roosting room A represents a platform elevated about 18 inches above the floor, and above this are the roosting poles, the best ones being 2 x 3 joist. The poles are all on a level and are about 6 inches above the platform. The dust box B should be filled with fine dry road dirt and placed under the window, so that the sun will shine on it. C is the door communicating between the roosting room and the open shed, while E indicates two small boxes nailed to the side of the house. One of these is intended for sharp gravel or crushed oyster shells as grit, while the other is intended for charcoal broken up about as fine as whole corn. The nest boxes are placed under the roosting platform. At another time I may send sketches of a double poultry house which may prove of interest to some of the readers.

Hectograph Copying Pad.

From O. A. S., *Chicago, Ill.*—Will some reader tell me through the columns of the paper how to make a hectograph copying pad in the cheapest and most convenient way? Blue prints are quite out of date for building purposes since this process came into use, and I would like to get at that process so that I will not have to wait three or four days for "Old Sol" to show his face.

What Will Keep Worms Out of Lumber?

From B. B. D., *Berea, Ohio.*—I have a pile of oak lumber in my shop which is worm eaten. It has been stuck up with lath, and has been repiled and wiped with gasoline, but without driving out the worms. I would like to know what will not only drive them out, but keep them out.

Constructing an Ice Chest.

From W. F. J., *Ardmore, Ind.*—I am a constant reader of *Carpentry and Building* and I think it is my time now to ask for information. What is the principle in making an ice chest? I want one 2 feet 6 inches in hight, or as near that as possible, and with two stories. How thick should the wall be made, and is sawdust or charcoal a necessity in the construction of ice chests? Let the boys come out on this point.

Cure for Cranky Doors.

From C. A. G., *Rankin, Ill.*—If any one has a cure for doors that are in wind and the cure is not worse than the disease, please communicate it for the benefit of myself and any others who may possibly be interested. I think a few lessons in wood turning would be appropriate for the columns of the paper and be appreciated as well. So pitch in, brother chips, and make the paper especially interesting during the winter season, while a large number of us have more time than usual to store our minds with useful information that will help us out when we get into a tight place.

Note.—We trust our many readers will adopt the suggestions of this correspondent and utilize the long winter evenings to write the editor interesting letters upon the topics mentioned and also upon others which are coming up every month in this department of the paper.

BRICK VENEERED HOUSES.

FOR small cottages, stables and workshops of limited dimensions, the method of bricking up the outside of a rough frame building is both economical and in very many cases highly desirable. The usual method of constructing what may be designated as a "brick veneered building" is to first lay down the foundation in stone the same as for a brick structure, leaving the wall at its top sufficiently wide to receive 4 inches of brick work, a 1-inch space, 6 inches of wood work and 4 inches of an offset inside the building to receive the ends of the lower joist. This would make the wall 15 or 16 inches wide at the top. Build a wooden frame of the balloon type, leaving ample room on the outer edge of the wall for one thickness of brick and a space of 1 inch. The studding forming the balloon frame must be tightly boarded both inside and outside with cheap but sound lumber, and all must be well nailed. All the openings for windows and doors may be accurately marked off on this boarding and cut out ready to receive the frames. The roof should then be put on and shingled or slated, as may be preferred. The eaves should project enough to properly protect the brick work, which has yet to be added. The jambs of the window frames should be wide enough to allow of only about 2½ inches of a margin or reveal of brick work to show past the casing. The top or head casing must be cambered the same as for an ordinary brick opening so as to admit of throwing a segmental retaining arch over the door or window. This arch is generally formed with the bricks on end, either one brick or one and a half, as the case may be.

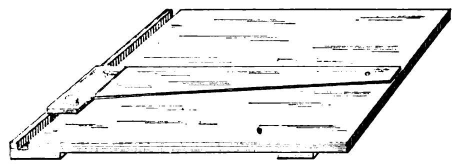
It is advisable where possible to use stone sills in a building of this sort, as wooden sills of any kind do not last long, and the expense of replacing them with others is more than the first cost of stone and is a disagreeable job. Stone sills, and wooden ones also for that matter, should be wide enough to reach the boarding and project at least 1 inch beyond the face of the brick. The wooden sub-sills of the window frames require to be wide enough to lap well on the stone sills. Cut nails may be driven in the boarding at the end of the stone sills in such a manner as to bond the sills to the wood. The proper manner of doing this will suggest itself to the average workman when he places the stone in position.

Before commencing the brick work, or even before the frames are put in, the whole outside of the building should be tightly covered with paper, which should be doubled around all angles. The brick used in veneering should be what is known as facing brick and no "bats" should be employed except as "closers." The whole brick work should be composed of stretchers except at the quoins, which should be formed of "headers and stretchers." In laying the brick the joints should be made thin, and should be flashed with mortar throughout their width. Every fifth course should be tied to the wood work with hoop iron ties, or with nails driven into the wood work an inch or two and their heads built in the mortar of the brick work. These ties, whatever may be their nature, should be about 4 inches apart, and those in one tier of brick should not stand directly over those in the tier below. In other words, the ties should stand zigzag in the wall, so as to obtain from them the greatest amount of efficiency.

A house built on these lines preserves all the good qualities of a frame structure, and none of the bad ones of a brick building. It is strong, if properly built, light and healthy, has the solid appearance of a brick house, and if desired may be made ornamental with fancy pressed brick or terra cotta, stone trimmings or decorative plaster work. It is economical to build, and as proof against fire as an all brick house that is furred and lathed and fitted with wooden partitions. For a struggling workingman it has the advantage of being fit to occupy before the brick work is finished. Indeed, it may remain unbricked for a year while occupied and the rent may eventually be devoted toward purchasing and laying the brick. This style of building is considerably in vogue in Northern New York, Canada and some of the New England States. In fact, it is to be found in many sections of the country.

Combination Drawing Board and Tee Square.

There are doubtless many readers of the paper who are often called upon to do more or less drafting, and who find a well made drawing board a convenient part of the equipment necessary to do good work. They will therefore be likely to find much that is interesting in a description of a combination drawing board and T-square here presented, the particulars taken in combination with the engraving being such as to enable them to readily make one for themselves. The object of the device is to enable the draftsman, when he wishes to retain the T-square in one position for any length of time, and to work from it with set squares, to clamp the T-square in position so as to avoid the necessity of holding it in place by the hand, which, in the case of a large T-square, is both inconvenient and tiresome. The illustration which is here shown represents the board with the T-square in place. The board is made with a ledge at one end rabbeted over the working edge. This ledge is of hardwood and carries a groove in which operates the lower stock of the T-square. The latter



Combination Drawing Board and T-Square.

is made with the stock on the upper surface of the blade, and extends to the drawing edge only. A second stock of the ordinary form is placed beneath this and affixed by a center, so that it may move within certain limits to set the blade to an angle and clamp it in position. Through the center attaching the two stocks passes a bolt, and affixed to this at its upper end is a lever, and at the lower end a cam. The lower stock runs perfectly free in the groove, and the cam is so placed that the T-square may be used in every way as an ordinary T-square, but by a slight turn of the lever the cam is made to come in contact with the side of the groove furthest from the working edge, thus forcing the stock hard up to the working edge and locking the T-square in position in any part desired. The T-square can also be clamped and left securely in any position if the draftsman likes to leave the drawing. The two stocks are provided with an index showing when the blade is truly square with the stock.

A House of Hollow Tubes.

A German inventor has built a house of hollow tubes, whose advantages, he says, are a constant temperature and incidentally strength, comfort and beauty. He first put up a frame of water tubing, allowing continuous circulation to a stream of water. Around this frame he put up his house in the ordinary way. The peculiarity is that all floors and ceilings are crossed and recrossed by the water pipes. The water, having passed through horizontal tubes under the floors and ceilings, passes through the vertical tubes until all have been gone through. In the summer, fresh, cool water circulates under pressure through the network of tubes, cools off the walls, and, after having run its course, flows out considerably warmer than when it entered. In its course it has absorbed much heat, which it carries away. During the long and severe winter the water entering through the basement is first heated to nearly 100 degrees and then forced through the ceiling. Of course much of the heat is left all over the house, and at the outlet the temperature of the water is about 40 degrees. The speed of the circulation of water can be regulated so as to allow fixing a certain temperature, equal throughout the building.

SHADOWS IN PERSPECTIVE DRAWING.*

BEFORE studying shadows in angular perspective let us consider the shadows of two details of the last article. Let the student once thoroughly understand the shadows of these simple details and he will find no further difficulty in determining those of more complicated drawings in parallel perspective. We are studying at present the shadows thrown by rays of light parallel to the picture plane on objects in parallel perspective. Fig. 2 is a detail in parallel perspective of shadows thrown by slanting and horizontal eaves. In Fig. 3 we have the eaves in three positions—horizontal, slanting and vertical—each with the wall plane at o o, from which points we must draw lines from the direction of the vanishing point, determine the shadows thrown by the horizontal eaves.

To find the shadow cast by the eaves on the wall of the gable fronting the observer, we first determine the point m, where the wall plane meets the slanting line of the roof; g on the horizontal line from the point is contained by the same plane as the wall, as is, therefore, the point where the light striking the eaves will first throw a shadow. The shadow line from point g meets the angle of the wall plane at point f. The portion of the wall above this shadow line from point f is, therefore, in shadow.

In Fig. 4 we have to find the shadow thrown against the ground plane by the box, the ray of light still arriving parallel to the picture plane, but at any angle to the horizontal plane

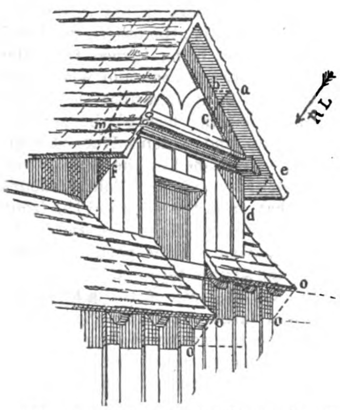


Fig. 2.—Detail in Parallel Perspective of Shadows thrown by Slanting and Horizontal Eaves.

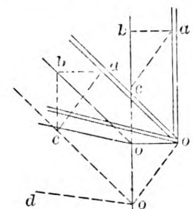


Fig. 3.—Eaves Shown in Three Positions.

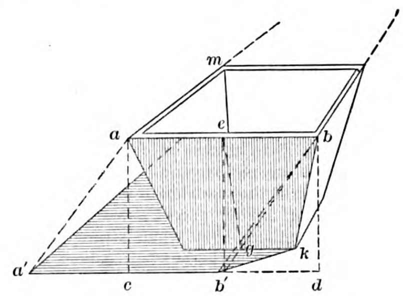


Fig. 4.—Finding Shadow Thrown by a Box

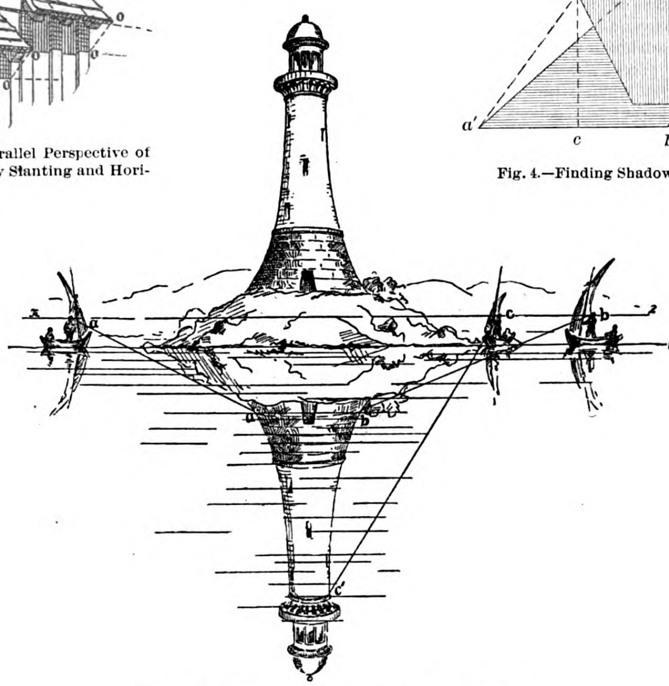


Fig. 5.—Lighthouse and its Reflection in the Water.

Shadows in Perspective Drawing.

same amount of projection, o o. The shadow thrown by the point o against the vertical wall plane will measure the same vertically in both cases, o o and b c; the vertical eaves being in the same plane as the rays of light will cast no shadow.

In Fig. 2, b a is the amount of projection of the eaves from the wall plane. The line drawn from the point a parallel to the direction of the rays of light R L meets the vertical wall plane b c at c; a line drawn through c parallel to the angle of the eaves will determine the shadow cast against a wall plane. Also, the shadow line from the point e determines the point a on the vertical plane and the distance of the shadow cast by the lower portion of the gable eaves.

Shadow lines drawn from the points o o and meeting we may desire. The shadow will be cast by the upper edge b a m. The line e g bisects the front side of the box. The intersection of the vertical dropped from e, and the line drawn from the point g from the vanishing point gives us the point b'. Therefore e b' is contained in the front vertical plane, a c d b, of the solid containing the box. The rays of light arriving parallel to the vertical plane are, therefore, contained by the front vertical plane a c d b. The shadow of the point a will, therefore, be at a' on the prolongation of the ground line d c of this plane. The shadow of the point b is necessarily at b'. A line drawn from point a' to the vanishing point and a line from point b' to the lower angle k of the box will contain the shadow thrown. The front surface of the box is in natural shadow.

Thus to determine the shadows thrown by rays of light

* Continued from page 236, October issue.

parallel to the picture plane striking on objects in parallel perspective, we have at the point where the light strikes to find the intersection of a plane parallel to the picture plane, and therefore also parallel to the direction of the rays of light.

The reflection in water of an object is the inverse reproduction of the object. We will notice the simplest example in order to be able to follow at one and the same time the true shadows and reflection according to the rules of perspective.

In the reflection of an object the lines converge to the same vanishing point; the size and hight measured from the water line are the same. In Fig. 5 the reflection of the lighthouse is similar to the construction itself. The observer stationed at *a* will see nearly the whole reflection, the one at *b* nearly as much, but the observer at *c* sees only the portion from *c'* to the summit of the lantern.

(To be continued.)

Dining Rooms of the Greeks and Romans.

Probably the best accounts of the dining rooms of the ancients are those given by Vitruvius, who states that in one of the largest Grecian houses the common dining rooms for the family were under the porticoes of the peristyle, and in the portico which looked to the north the cyzican triclinium, or chief dining room, and the pinacotheca, or picture and statue gallery. On the right and left also of the mansion or main building small houses were erected, having proper gates, dining rooms and convenient chambers, that when strangers arrive they may not enter the peristyle, but be received into this hospitalium, for when the Greeks were more refined and opulent they prepared triclinia (dining rooms), cubicula or chambers, and provisions for strangers, the first day inviting them to dinner, afterward sending them poultry, eggs, herbs, fruits and other productions of the country. Masters of families, therefore, when they abode in this manner, seemed not to be from home, enjoying the full liberty of retirement in these apartments. The triclinia, or dining rooms, of the Romans, with the procœton, or room for attendants, the cubicula, with the baths, &c., were disposed on the sides of the cavædium. Vitruvius directs that the winter dining room and bath should look to the winter's declining sun, because the afternoon light is there useful; besides, the western sun shining thereon produces heat, and makes that aspect warm and pleasant in the evening. The spring and autumn dining rooms (for the luxurious Romans had one for every season of the year) should look to the east, for the windows then being turned from the sun, which is proceeding westward, render those rooms temperate at the time they are generally used. The summer dining room should look to the north, because this aspect is not, like the others, rendered hot at the summer solstice, for being turned from the course of the sun it remains always cool, and when used is salubrious and pleasant. Pliny describes the dining rooms at his Laurentinum as being beyond the portico, through a pleasant cavædium, and which advanced upon the shore, so that it was gently washed by the waves when the south wind blew. On every side were folding doors or windows as large, so that from the sides and the front he enjoyed a prospect, as it were, of three seas, and backward were to be seen the cavædium, the portico and the area; again, the portico and atrium terminated by woods and distant mountains. On the left of the triclinium, but not so forward, was a large cubiculum and then a smaller one, where one window admitted the rising and another the setting sun. From hence you viewed the sea, rather more distant, but more securely. This cubiculum and dining room by their projection formed an angle, which not only retained, but augmented the heat of the sun's rays. On the right side of the dining room was a most elegant cubiculum, with another large cubiculum, or moderate cænatia (common eating or supper room), which received light both from the sun and the sea.

LAW IN THE BUILDING TRADES.

ADDITION TO HIGHT OF PARTY WALL.

Under a deed providing for a party wall, it was stipulated that it should be built to the hight of one story of the other's house, which was already built, and that either party could add to the wall in hight, doing work from his own side if the other side was built upon. The first party built a party wall to the hight of one story, under the other's wall, and wishing to go higher, built on top of such wall, but on his own side of the line. The court held that, under the provision that either party might add to the wall in hight, such addition was not a party wall.—Palmer *vs.* Evangelical B. B. & M. Soc., Sup. Jud. Ct. Mass., 48 Northeastern Reporter, 1028.

BUILDING LINE.

The Supreme Court of Illinois holds that a covenant in a deed that a house shall not be built within 20 feet of the front line, is not violated by the building of a porch which extends beyond that distance. Also that the failure of an owner of adjoining property to object to the erection of such a structure, or to make any inquiry of the intention of the party building, during the construction of such house, constitutes a waiver of the right to declare a forfeiture for violation of such agreement.—Hawes *vs.* Favor, 48 Northeastern Reporter, 1076.

ACTION FOR THE PRICE OF BRICK ON REFUSAL TO ACCEPT.

A purchaser who, after the delivery of part of the brick called for by a contract, refuses to accept or receive the balance, must pay the contract price for the brick delivered. And for damages for breach of contract by refusal to receive the balance, the seller has the right to show the market price of the brick at such time, and recover the difference between such price and the contract price.—Breneman *vs.* Kilgore, Ct. Civ. App. Tex., 35 S. W. Reporter, 202.

PURCHASE OF INTEREST IN PROPERTY DOES NOT EXTINGUISH RIGHT OF LIEN.

The fact that, during the progress of their work, contractors claiming mechanics' liens purchased an undivided half interest in the property, will not extinguish their lien, where it appears that the owner had become insolvent, and unable to pay such contractors, that the deed was taken in order to secure a loan on the property and complete the work, that the contracts were not surrendered or canceled, and that there was no express agreement for discharge of the liens.—Blatchford *vs.* Blanchard, Supreme Ct. Ills., 43 N. E. Reporter, 794.

RIGHTS OF PURCHASER OF EFFECTS OF INSOLVENT CONTRACTOR.

Where one buys at sheriff's sale the property of a contractor who has failed, assumes the place of the contractor, under a partially performed building contract, and completes the work for him, he is entitled only to the amount which would have been due the contractor, who had been overpaid for the work already done by him.—Marshall *vs.* Brick, Sup. Ct. Penn., 34 Atl. Rep., 520.

LATERAL SUPPORT.

Where the excavation by a party on land adjoining the land of another causes the soil of the latter to give way, due to its gravelly and sandy condition, and not because of a building upon the land, which was located 4½ feet distant from the division line, the failure of the party making the excavation to protect such building, which could have been done at little expense, renders him liable for the damages to the land and building, and the failure of the owner of the building to take steps to protect his property does not prevent recovery on the ground of contributory negligence.—Gildersleeve *vs.* Hammond, Supreme Ct. Mich., 67 Northwestern Reporter, 519.

PARTY WALL AGREEMENT.

An agreement for the construction of a wall in common by joint property owners, to the hight of three stories, on the land of one, does not justify the assumption that the other party may, of his own motion, and for his own sole benefit, extend such wall upward still another story, irrespective of injury likely to result to the adjacent property, or that such use may ripen into an easement. The owner of the adjacent property, whose rights and estate are threatened by the proposed erection about to be made by the other, is entitled to the protection afforded by an injunction.—Calmelet *vs.* Sichl, Sup. Ct. Neb., 67 Northwestern Reporter, 467.

The Builders' Exchange

Directory and Official Announcements of the National Association of Builders.

Officers for 1896-7.

President,
James Meathe of Detroit.
First Vice-President,
Thos. R. Bentley of Milwaukee.
Second Vice-President,
Wm. H. Alsip of Chicago.
Secretary,
William H. Sayward of Boston.
Treasurer,
George Tapper of Chicago.

Directors.

Samuel B. Sexton	Baltimore.
E. Noyes Whitcomb	Boston.
John Feist	Buffalo.
James A. Hogan	Chicago.
Alexander Chapoton	Detroit.
Frank L. Weaver	Lowell.
C. A. Sercomb	Milwaukee.
Chas. A. Cowen	New York City.
Stacy Reeves	Philadelphia.
J. J. L. Friederichs	Rochester.
T. J. Moynihan	St. Louis.
Maynard T. Roach	Worcester.

The Future of the National Association of Builders.

The following is the closing part of the secretary's report to the Buffalo convention, and is his presentation of the future of the association, based upon present conditions:

In spite of the fact that the present condition of the exchanges composing the National Association seems to be unpromising, there has never been, in reality, a time in our history when the possibilities of success were so great. We have now had ten years of experience, and are able to determine exactly the causes which effect us beneficially or otherwise, and are able to recognize the conditions necessary to the success of the work we are trying to do. The exchanges which have been and are still represented in the association were accepted as members, irrespective of their ability to perform their share of the work or their fitness to carry out the principles we have enunciated; and all have learned that local organizations must be carefully founded, and must have an adequate understanding of the principles involved in organization, before any degree of success can be hoped for. The exchanges which have failed to comprehend the true character of organization have dropped out of existence and left us with an organization better equipped for the work than at any time in its history. The local exchanges which have fallen to pieces leave us a clear field in which the exchanges that have proved their fidelity to the cause and their understanding of the work may reorganize the builders throughout the country upon a safe and sure foundation. We are now in a position to require that exchanges admitted to membership in the future shall conform to certain specific conditions, and that they shall be based upon lines which our experience has determined as being capable of producing successful results. New exchanges to be admitted shall be so organized that the defects that have worked destruction in the past shall be reduced to a minimum. They shall be founded upon principles which have been the outgrowth of the experience of the past ten years, both locally and nationally, under the application of which the mistakes of those ten years may be avoided.

The present outlook is not so gloomy as it appears, if we take into consideration the fact that the National Association was not established for a day only, and that at the outset there was the clearly defined idea that the association was to exist perpetually. When the association was formed there was no question of limiting its work to any given time. It was formed for the protection of the building fraternity so long as the fraternity should need protection; and now, at a period when the need of that protection is much more pronounced than ever, the incentive to work is correspondingly greater than it ever was before.

The failure of so many local exchanges is the most distinct and positive emphasis that could be laid upon the fact that there is a specific need for our work, for those failures show clearly how little the real nature of organization has been understood. The conditions to be met at the outset were largely speculative, and while it was hoped that the establishment of the association and the dissemination of the principles upon which it was founded would recommend themselves to builders, there was no reason for assuming that they would be sufficiently understood or extensively enough applied to insure success without years of hard and often undervalued work. The enthusiasm which prevailed in the beginning has naturally waned because organizations generally contain few real workers, and the building fraternity in this respect is no different from humanity in any other walk of life.

When we began our work the local exchanges, in the enthusiasm of the moment, seemed to feel that the mere establishment of the association and the combining of the individuals forming the building business of the country would so alarm the evils by which they were menaced that those evils would entirely disappear and leave a condition of affairs in which the cupidity of the individual, and the damaging customs that have prevailed for years, would be entirely obliterated. With experience the fact began to be demonstrated that everything worth having is worth working for, and the value of the reforms dwindled, apparently, as those who were disinclined to work for the accomplishment of reforms gradually allowed matters to drift along without effort in their behalf. The number of those who are willing to devote their personal efforts to the improvement of prevailing conditions is so small that the results of their work must of necessity, be manifested slowly.

We are confronted to-day with a condition of affairs in which a large number, if not a majority, of the exchanges established since the National Association was founded have fallen to pieces. In many instances the members who composed these exchanges have concluded, as a result of their experience, that beneficial organization among builders is impossible, and cite their own cases as proof of the correctness of their opinion. It may be accepted as a fact, however, that no builder holding this opinion could sustain it against the experience of those exchanges which have proved successful; and it is the duty of the National Association to point out to such builders the mistakes that have caused the failure of their organizations, and to show them the lines upon which organization may be rightly established and successfully maintained. However convincing the experience in a given city may be to the builders doing business in that city, failure must, of necessity, presuppose fault, and if the fault is not sufficiently defined in the mind of the local builder, so that he is enabled to recognize and correct it, how much greater then is the duty of the National Association to point out the fault, and make clear the manner in which it has operated to prevent success. The inevitable outcome of faulty work is faulty results; and although the worker may be unable to detect the fault he must admit that fault exists, because of the faulty and inefficient nature of the results.

The builder in a given city is likely to accept the conditions by which he is surrounded as being incapable of improvement, especially after a faulty attempt at their correction; because he fails to recognize that the faults lie, not in the conditions, but in the manner of the attempt at their correction. The National Association (that is, the builders from all over the country) recognizes that all conditions are capable of improvement, and that no local condition is so hopeless that its betterment is not possible, and is enabled, by its larger experience, to point out the fault that has prevented the success of attempts at improvement.

How clearly defined, then, and how insistent is the duty of the National Association to supply the need which it so fully recognizes, even though the local builder may believe that the conditions under which he exists are incapable of improvement. The very fact that he believes such to be the condition is the surest evidence that he needs the work of the National Association, and no matter how indifferent he may be to that work the need of the work is still as apparent as ever.

Builders in many localities have become so discouraged with the conditions under which they are compelled to transact their business that the successful intervention of organization for their help seems to them impossible. In many cases they have tried organization as they have understood it, and found it wanting. They believe that they have applied organization in its best possible form as a means of supplying their needs; and those needs remaining still unsupplied, they have concluded that the fault lies in organization instead of the manner of its application. The organizations of which they complain have been formed of builders, good, bad and indifferent;

they have met regularly, they have adopted apparently satisfactory constitutions, they have enunciated principles which seemed calculated to insure success, they have condemned those who departed from the principles enunciated, and after all still found the evils of which they complained existing in undiminished force. Meetings have been regularly held and the ordinary functions of organization, so far as comprehended, have been fulfilled. and yet, in the face of all this effort, organization for them has not been a success; it has not accomplished what was expected of it, and as a natural result organization as an aid to the transaction of business has been considered incapable of producing the results claimed for it. It is plainly the duty of the National Association to point out the specific manner in which these organizations have been at fault, the specific manner in which the individuals composing these organizations have been at fault, and to bring about a recognition of the fact that faulty organization must inevitably produce faulty results, if it produces any results at all. It is the duty of the National Association, first, to secure in the individual a recognition of the fact that organization, as he has understood it, is not organization as advocated by the National Association; and next, that until a sufficient number of individuals in any city recognize their obligations to others, the organizations which they compose must, of necessity, be limited in power to produce benefit, and inefficient as a means of protection.

It is most unfair to expect the National Association to explain to every builder in ten years the true nature of organization and the manner in which he individually may help to make it effective. Builders must recognize that the fault does not lie in the National Association, for in reality the association is simply the voice of builders all over the country who have given earnest thought to the needs of the fraternity, and who for the better dissemination of their conclusions have formed what is called the National Association of Builders. In blaming the National Association builders are not blaming an organization, but are attempting to shift their individual responsibility off on to those members of the fraternity who are striving to formulate principles and methods for protection and advancement. From no possible point of view can the National Association be rightly blamed for anything, for if blame is to be attached to any one it should not fall upon the builders who are working for the benefit of the fraternity, and who in reality constitute the National Association. The sole fault in the failure to secure greater benefits rests upon the individual, for his failure to investigate the conclusions of his fellows (as presented by the National Association), and his failure to apply those conclusions for his own protection (when those conclusions meet his approval), is the cause of the failure of the organization, and the blame, if any, must rest upon such individuals, where it belongs.

In reality, however, it is immaterial whether the blame should rest upon the individual, or even whether there is any blame to be attached to any one; because all recognize that the conditions by which builders are surrounded are damaging and injurious, and therefore that they need correction; and all also recognize that the best thought of the builders of the country is the best means for formulating the methods by which the needed corrections are to be secured. The National Association is the means whereby the best thought of the builders of the country may be attained; hence there is no question as to the value of its work or the need of its maintenance.

The manner in which we must work must be that which will soonest bring about an understanding in the minds of all of every man's responsibility to the fraternity and to his fellows individually; and that manner seems to be based upon some course which will place in the hands of the individual builders everywhere the best possible explanation of their needs and the best possible means for their correction. This work must be done unceasingly; it must be done because it is needed, and it must be done so sincerely and so disinterestedly that it shall appeal to builders everywhere as a work for the benefit of all, and in which no individual will profit in any manner at the expense of his fellows. The work must be carried on in such a form that it will draw to it the loyalty and support of builders everywhere, adding allegiance from day to day and from year to year, until at last sufficient strength shall have been gathered to control the conditions by which builders are surrounded, and to reduce damaging and injurious customs so destructive to progress to their lowest terms.

Massachusetts State Association.

The second annual meeting of the Massachusetts State Association of Builders was held at Lowell, Mass., on October 28. Preparations were made for an interesting meeting, and all the exchanges in the State, whether or not members of the association, were cordially invited to send as large a delegation as possible.

The principal business of the meeting was the formulation of some method of procedure whereby the association might secure affiliation from all exchanges in the State not yet identified with it, and to extend the beneficial influence and operation of careful organization as widely as possible.

In addition to the regular delegates a large number of visitors were expected from Boston and Worcester, the other cities represented in the association, and from other cities in which representation has not yet been secured.

The members of the Lowell Exchange had provided a number of pleasing entertainment features for the occasion, including a collation during the noon recess and a dinner after the close of the meeting.

New Publications.

PRACTICAL GAS FITTING. Size 6 x 8 inches; 116 pages; 54 illustrations; bound in board covers with gilt side title; published by David Williams, 232-238 William street, New York City. Price, $1.

This little volume consists of two illustrated articles reprinted from *The Metal Worker* describing how to run mains, lay pipes and put up gas fixtures. The articles were prepared by practical gas fitters, and constitute a treatise on the subject which cannot fail to prove both interesting and valuable to all engaged in the line of work mentioned. The subject is rendered all the more valuable from the fact that it is treated from two points of view, and the descriptions, although perpared independently, necessarily supplement each other in a number of particulars. The first article is by J. W. Hughes and the second by W. B. Gray, both well-known writers on plumbing and gas fitting topics, and the volume considered as a whole is well calculated to prove of special assistance to the younger members of the plumbing trade

ROOF FRAMING MADE EASY. By Owen B. Maginnis. 52 pages; illustrated with 76 engravings; size, 6 x 9¼ inches; bound in board covers; published by the author. Price, $1.

This little volume has been brought out by the author for the especial use of those who are desirous of becoming proficient in the higher principles of construction and who wish to study and apply the best methods in actual daily practice. It is comprised in 27 chapters, which cover various forms of roof construction, the methods being made clear and easily comprehensible by means of numerous illustrations.

CONTENTS.

Carpentry and Building

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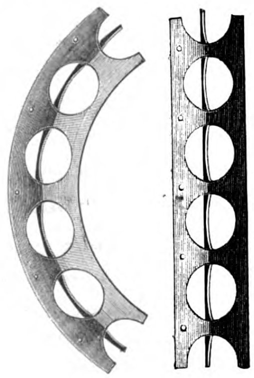
ENTERED AT THE POST OFFICE, NEW YORK, AS SECOND-CLASS MATTER.

NOVELTIES.

The Union Metal Corner Bead.

A device in which builders, and especially plasterers, cannot fail to be interested, is a metallic corner bead for



Novelties —The Union Metal Corner Bead —Fig. 1.—Two Sections of the Bead.

plaster corners, and intended for use in connection with wood, brick, terra cotta and steel buildings. The bead is of simple construction and its use is claimed to enable any ordinary mechanic to make a first-class corner as easily as he can do plain wall work, owing to the fact that the line is established before the plaster is applied, and it is only necessary for the mechanic to work up to it. By this means it is claimed a great economy is effected, as well as immunity from defacement by chipping. The accompanying illustrations show the appearance of the bead as well as the manner in which it is applied to wooden and iron

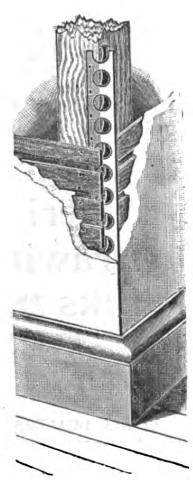


Fig. 2.—Showing Manner of Using the Bead on Wood.

buildings. Fig. 1 represents two sections of the bead, one being curved and the other straight. Fig. 2 shows its application to wood, and Fig. 3 the manner in which it is used in connection with an iron building. The bead is formed of rolled steel plate folded double and galvanized. It is perforated in such a way that the plaster goes through the openings and thereby forms a solid corner of mortar and steel securely locked together, while the folded edge remains exposed. The manufacturers state that the Union metal corner bead can be papered over without forming wrinkles, and that its strong points are construction, durability and appearance. The bead is made for all angles and arches and can be supplied in lengths of 6, 7, 8, 9 and 10 feet. The strips are manufactured by the Youngstown Iron & Steel Roofing Company of Youngstown, Ohio, and galvanized and finished by the Union Metal Corner Company, with general office at 186 Summer street, Boston, Mass., and branch office at Youngstown, Ohio. The manufacturers state that the use of this metal corner bead makes a plaster corner that will last as long as the building itself.

Combination Boxwood Rule.

Stephens & Co. of Riverton, Conn., who for many years have manufactured United States Standard boxwood and ivory rules, bench rules, desk rules, &c., also make a combination

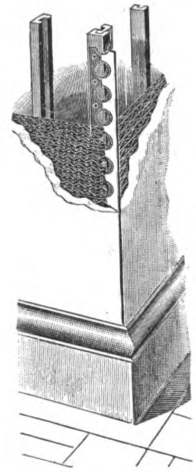
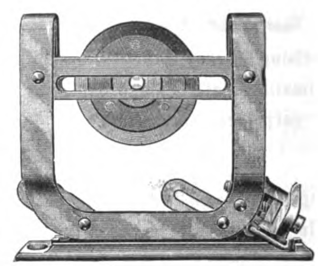


Fig. 3.—Application of the Bead to Iron

rule of boxwood with one joint, well protected with brass binding. This instrument may be used as a spirit level, try square, level, plumb and inclinometer or slope level. The steel blade folds like a knife blade and one side of it is graduated, the figures 5, 10, 15, 20, up to 45 denoting the degree of the angles which are formed by opening the legs of the rule. This tool is sold by the hardware trade largely, but samples from the factory are sometimes sent by registered mail.

Freeport Parlor Door Hanger.

Warner Hardware Company, Freeport, Ill., have put on the market the parlor door hanger shown in Figs. 4 and 5. The hanger is made of steel and malleable iron, so as not to break. The wheels are made of solid vulcanized fiber, so that no metal comes in contact with the track. In hanging the doors the sliding base plate with automatic gravity lock makes it unnecessary, it is explained, to remove the adjusting screws, as when the base plate is screwed to the door the door is coupled to the hangers by simply sliding the parts together, when the gravity lock falls and locks them together. The door, it is shown, may be readily detached at any time, without removing the screws, by raising the gravity lock and slipping the hanger from the base plate. This is referred to as a great saving of time and as being appreciated by any one who uses the hangers. The center stop, which is provided with sound deadening bumper, is secured directly to the stop and is released by the use of a screw driver, and moved along the track so that the door may be moved out to get at the rear adjusting screw.



Freeport Parlor Door Hanger.—Fig. 4.—General View of the Hanger.

The wheels run on a single steel track, easily secured in place, it is stated, and not subject to the derangements caused by the warping and twisting of wood track. The manufacturers claim that the hanger is as noiseless as it is possible to make it; that its anti-friction form secures freedom of action, and that the hangers are independently adjustable and are attached without cutting the door.

The Peerless Sandpapering Machine.

A machine adapted for use in many branches of the wood working business is the Peerless sander, illustrated in Fig. 6 of the engravings. This machine is claimed by the manufacturer to do all work perfectly that can be done on a disk or a drum sander, besides doing many kinds of work that has heretofore been done by hand. The construction is said to be such that a finished surface is produced equal to the best hand work, and that the machine can be used with an emery belt instead of sand for the finishing of brass work and metal of all kinds, where flat and square edges are required. In the construction of the machine there is an endless belt made of sand cloth of any number

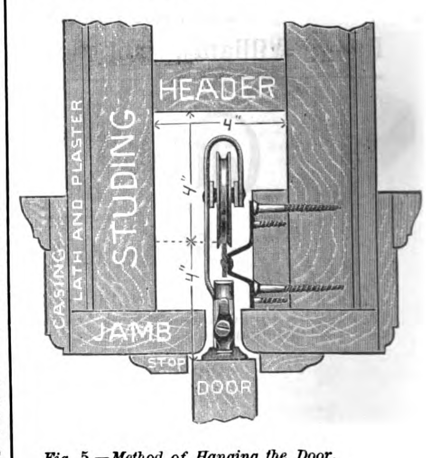
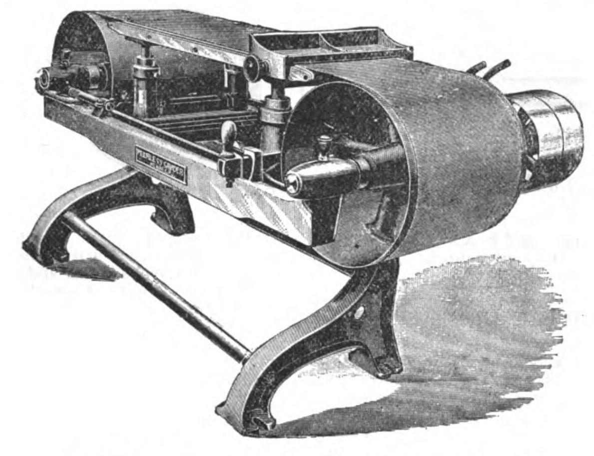


Fig 5.—Method of Hanging the Door.

from No. 0 to No. 3, running on two drums over a working table covered with rubber, thus making an elastic surface on which to operate while protecting the paper and thus adding to the length of time which it can be used to advantage. One drum has an adjustment, and can be accommodated to the requirements of the belt while in motion, also giving the necessary tension and enabling the operator to make such changes of paper as the different kinds of work may require.



Novelties —Fig. 6.— The Peerless Sandpapering Machine.

The length of the machine over all is 60 inches, its width 36 inches, and its weight 650 pounds. It is being manufactured and placed on the market by E. J. Bein of 277 Orange street, Newark, N. J.

The Fitch Sash Lock.

The sash lock represented in Fig. 7 of the ilustrations is put on the market by the W. & E. T. Fitch Company, New Haven, Conn. Its construction is such as to securely lock the window, at the same time lifting the upper sash from the point to which it frequently rebounds or sags. The lock is arranged also to prevent rattling by drawing the sash together, while the spring in the lock keeps the window locked or unlocked, thus preventing such disfigurement of the sash as often occurs and the breaking of the locks. The manufacturers call attention to the simplicity, durability and attractiveness in design of the lock. It is furnished in either plain or ornamental design in various iron and bronze finishes, copper plated, brass, silver finish, &c.

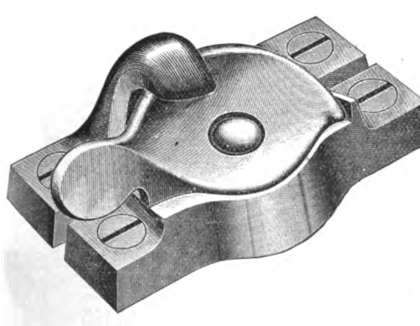


Fig. 7.—The Fitch Sash Lock.

THE SYKES STEEL ROOFING COMPANY, 611 South Morgan street,, Chicago, Ill., have lately shipped 1600 squares of steel siding and roofing for a large grain elevator at Minneapolis. They have also completed a similar order for a Chicago elevator.

The Ideal Band Resawing Machine.

A band resawing machine, embodying many interesting features of construction, is that known as the Ideal, and manufactured by William B. Mershon & Co. of Saginaw, East Side, Mich. This machine is referred to as being first-class in all respects, convenient and accurate in adjustment, durable, powerful and economical to operate. It has been brought out to meet the demand for a high grade tool, which could be sold at moderate cost, and is well suited for all kinds of resawing such as picture backing and veneers, where accuracy is required, as well as resawing panels, box boards, &c. It is especially adapted to the requirements of sash and door factories, planing mills, &c., the statement being made that pieces as short as 8 inches or less can be sawn with safety. Saws as thin as 23 gauge or thinner may be used, removing a saw kerf of less than $\frac{1}{20}$ inch. The matter of the thickness of the saw employed has become of such great importance that the company now order their saws ground by micrometer gauge. The manufacturers call special attention to the heavy, massive frame to which are attached the journal boxes of the main shaft, the great spread of the base, giving an extra rigid foundation, and to the guides, for which patents were lately granted. The upper one, while sufficiently rigid to properly guide the saw, is slightly flexible so as to prevent crystallization when coming in contact with the material. The lower guides are yielding or have relief springs which permit the saw if forced by accident or otherwise to pass entirely out of the side of the board without being bent or stretched out of shape. The guides receding for this purpose retain at the same time all the properties of the fixed or rigid guides, which the company consider very important, as it enables the use with safety of the very thinnest saw blade. There are also patented appliances for removing all pitch from the wheels so that the latter, which are ground to fit a steel templet, always present the same face to the saw blade, thus giving the requisite tension to all portions of the blade and insuring perfect working. A general view of the resaw is shown Fig. 8 of the cuts.

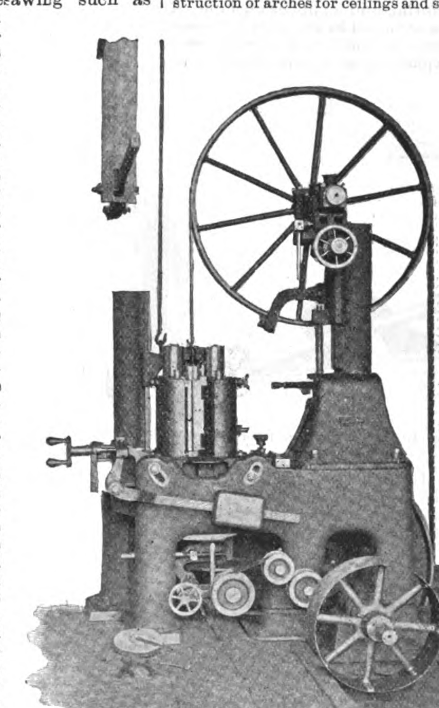


Fig. 8.—The Ideal Band Resawing Machine.

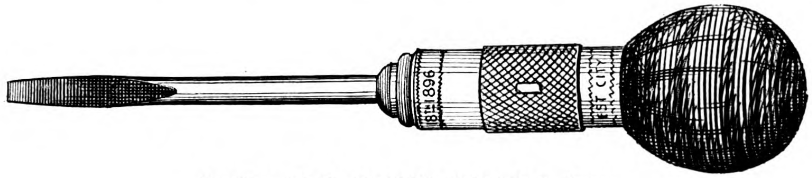
New Padlocks.

Slaymaker-Barry Company, Lancaster, Pa. (for whom John H. Graham & Co., 113 Chambers street, New York, are agents), are now prepared to execute orders for their new padlock, No. 4045. They describe it as all rolled steel case and shackle, shackle polished, case blued background, polished raised parts, four cut brass levers, three brass stops, large number of changes and large milled bronze metal key bushing. It is quite unique in design and appearance. The same pattern is made in No. 4046, with exterior sand finished, clouded antique copper, and No. 4047, all bronze metal, polished and lacquered.

THE R. GUASTAVINO FIRE PROOF CONSTRUCTION COMPANY of 9, 11 and 13 East Fifty-ninth street, New York City, have lately made improvements in the building tiles which they are offering to the trade. One of their late patents, granted to Rafael Guastavino, and assigned to the company, relates to the manufacture of building tiles intended particularly for use in the construction of arches for ceilings and staircases and for partitions. The object of the invention is to produce a block of building tiles which block, when completed, shall embody a certain number of tiles with flanged longitudinal sides and beveled ends, and a certain number without the flanged sides and beveled ends, but with their ends cut diagonally to the edges of their sides so as to give them faces in the form of rhomboids.

Ratchet Screw Driver.

Forest City Screw Driver & Drill Company, Portland, Maine, Allerton-Clarke Company, 97 Chambers street, New York, general selling agents, have just put on the market the ratchet screw driver shown in Fig. 9 of the illustrations. The handle is hard-



Novelties —Fig. 9.—Forest City Ratchet Screw Driver.

wood, cherry finish. The blade is attached to a hardened brass shaft having parallel grooves, which is contained in a metal cylinder, over which passes a " shipper " or sleeve. Moving the shipper toward the handle causes the blade to drive a screw in; moved to the other extreme reverses the action for withdrawing screws, while left midway makes the blade rigid for use as an ordinary screw driver. It is made in 3, 4, 5, 6 and 8 inch sizes.

The Bradeen Door Check.

The Bradeen door check, illustrated in Fig. 10 of the cuts, is manufactured by Gilbert K. Bradeen, 178 Devonshire street, Boston, Mass., and is made of malleable iron finished in japan, bronze or nickel. The check is composed of two pieces of malleable iron, a coil spring and a rubber cushion. It may be attached to any door by means of screws, and will not be in the way, it is explained, as it sets close to the

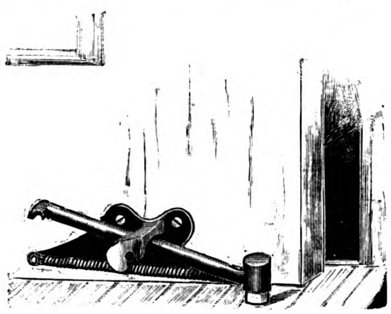


Fig. 10.—The Bradeen Door Check.

door. It is operated by the foot, and a slight pressure releases the spring and causes the rubber tipped lever to grip the floor, thus holding the door, while a similar operation raises the lever and permits the door to swing. The check is designed to be attached to any door by means of screws, to hold the door wide open, half open or in any position, and to prevent slamming and breakage of glass.

New Model Up to Date Champion Saw.

The National Saw Company of Newark, N. J., are offering the trade a cross cut saw which is catalogued as " Our New Model Up to Date Champion." It is stated that the saw will retain the same thickness on tooth from the end of saw, no matter how much the saw is filed down by sharpening, this result being obtained by perfected grinding machinery. The saw is made of Hercules steel, to the high quality of which the manufacturers refer. They point out that an important feature in the new saw is that the new process of grinding leaves it so stiff, no matter how much it is filed, that one man can use the saw and work it with ease. The saw is made in XXX thin back, six gauges, and in XX thin back, three gauges, fully warranted.

Russell & Erwin Mfg. Company's Special Goods.

The knob and escutcheon shown in Fig. 11 of the cuts represents

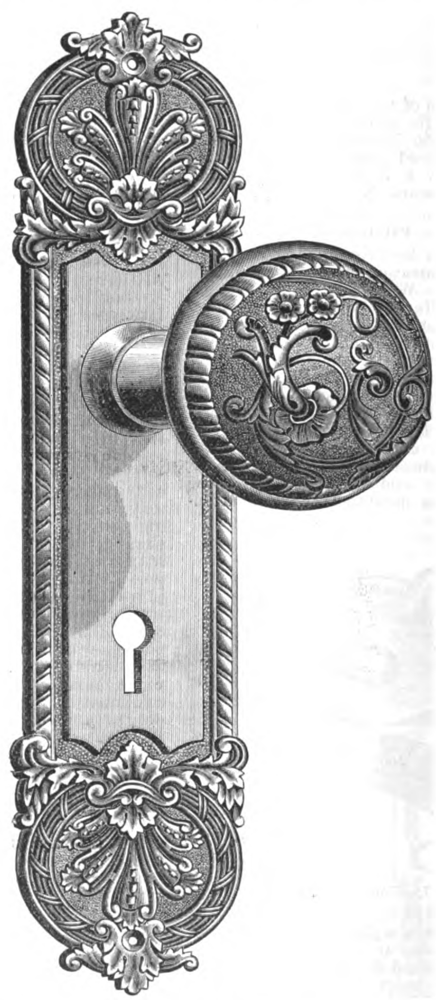


Fig. 11.—New Design of Knob and Escutcheon in Embossed Bronze.

a new design in embossed bronze metal, added to their line by Russell & Erwin Mfg. Company, New Britain, Conn., and New York City. The design is adapted to the modern order of architecture and decoration, and is made especially to take advantageously the prevailing styles of old copper finish, both in smooth and sand blast. The manufacturers refer to it as an advance upon work of similar character on the market, and call attention to the attractiveness and artistic merit of the design. Trimmings are made in this design for mortise locks, sliding door locks, knob latches, Columbia vestibule mortise latches, and in push buttons and sash lifts. A pamphlet illustrates these goods, with descriptions and list prices. The company also issue a 30 page pamphlet entitled "Columbia Lock Supplement," in which they show the increased line of locks in which the Columbian cylinder is applied, including night latches, dead locks, office

door locks, front door and vestibule door locks and store door locks. An improvement in the Columbia hori zontal rim night latch is shown, consisting of a connecting bar, adjustable for any thickness of door, without cutting off or measuring it. This is accomplished by making the knob hol l ow, thus permitting the bar to slide into it.

TRADE NOTES.

EXAMINATIONS of applicants for admission to the Williamson Free Trade School, Media, Pa., commenced at the school on Monday, October 12, the successful applicants to be admitted with the next class, entering the school in 1897. An extension has lately been made to the school buildings, which brings the total capacity of the institution up to 180 pupils.

THE JOSEPH DIXON CRUCIBLE COMPANY, Jersey City, N. J., continue to favor their friends with monthly reminders in the shape of blotters backed with a calendar and an appropriate picture.

"THE USE AND CARE OF BAND RESAWS" is the suggestive title of a valuable handbook which has been issued by W. B. Mershon & Co., Saginaw, East Side, Mich. It is a volume of 70 pages in which is to be found not only a full description of the machines and tools manufactured by the company named, but also full and practical directions based on the latest information at their command concerning the care and management of saw blades. Among the various phases of the subject treated may be mentioned directions for brazing saw blades, hammering, tensions, leveling and straightening, form of teeth, &c., cracking, changing the saw on the mill and straightening, the back edge of a saw. Numerous illustrations are presented, together with various testimonial letters. the little work, as a whole, being of such a character as cannot fail to prove interesting and valuable to many in the trade. We understand that the company will forward a copy of the handbook to any one who may apply.

A NEW DEPOT for the sale of Cabot's creosote shingle stains, sheathing quilt, mortar colors and brick preservative, made by Samuel Cabot of Boston, Mass., has been opened in San Francisco at 640 Mission street. The depot is in charge of Charles J. Waterhouse, well known to architects and builders on the Pacific Coast as the representative of Burrowes' screens. All the above mentioned materials will be carried in stock, ready for immedate shipment, and samples, prices, estimates, &c., will be gladly furnished on request.

THE J. A. FAY & EGAN COMPANY of Cincinnati, Ohio, announce that Charles A. Gilbert, formerly one of their salesmen located at Atlanta, Ga., is no longer connected with the company, and that Eugene Donnelly, formerly with their New Orleans office, has been placed in charge of the Atlanta branch, at 36 West Alabama street.

BRADLEY & HUBBARD MFG. COMPANY, Meriden, Conn., for many years manufacturers of metal lamps, have recently added a department for wrought iron, brass and bronze metal work, such as bank and office railings, grilles, elevator inclosures, &c., and advise us that they are prepared to make estimates from architects' drawings or furnish such designs and estimates themselves.

THE J. L. MOTT IRON WORKS, New York City, are distributing circulars of the new series Sunray steam boiler, which is a vertical sectional boiler of the indirect draft type, using push nipples in the connections, and the bolts for holding the sections together are all on the outside of the fire and water passages. No headers are used in the boiler, the sections being so constructed as to obviate their necessity. The grate is of the labor saving type and there are ample facilities for cleaning the flues, feeding the fire and removing ashes. The boiler is intended to meet the competition of low priced goods.

WE HAVE RECEIVED from Morse, Williams & Co., with general offices and works at Frankford avenue and Wildey and Shackamaxon streets, Philadelphia, Pa., a copy of a voluminous catalogue entitled "Elevator Etchings." The 40 pages of which the work consists are bound in colored paper covers by means of a silken cord, stitched through the leaves at the extreme left. The printing is on heavy paper, and the only text is found in the opening pages in the shape of a table of contents in which each style of elevator shown is briefly described. One of the plates is a reproduction from a photograph of the company's works, which cover an area of 31,672 square feet, giving a floor space of 72,617 square feet, devoted exclusively to the manufacture of elevators. The plates contained in the volume are copyrighted. The manufacturers state that they have issued several especial circulars pertaining to the various styles of elevators which they build, and these will be sent to any one on application. The make up of the volume is such as to render it valuable to builders and contractors as well as others who have occasion to purchase or install hydraulic, electric, steam, belt or hand power elevators, dumb waiters, &c.

THE PITTSTON IRON ROOFING COMPANY of Pittston, Pa., are erecting a new building 50 x 60 feet in size and three stories in hight. It is near the Ferry Bridge, which is about ¼ mile from the company's old site. The engine and machinery for manufacturing the steel roofing will be located on the ground floor, the office and stockroom on the second floor, while the third floor will be used as a room for painting the roofing.

THE ADVENT of cold weather is calculated to turn the attention of house owners to the matter of heating, and many, therefore, will be interested in the announcement presented in another part of this issue by the Mount Penn Stove Works of Reading, Pa., and with Philadelphia office at 1111-1113 North Second street. This company refer to the ideal method of economical heating which is embodied in their hot water heating range. They state that a house of six or seven rooms requires no other heating apparatus than this device, while a mansion is heated in part, and in spring and fall sufficiently, without additional expense, and without diminishing the hot water supply for domestic purposes. Those who are putting up buildings are interested in knowing how their investment may be improved, and to such the company will send upon application a copy of a little book descriptive of their system. The company state that the cost of heating to which they refer brings it within the reach of every one and that it is adapted to the cheapest buildings.

"SELF HELP" is the apt title of a new publication issued by the Colliery Engineer Company, Scranton, Pa., in the interest of the International Correspondence Schools of that city, and which is described as "a journal to make known the merits of correspondence instruction in technical subjects." The first number of the new paper contains views and descriptions of the handsome new buildings now being erected for the International Correspondence Schools, which show that the institution will possess a very complete equipment for its work. In addition to some interesting technical articles, full information is given in the paper regarding the scope of operations of the schools, and details are provided about scholarships, &c. Copies of the publication may be obtained on application to the purchasers.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Washington, D. C., until November 18, for all the labor and materials required for the roof sheathing, slate and copper work of roof, down and drain pipes, roof skylights, &c., for the United States Court House, Post Office and Custom House Building, at St. Paul, Minn., in accordance with drawings and specifications, copies of which may be had from the Supervising Architect, at Washington, or from the Superintendent at St. Paul, Minn.

THE AMERICAN SCREW COMPANY of Providence, R. I., send us a sample of their patent forged screw, which among other features is claimed to possess the characteristics of strength, centralized point, thin screw, tapered shank and uniformity. This screw, we understand, represents the greatest advance in screw making since the adoption of the gimlet point, patented August 20, 1846. A neat little folder carries illustrations showing the process of development from the plain wire to the finished product of the company's cold forged wood screw. The smple screw which the company are distributing is tied by means of a silken cord to the folder in question.

THE EVENING TRADE CLASSES which were held last year under the management of the Department of Manual Training and Art Education of the Teachers' College, Morningside Heights, New York City, resumed their sessions on Monday, October 12.

WILLIAM A. CHAPMAN & Co., general contractors, announce that their office will be moved November 1 to more commodious quarters on the sixth floor of the Industrial Trust Company's building, 49 Westminster street, Providence, R. I.

THE SIMONDS MFG. COMPANY of Fitchburg, Mass., and Chicago, Ill., are distributing a package of advertising matter calling attention to the various specialties which they manufacture. A little pamphlet of 32 pages contains Hints to Sawyers and Filers, reference tables and numerous testimonial letters. Among the circulars are those relating to the Simonds band saw guide, Simonds cross cut saws, Simonds patented improved saw tool, and the Simonds saws and knives. Many of the circulars are illustrated, and the matter is of a nature to interest the sawyer, filer, and the mill man.

DURING his short stay in Cincinnati, Ohio, Prince Michel Hilkoff, Russia's Imperial Minister of Ways and Communications, visited many points of interest, including several industrial establishments. His special escorts in Cincinnati were Ralph Peters, representing the Pennsylvania Railroad, and Thos. P. Egan, of the J. A. Fay & Egan Company, representing the manufacturers of that city. In examining machinery for making cars, at the J. A. Fay & Egan Company, Prince Hilkoff showed his practical knowledge. They had machines in operation, and he asked to see a square hole made with a round auger and also a special machine for tenoning, gaining and cutting off car timbers at both ends at the same time. He was much gratified, and admitted that this was his special business in coming to Cincinnati to see this great manufacturing company.

"SUN STOPPERS" is the title of a very neat catalogue which reaches us from the Willer Mfg. Company of Milwaukee, Wis. It is known as the popular edition of Catalogue A, No. 15, and relates to Willer's specialties in inside window blinds. The pages are 80 in number, illustrated with many engravings calculated to render the construction and operation of the goods more easily understood than would result from the use of text alone. In offering this little book to the public, the company say: "It is our purpose to give the general public, the people having houses built for themselves, more so than the professional architects and builders sufficient information about the various kinds of inside blinds we make to enable them to make a selection as to the kind or kinds of blinds they prefer, and making such preference known to their architect and builder. We particularly desire to put the building public in a position to make their wants and preferences known to the architect and builder before the construction of the house is begun, so as to enable such architect and builder to arrange his window frames in a manner best suited to the particular kind or class of blinds selected. Complete information as to the construction of the window frames, the application of the blinds and guideways to the window, and all other minor details, which are of no special interest to the public at large, is all contained in our large Catalogue C, No. 13, complete architects' and builders' edition, a copy of which is supposed to be in the hands of every architect, and where not, it will be supplied upon special request of such architect."

FROM THE HOWARD THERMOSTAT COMPANY, 111 and 115 Water street, Oswego, N. Y., we are in receipt of a prettily printed pamphlet of 16 pages, directing attention to the advantageous features of the Howard automatic draft regulator. A full description of the apparatus is given in the beginning of the pamphlet, and opposite is a sectional view through a house, showing the Howard automatic draft regulator applied to a furnace. A significant feature of the illustration is a little fuel receptacle which carries the inscription "Only a small coal bin necessary." The regulator is explained in all its details and reference is made to the medal awarded the company by the World's Columbian Exposition, and at the end are several pages of testimonial letters and references.

THE NASON MFG. COMPANY, 71 Beekman street, New York, report, in addition to a lively trade in the Equator steam heater, the receipt of a number of orders for the Nason vertical water tube radiator, the makers pointing out that the efficiency of this character of radiator and the price at which it can be sold are equally attractive to the trade.

THE POWHATAN CLAY MFG. COMPANY of Richmond, Va., have furnished their cream white bricks, Roman shape, to D. M. Lea for nine residences on Kenesaw avenue, Washington, D. C., and their standard size brick for a new residence at Somerville, Mass. They have also furnished 40,000 granite colored bricks to J. E. Cox, for his new residence at High Point, N. C., and have furnished the brick for the new library building at Princeton, N. J.

THE F. A. REQUARTH COMPANY of Dayton, Ohio, distribute a card calendar for the month of October, which in design and general make up is in keeping with those sent out for previous months by this house.

THE EDUCATIONAL DEPARTMENT of the Young Men's Institute, 222 Bowery, New York City, opened its doors to young men on Monday, October 5. Instruction is given in freehand, mechanical and architectural drawing, practical electricity, steam engineering, carriage drafting and some of the English branches. The classes are open to all men of good character between the ages of 17 and 35. The instructors are men of experience and have attained marked success in their particular lines. The school year continues until May and diplomas and prizes are awarded by the Committee of Management.

— "I WENT to take a quinine capsule this morning, and just as I got it in my mouth, it came apart —"
"Ah, that was a bitter parting, indeed!"—*Indianapolis Journal.*

— "Now, Eleanor, you weigh 130 pounds and the weight gauge on the hammock registers 300 pounds. Where did that other 170 pounds come from?"
"From—N-new York, I think."—*Life.*

— A BUSINESS VIEW OF IT.—Doctor: "You are suffering from a complication of diseases, my dear sir—at least six."
Humorous Invalid: "How much discount do you give me on half a dozen, doctor?"—*London Tit-Bits.*

CARPENTRY AND BUILDING

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
232-238 WILLIAM STREET, NEW YORK.

DECEMBER, 1896.

Business Revival.

The election is over, with results which indicate renewed prosperity to the trade and commerce of the country. The dread of a possible recurrence of severe business depression is removed. Capital which has for months past been locked up is now more freely flowing in the old as well as in the new channels of trade and enterprise. Already the relief felt in the outcome of the election is being expressed on all sides in an expansion of business as marked as it is encouraging. Numbers of lately idle mills and factories are already in motion or preparing to resume active operations. Building operations which were held in abeyance pending the outcome of the election have now taken on a new lease of life and everywhere in the trade is a feeling of encouragement as to the future. Stocks in almost every branch of business are known to be phenomenally low, as for many months past no one bought at a time more than necessary to fill current needs. The times are ripe for an active trade in all kinds of seasonable goods. Politics, which usurped the place of business for many weary weeks, should now be put on the top shelf, and the splendid opportunity which seems to be opening out for a general trade revival of a permanent character should be improved without loss of time.

Sanitary Conditions in Tenement Houses.

The proposed charter for the Greater New York contains some provisions designed to improve the sanitary conditions in tenement houses in the city, which are a decided step in advance of the existing regulations. It is required that all tenement houses must have light, ventilation and ample means of exit in the construction. Among other things it is provided that they are to be inspected twice each year, and the infected dwellings and those considered unfit for human habitation are to be condemned. Two buildings must not be placed on the same lot unless there is a clear open space between them not less than 10 feet wide, while no building must occupy more than 65 per cent. of the area of its lot. In tenement houses erected after June 16, 1897, every sleeping room must have a window at least 12 square feet in size, admitting light and air directly from the street or yard. These are all judicious regulations which will tend to improve the lot of the dwellers in the crowded tenement house districts of this city.

Trade Protection.

Some curious questions are arising in sundry trades which involve the right of other persons to perform functions claimed to belong to a particular craft. In Chicago the electrical mechanics and the gas fitters are at loggerheads over conduit work, in which wrought pipe is used for protecting wires when laid underground. The gas fitters contend that members of their trade shall do work of this character, and they have the support of the Building Trades Council in their contention. But the electricians have the majority of the electrical contractors on their side. It is claimed that the decision of the Building Trades Council was based on the belief that the pipe used for undergound wiring is threaded, but the electrical workers state that they use a coupling which requires no work to be done on the pipe. Nevertheless, the gas fitters are persisting in their demands and have gone so far as to order a building trades strike on a job on which electricians are doing iron conduit work. In Buffalo the plumbers and hardware merchants are fighting over the right to make water connections with ranges. The plumbers claim that all such work is plumbing and belongs to them, although the connections may be made by special couplings which do not involve the wiping of a joint, but only need the use of a wrench. Another question of a related character has arisen in Chicago between the master plumbers and the journeymen's union. The slackness of trade has compelled some employers to discharge their journeymen, and to start out themselves with a kit of tools when called upon to do a job of plumbing. The journeymen's union resents this as an invasion of their rights, and demands that master plumbers shall either refrain from actual manual labor as plumbers or shall join the union and agree to live under union rules, paying fees and dues corresponding with their presumed greater financial ability as compared with journeymen. This disposition to protect a trade is not of recent origin, although some of the peculiar phases now developing are of a novel character. Some of them seem absurd and unworthy of serious consideration.

Brussels International Exposition.

Prof. J. H. Gore of the Columbian University and Prof. Thos. Wilson of the Smithsonian Institute, the United States Commissioners to the Brussels International Exposition of 1897, to which reference was made in our issue for October of this year, have completed their plans for American participation in the undertaking. They now appeal to the manufacturers and producers of the United States to seize the favorable opportunity which the exposition will afford for introducing their goods into European markets, by placing exhibits of their products there. They quote a recent report to the State Department from the United States Consul at Ghent, Belgium, which tends to show that a market for American goods in that country could certainly be well worked with proper attention and care, Belgium being a large purchaser of foreign products, while her favorable tariff regulations offer special facilities for the promotion of foreign trade. So much is this latter advantage appreciated that many large commission houses are located in the principal Belgian cities for the sale of foreign goods to consumers in all the countries of Europe. By making an adequate exhibit of their products at the Brussels Exposition, American manufacturers would thus get an excellent opportunity to place them in competition with those of other countries and to secure a large part of the trade that now falls to the European producers. The exposition will be opened on May 24 and will continue to October 31, 1897. It is recommended that exhibitors have a special representative in charge of their display who can speak French. But, in the case of small exhibits, arrangements for the unpacking, installation and care of the same may be made with M. Jean Verhaegen, Place Loos 1, Antwerp, Belgium. Applications for space are to be made on special forms supplied by the commission, and must be sent not later than January 1, 1897, to the office of the Commissioners of the United States, Columbian University, Washington, D. C. All foreign exhibits will be admitted in bond free of customs dues, provided they are re-exported at the close of the exposition.

A Novel Race Between Builders.

Among the more important building operations in progress within sight from the windows of the editorial sanctum of *Carpentry and Building* are the magnificent structures which are being erected by the New York Life Insurance Company, at Broadway and Leonard streets, and by the Central National Bank, at the corner of Broadway and Pearl streets. What lends more than usual interest to the progress of these two structures is the fact that they are nearly the same in size, so far as ground space is concerned, and will be of nearly the same hight when completed. The work of tearing down the old structures on the two lots commenced at exactly the same time, as did also the foundations, and the plans contemplate that both buildings shall be ready for occupancy May 1, 1897, or just one year from the time the work of taking down the old buildings began.

McKim, Mead & White are the architects of the New York Life Building, and Charles T. Wills is the contractor. John T. Williams is both architect and contractor for the bank building.

While there is no formal understanding between the architects, contractors or foremen of the two buildings, there is doubtless a desire on both sides to be the first to complete their structure, and this is pushing the work along in such a way that the two buildings are keeping well together.

The New York Life Building is 50 x 200 feet and is to have 13 stories, with a tower equal in hight to five stories. At the time of writing the iron work on this building is completed to the first story of the tower, the fire proof flooring has been laid to the top floor, and the outside stonework has reached the level of the tenth floor from the street all around the building.

The Central National Bank Building is 75 x 150 feet and is to be 15 stories high, with no tower. Its iron work and fire proof floors are completed to the roof, and its outside stone and brick work is a little above the level of the thirteenth floor. The first story of the bank building is 22 feet high, while that of the New York Life is only 16 feet.

If either building is completed ahead of time, the contractor will be paid a bonus for every day under the specified time, while, on the other hand, if either of them is delayed over the specified time, the contractor will forfeit a certain amount for every day. All things considered, the race is a novel as well as an interesting one, with the chances in favor of the buildings being completed ahead of time.

THE following is a recently adopted amendment to the ordinance governing the installation of hot air furnaces in Baltimore, Md.: "Section 3. And be it further enacted and ordained, that no hot air furnace or other heating apparatus shall be placed in a dwelling or other building until a permit so to do shall have been obtained from the inspector of buildings for each dwelling or other building to be heated, and a failure to obtain such permit shall subject the party erecting the heating apparatus to a fine of fifty dollars ($50), such fine to be collected as other fines for the violation of city ordinances are collected; and such permit shall be returned to the inspector of buildings by the party erecting such furnace or heating apparatus at the time the final inspection of the work is done."

Tests of Wired Glass.

The tests of wired glass appearing in a recent report of the Boston Mutual Fire Insurance Company indicate an unexpected use of this article in fire proof work. The building used in the experiment was an ordinary brick building 9 feet high, provided on one side with a wire glass roof and roughened glass on the other, side windows and a glass door with wooden frames lined with tin. The building was filled with rosin saturated wood to the hight of 6 feet. On firing the ordinary glass cracked and fell at once, while the wired glass remained, notwithstanding the heat was so great as to crack the walls of the building. The theory of this glass standing the heat in this manner is that the glass, under the first influence of heat, cracks but is held in place by the wires, but as the heat increases the glass becomes fused and again cemented together. Glass fusing at a lower temperature than the wire, and being a poor conductor of heat, each protects the other.

Brick Makers' Convention.

The Executive Committee of the National Brick Manufacturers' Association have, through the secretary, T. A. Randall, Indianapolis, Ind., issued an announcement to the effect that instead of meeting next year in Boston, Mass., they have decided to hold the eleventh annual convention in Buffalo, N. Y., on February 2, 3, 4 and 5, inclusive. The sessions will be held in the main hall of the Builders' Exchange, only one square from the new Tifft House, which will be the headquarters of the association. Brick Makers of the United States and Canada are invited to attend.

Rare Wood Carving.

A rare specimen of artistic wood carving, consisting of a life-size figure representing Tsaka, the coolie who saved the life of the present Russian Czar when the latter, visiting Otsu, Japan, in 1892, was attacked by a would-be assassin, was recently on exhibition in New York City. The jinrikisha or Japanese carriage in which the Czar rode at that time was a part of the exhibit, Tsaka, who was the jinrikisha man, being represented dragging it. For his bravery on that occasion Tsaka was awarded an annuity of 20,000 yen by the Czar. The figure is the work of Kuruma, known as the best artist in the East, and employed exclusively by the Japanese Emperor. It was the product of two and a half years' work, and was intended for the World's Fair, in Chicago, but was not completed in time. It is worked out of a single piece of wood from the Indian oak, or teak wood, the figure posed as in a running position, resting on one foot. With the extreme pains characteristic of the Japanese, the figure has been made as nearly a perfect model of the jinrikisha man as though taken from a plaster cast; every vein and every muscle showing as it would be in the strain of dragging the carriage. It is valued at $12,500.

A New Flooring Material.

The name of papyrolith is given to a novelty in flooring material which has lately been invented by Otto Kraner of Chemnitz, the article being a special preparation of paper pulp, which is in the form of a dry powder; when mixed with water it may be spread like mortar over stone, cement or wood, where it dries quickly and may be smoothly planed, besides which it may be tinted almost any color, in this way adapting it for parquetry with variegated borders, or for panels and mosaics. Among the various advantages claimed by the inventor for the use of this product are freedom from crevices, deadening of noises and poor conduction of heat, also considerable elasticity, safety from fire and remarkable durability. It may be employed, too, for wainscoting and other architectural purposes, as well as for flooring.

RESIDENCE OF WILLIAM C. WELLS, SOUTH BROAD STREET ELIZABETH N. J.

DAVID B. PROVOOST, ARCHITECT.

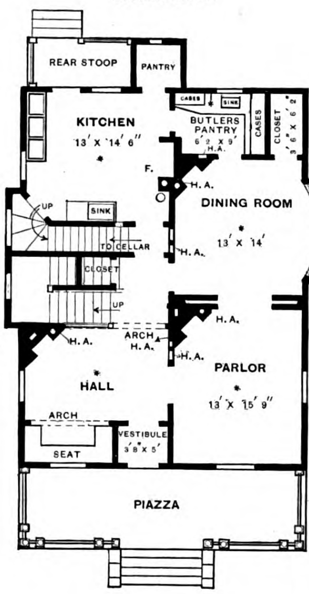
SUPPLEMENT CARPENTRY AND BUILDING, DECEMBER, 1896.

A STUDY IN COLONIAL ARCHITECTURE.

AMONG the many points to be considered in designing a building intended for dwelling purposes, that of so grouping the number of rooms required as to give an easy working arrangement is of prime importance, and satisfactory results in this respect can hardly be obtained unless the planning embraces such a disposition of the space as will necessitate the least possible travel on the part of those who are called upon to perform the household duties. A very good example in which these points are carefully considered is the handsome residence illustrated herewith. The building contains eight rooms, including a large reception hall, and is of a style of architecture which may be designated as modified colonial. The treatment of the exterior is exceedingly tasteful and attractive, as may be seen from the half-tone engraving which constitutes our supplemental plate this month. This picture was made from a photograph of the house, taken especially for the purpose shortly after it was completed and occupied. The convenience and compactness of the interior arrangement may be judged from the floor plans, while the numerous details which are presented give an idea of the construction employed. The building was erected the past summer for William C. Wells, and is pleasantly located on South Broad street, Elizabeth, N. J. The house is of balloon frame, constructed of hemlock timber, the foundations being of 12-inch brick laid in cement. The sheeting boards being covered with paper, over which is placed narrow pine siding. The sills are 3 x 8 inches, posts 4 x 8 inches, plates 4 x 6 inches and the ribbon strips 1 x 5 inches, the latter being made of spruce. The outside studding at all door and window openings is 3 x 4 inches and elsewhere 2 x 4 inches, placed 16 inches on centers. The inside studding is 3 x 4 inches, doubled at all door openings, while elsewhere it is 2 x 4 inches. The floor beams are 2 x 10 inches, doubled for all headers, trimmers and beams under partitions, the studding and floor beams being placed 16 inches on centers. The hip rafters are 2 x 10 inches, the common rafters over 10 feet in length are 2 x 8 inches, while those under 10 feet in length are 2 x 6 inches, all placed 20 inches on centers.

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

Second Floor.



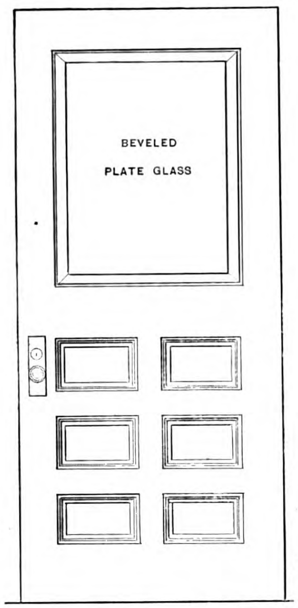
First Floor.

Scale, 1-16 Inch to the Foot.

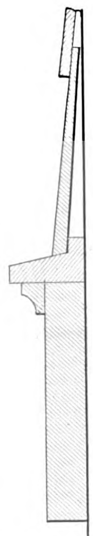
A Study in Colonial Architecture.—D. B. Provoost, Architect, Elizabeth, N. J.

The deck plates are 4 x 6 inches and the deck rafters 2 x 8 inches. Each tier of beams has three rows of cross bridging of 2 x 4 joist, with three tenpenny nails at each end. The main roofs of the building are of slate and the deck roofs of heavy coated tin. The exterior of the building is painted three coats of colonial yellow, with white trimmings.

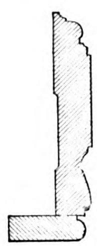
For the most part the interior trim is of cypress, the exception being the stairs, newel post, grille, &c., which are of oak. The floors are double, with deadening felt



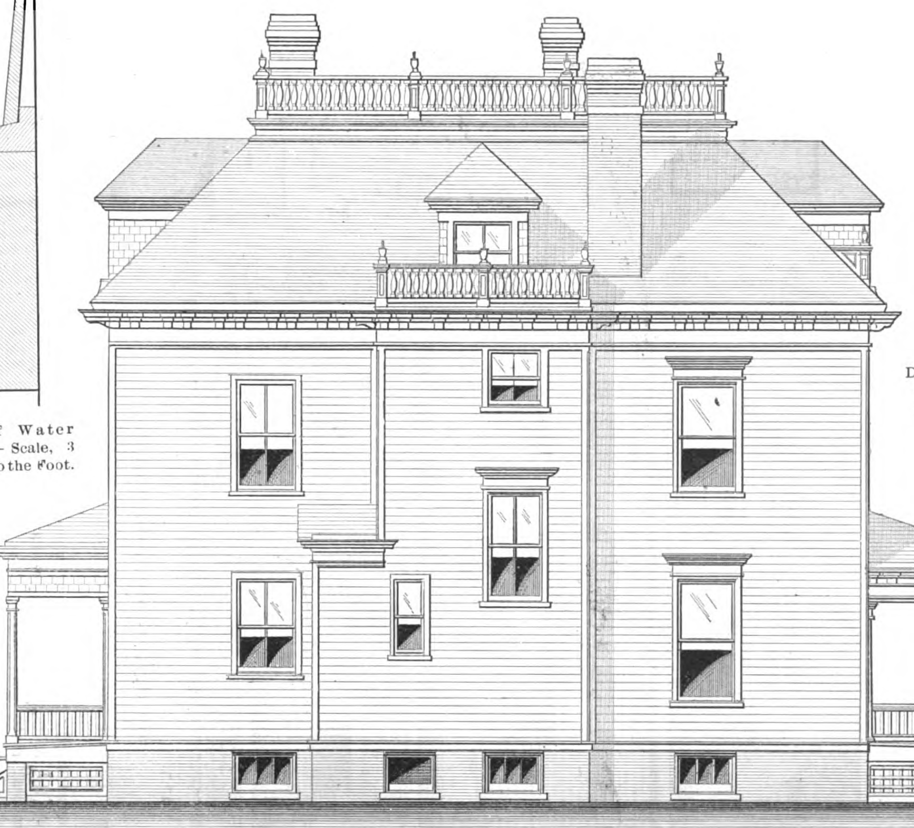
Elevation of Vestibule Door.—Scale, ½ Inch to the Foot.



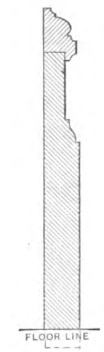
Detail of Water Table. — Scale, 3 Inches to the Foot.



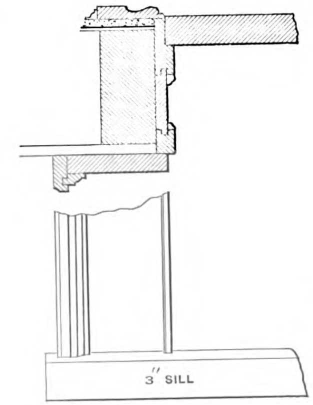
Detail of Window Trim.—Scale, 3 Inches to the Foot.



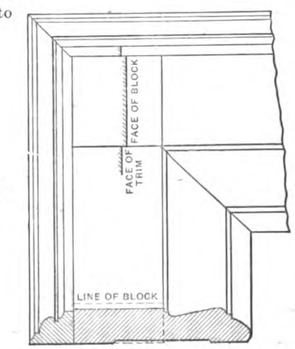
Side (Left) Elevation.—Scale, ⅛ Inch to the Foot.



Detail of Base — Scale, 3 Inches to the Foot.

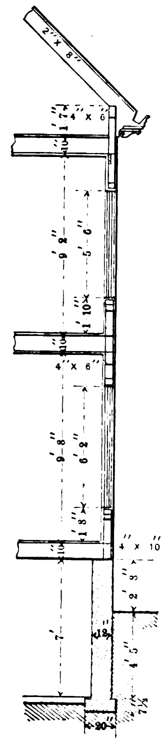


Detail of Front Door Frame.—Scale, 1 Inch to the Foot.

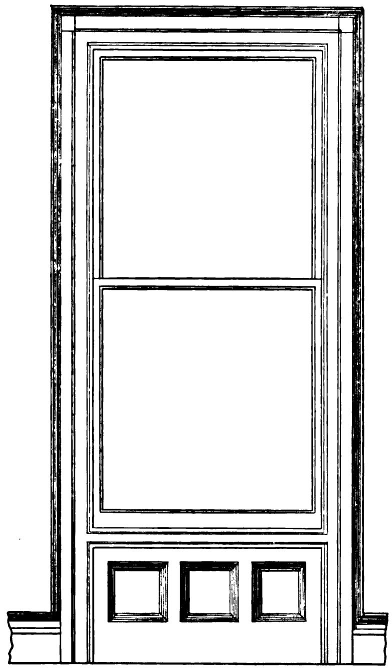


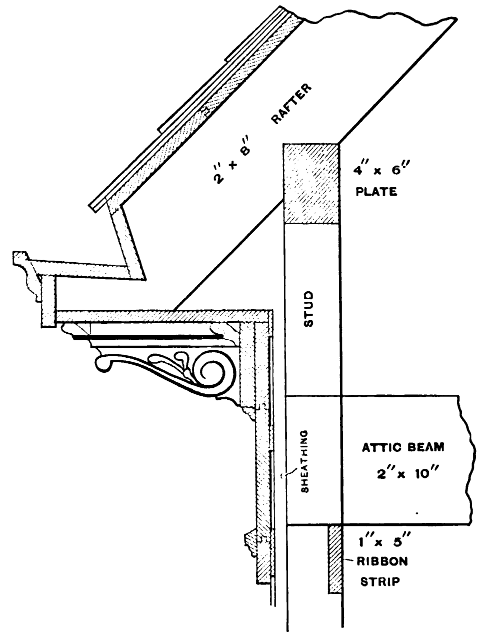
Detail of Inside Finish.—Scale, 3 Inches to the Foot.

A Study in Colonial Architecture.—Side Elevation and Miscellaneous Constructive Details.

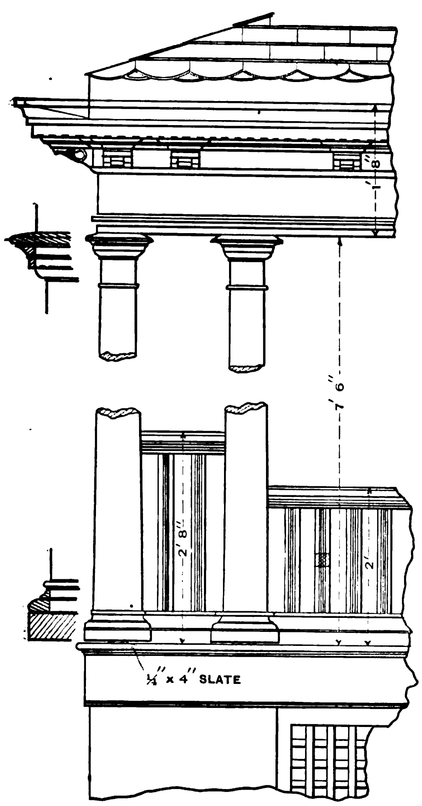


Section.—Scale, ⅛ Inch to the Foot.

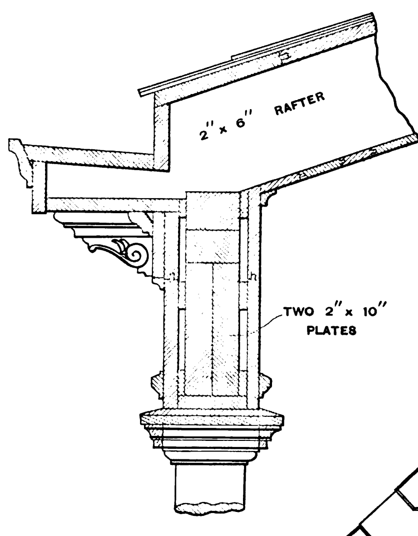

Elevation of First-Story Window.—Scale, ⅛ Inch to the Foot.



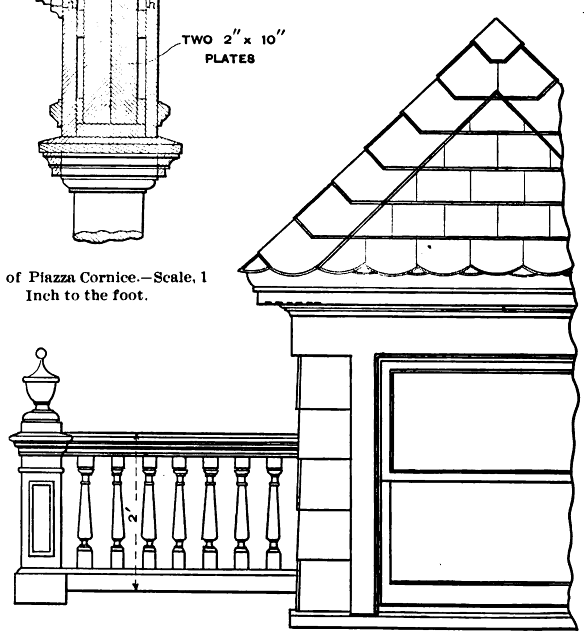
Detail of Main Cornice.—Scale, 1 Inch to the Foot.



Details of Front Piazza.—Scale, ⅛ Inch to the Foot.



Detail of Piazza Cornice.—Scale, 1 Inch to the foot.

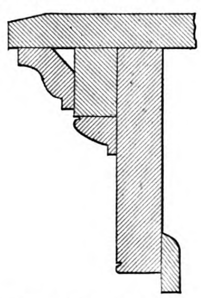


Detail of Dormer Window and Balustrade on Main Roof.—Scale, ⅛ Inch to the Foot.

Study in Colonial Architecture.—Miscellaneous Constructive Details.

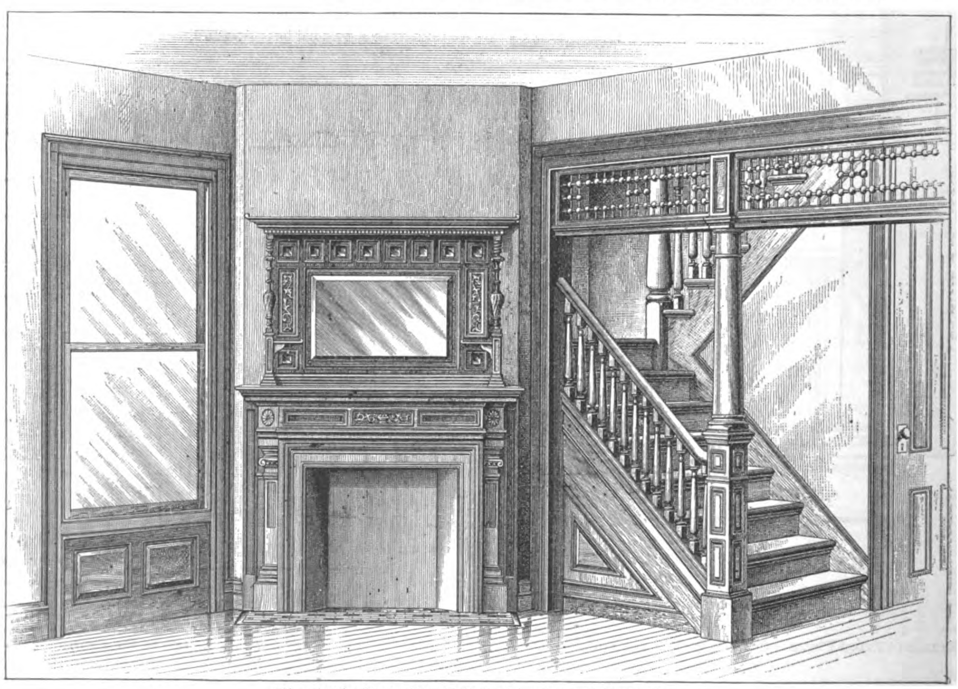
between. The lower floor is of hemlock, laid diagonally, while the top floor is of 1 x 2½ inch North Carolina pine, filled and polished. The butler's pantry, kitchen and bathroom are wainscoted 4 feet high. The plumbing throughout is of the latest improved open type, with servants' closet in the basement. The glass at the front of the house is polished plate, and elsewhere it is double thick sheet glass. There are inside blinds on all windows at the first and second stories. The building is heated with hot air, is lighted with both gas and electricity and provided with electric call bells and speaking tubes. The cellar is concreted and the attic has one finished room.

The drawings for the house were prepared by David B. Provoost, architect, of Elizabeth, N. J., who states that the structure cost, without mantels and gas fixtures, $4200, and with them $4480. In referring to the dwelling as a home, the author states that it has these advantages: The building being small, the floor space is made large by reason of the fact that the reception hall, parlor and dining room can all be thrown into one by means of sliding doors; that the working space between the kitchen and dining room through the butler's pantry is both compact and convenient, and at the same time the kitchen is shut off by two doors, so that odors from cooking cannot penetrate to the dining room The stairs, both front and back, are so placed as to give a very small second-story hall, yet of such size that direct access is afforded to each room. The bathroom and the various closets are so disposed as to economize space, thereby giving all that is available to the different rooms and not putting it into useless halls. Another feature to which attention is called is the open fire place to be found in each of the principal rooms on the main floor.



Section of Cornice in Butler's Pantry.—Scale 3 Inches to the Foot.

Elevation and Section of Cases in Butler's Pantry.—Scale, ½ Inch to the Foot.



View in the Reception Hall Looking toward the Stairs.

A Study in Colonial Architecture.—Miscellaneous Constructive Details.

HINTS ON ESTIMATING.

BY F. T. HODGSON.

IN order to be able to make a correct estimate of the cost of any building, a plan of the structure is an absolute necessity. If no plan is furnished by the architect, then prepare with pencil or ink a ground plan, also a plan of the second story, showing all parts, stairs, chimneys, doors, windows or other openings. Mark in plain figures on these plans the dimensions and the measurements of everything in the building of which an estimate is desired. Let us suppose a building of any reasonable size, of balloon frame, and to stand on a stone foundation, to be the one on which an estimate is to be made. If we are expected to do the entire work we should, if possible, see the site so as to get an idea of the amount of excavating that may be required. We shall also want to know the kind of earth to be removed and the distance it will have to be conveyed. It requires a full day of nine hours to dig and fill into a car or wheelbarrow 12 cubic yards of common coarse gravel or clay. A sound man will wheel and unload the former material 100 yards away in one day and the latter in seven hours. Given the wages paid per day and the number of yards to be excavated and it is a simple matter to ascertain the cost.

The excavating being finished, we next want to know the cost of the stone work. In many parts of the country stone work is measured by the perch, which is 16½ feet long, 1½ feet thick and 1 foot high, containing 24¾ cubic feet. In estimating, however, 25 cubic feet are regarded as a perch, and in the solid wall will contain about 22 cubic feet of stone and 3 cubic feet of mortar. In some localities stone is measured by the cord of 128 cubic feet. This, in the opinion of many well qualified to discuss the subject, is the better method of measurement. One hundred cubic feet measured in the wall is considered 1 cord, and the estimator must make a note of that. Corners or quoins are measured without reduction for thickness; then a tape line run all around the wall on the outside and meeting at any point is the total length of the stone work. To lay 1 cord of ordinary quarried stone will require 2½ bushels of lime and 5 barrels of sand. A day's work for a mason's helper on work of this kind is to move 1 cord of stone to the mason and to mix and carry the mortar for laying the same. A mason will lay 1 cord of stone a day, therefore it is easy to estimate the cost of putting in a stone foundation after the number of cubic feet in the wall are known, for we have:

1. Cost of 128 feet of stone, delivered	$......
2. 2½ bushels of lime and 5 barrels of sand	......
3. Mason's wages, one day	......
4. Laborer's wages, one day	......
Total	$ .....

As prices differ in various localities, the estimator can fill in the blanks to suit the prices prevailing in his place.

There is always more or less brick work to be done in connection with a wooden building, such as fire places, chimneys, piers, &c., and we will next turn attention to it. Brick work is estimated by the 1000 brick, but as the building under consideration does not contain much of this work we will content ourselves with giving a few rules for estimating for fire places and chimneys only, leaving the greater questions to be dealt with at another time. In building common brick fire places and ordinary flues, a workman will lay about 600 brick a day, and it will require a laborer to wait on him and prepare the mortar. To lay these brick will require 1¼ bushels of lime and 7 bushels of sand. One cubic foot of brick work takes 22 brick, so the solid contents of a chimney or fire place should be first obtained in cubic feet; then when multiplied by 22, the number of brick required to do the work is ascertained. The cost thus obtained holds good if the building is two stories or less. If more than two stories in hight 10 per cent. of the cost for each story above the two must be charged. Extra charge should also be made when the interior of the flue is plastered or "pargeted." This charge will, of course, depend upon the size and length of the flue. As a rule, chimneys in small houses where no fire places are employed cost about 40 cents per running foot for single flues and 75 cents per foot for double flues, these prices, however, being only approximate.

Timber Work.

Next in order is the timber work, and the first thing to be done is to obtain the linear measurement of all the sills and from their size estimate the number of feet, board measure. A ready reckoner, one of the many in the market, should be at the estimator's elbow, in order to save time in making the estimates. Retain the linear measurements, as from these the amount of labor is determined. The labor on sills is of three kinds:

1. Framing without gains for joist or mortises or for studding, as in common building, where the studding is spiked to the sills and the joist rest on top of the sills.
2. With mortises for studding, gains for joist, or studding without mortises.
3. With both studding and mortises.

Sills 6 x 8 inches framed and placed on the wall by the first, second and third processes will cost for labor 2, 4 and 6 cents per linear foot. Sills 12 x 16 inches require double the above prices. The intermediate sizes may be approximated.

Joist are generally placed 16 inches from center to center, and when so placed the number required on a given floor may be found by taking three-quarters of the length of the building and adding one joist when they are placed on top of the sill, and deducting one when the sills are utilized to receive the flooring and lath. The first-floor joist may be from 2 x 8 to 2 x 14 inches; the second-floor joist are usually from 2 x 8 to 2 x 12 inches, and the top ceiling joist from 2 x 6 to 2 x 8 inches. A man will frame and put in place in the building about 700 feet, linear, of joist, having dimensions from 2 x 6 inches to 2 x 14 inches, provided he has not more than two stories to lift his stuff. In putting on plates, which in balloon frames should be doubled, with joints well broken, the cost will be 1 cent per linear foot for each thickness. Studding is usually placed 16 inches from center to center, and may be 2 x 4 or 2 x 6 inches. If the former, two men will lay out and raise 800 linear feet per day, and if the latter size, 750 feet. A short rule for obtaining the number of pieces of outside studding, including plates and allowing one piece of studding extra for corners, windows and doors, is to allow one stud for every foot in length of the wall. This rule for buildings having many angles where the studding must be doubled approximates very closely to the true result. In smaller buildings with but few angles it will somewhat overrun.

The exact number of pieces of outside studding may be obtained by taking three-quarters of the number of feet in the outside measurement of the building and adding one stud for each angle and one for each door and window. To this add for the plates and gable studding. For partitions take three-quarters of the number of feet the whole partitions measure in length, and that figure will be the number of pieces of stuff required. The length of the studs will, of course, depend on the hight of the rooms. This number provides for double studs at the doors. The cost of the labor in putting up the partitions is the same as for putting up outside walls.

When "cut-in" ribs are used for supporting the upper joist about 1 cent per linear foot is to be charged, which will cover the cost of "notching" the studs, making the ribs and spiking them in place. In estimating material for studding the gable, take three-quarters of the length of the base and the number of feet, less one, which will give the number of pieces required. The average length of each piece is the distance from the plate to the ridge of the roof, or what is termed the rise of the rafter.

The Rafters.

Rafters are designated as main or principal rafters, hip rafters, jack and valley rafters and plain rafters. The long rafters in a pyramidal roof are called hip rafters, the shorter ones cutting against the hips are called the jack rafters. A plain rafter is the ordinary rafter used in common gable or saddle roofs. The projection of a rafter is the distance it extends beyond the plate or hangs over the wall. The rise of a rafter is the hight on a perpendicular line from the plate to the ridge of the roof. The gain of a rafter is the difference between the run and its length, the run being the distance from the outer edge of a plate to a point immediately under the ridge of the roof, or one-half the width of the building. The lengths and bevels of rafters of any pitch may be obtained at once by the use of the steel square when properly understood and applied, and every good carpenter ought to understand and apply this useful tool in every case of roof work.

Main rafters intended to receive a shingle roof are placed from 16 to 24 inches from center to center, according to their length and the weight of the roof they are called upon to carry, 2 feet being the usual distance. The number of rafters in a plain gable or saddle roof is found by dividing the length of the building by the distance the rafters are apart from center to center, to which add 1, the result being the number of pairs of rafters.

Roof Work.

Two men will frame and put in place 600 linear feet of 2 x 6 inch or 2 x 8 inch rafters in one day on a plain gabled roof ; in a hip roof, including framing for deck, when there is one, 250 feet, running measure, is a good day's work for one man. It must be understood that these estimates are based on the supposition that nine hours constitutes a day's work, and that the material used is soft wood, such as pine, hemlock or spruce. Any deviation from the plain work as set out in the foregoing, such as circular, segmental or octagonal work, requires an additional allowance for time and material, varying from double for octagonal to quadruple for circular. Of course, something will depend on the character and position of the work. In preparing the lookouts for hip roofs and setting them, including the nails and all material, 15 cents each is about a fair price, basing the wages of the workman at $2.50 a day. This means leaving the lookouts and eaves ready to receive finish for the cornice.

In closing in the building with rough stuff, as is the custom in the Northern States, it is better to run the stuff through the planer and reduce it to an equal thickness before using. The cost will not be much and the stuff will be more easily handled and will make a better job when finished. In the case of dwelling houses a man will cut, fit and nail on 1000 feet of rough lining in a day, but on a barn or outhouse, where there is not so much fitting, he will be able to do much more.

Siding or Finishing Stuff.

The siding or finishing stuff for a building may be either drop siding, lap siding or simply matched sheeting. The number of feet of drop or lap siding is found by multiplying the outside measurement of the building by the hight of the studding, to which add for gables. In the case of a gable roof multiply the width of the building by the hight from the plate to the ridge of the roof. This gives the number of surface feet, to which add one-fifth for lapping, and the result is the number of feet surface measurement. In putting on siding it is always better that two men work together, as they assist each other and the plan is more advantageous. Two men will put on 500 feet of siding a day, or 250 feet each, and cut close against window and door casings and corner boards. When a building is boarded vertically, or up and down, and the stuff is dressed and matched, two men will put up and nail about 2000 feet, board measure, and build their own scaffolding. This method of sheeting will require to be battened, and it is worth 20 cents per 100 feet, running measure, to cut, fit and nail on the battens. If building paper is placed under the siding or sheeting, it is worth 20 cents per roll to nail it on the walls.

The area of a plain gable is found by multiplying the length of the rafter by the length of the building, including the projection of the cornice. This gives one side of the roof, and by doubling we obtain the area of the whole roof. One thousand shingles if laid 5 inches to the weather will cover one square of 100 square feet. A man will nail 1500 shingles per day and carry them up to the roof. If a layer of coarse mortar is placed under the shingles 60 cents a square extra should be charged for labor and material. It will require 6½ pounds of nails to lay the shingles. If building paper is used on the roof and the shingling is done over it, 25 cents a roll must be added for laying the paper and extra work in connection therewith. This relates only to ordinary gable or saddle roofs. Hip and valley roofs, as well as circular and tower roofs, are more expensive to build.

LAW IN THE BUILDING TRADES.

WHEN ARCHITECT IS NOT ENTITLED TO FEES.

An architect employed to prepare plans and specifications for a building, and furnish an estimate of the probable cost, is not, upon submitting the same, entitled to his fees, unless the building can be erected at a cost reasonably approximating that stated in such estimate. In this case, the architect had estimated that the building would cost about $4000, but when bids were obtained it was found that it would cost over $7000, and the other party refused to go ahead with the building, and also to pay the architect any commission, claiming that he was induced solely by the estimates of the architect to have the plans drawn.—Feltham *vs* Sharp, Sup. Ct. Ga., 25 Southeastern Rep., 619.

WHEN LANDLORD IS LIABLE FOR TEARING DOWN ADJOINING BUILDING.

Where a landlord, who owned another building adjoining that occupied by his tenant, the two being constructed together, tore such building down, rendering the leased building unsafe, and then procured its condemnation and destruction by the city authorities, such acts constituted an eviction, for which the tenant may recover damages, and the landlord cannot avail himself of the action of the city authorities as a defense.—Silber *vs.* Larkin, Sup. Ct. Wis., 68 Northwestern Rep., 406.

CONTRACTOR CAN RECOVER THOUGH BUILDING DESTROYED BY FIRE.

A contractor for the carpenter work in a building in the course of erection is entitled to recover from the owner the value of the materials used and the work done by him, where the building was destroyed by fire before the contract was completed; but he is not entitled to recover for the value of materials which he had procured to use in the house, but which had not actually been used at the time of the fire.—Hayes *vs.* Gross, Sup. Ct., App. Div., 40 N. Y. Supp. Rep., 1098.

WHEN CONTRACTOR CANNOT RECOVER.

When there has not been a substantial compliance on the part of the contractor with the building contract, nor an acceptance of the building, the contractor cannot recover, in an action on the specific contract, the contract price less allowances for defects.—Hulst *vs.* Benevolent Hall Association, Supreme Ct. S. D., 68 Northwestern Reporter, 200.

EXPERT TESTIMONY AS TO WALLS.

In an action growing out of the collapse of a wall while being constructed, the opinions of qualified experts may be received in evidence as to the sufficiency of the wall in respect to thickness alone, and whether a wall of the thickness of the one in question was strong enough to resist the pressure naturally resting upon it.—Sneda *vs.* Libera, Supreme Ct. Minn., 68 Northwestern Rep., 36.

DISSATISFIED IN "GOOD FAITH."

Where a building contract provides that the work shall be done to the satisfaction of the owner or a third person, the contractor cannot recover if the owner or the third person is in good faith dissatisfied with the work.—Marshall *vs.* Ames, 11 Ohio Cir. Ct. Rep., 363.

PARTY WALLS.

A property owner has a right to board up the windows in a party wall to prevent persons on the adjoining premises from looking into his dwelling.—Dawson *vs.* Kemper, 11 Ohio Cir. Ct. Rep., 180.

HEATING AND VENTILATING A SCHOOL BUILDING.

ONE of the most important matters to be considered in connection with the erection of a school building is the proper heating and ventilating of the various rooms, for upon this depends in a large measure the success of the school as an institution, and the health of the pupils attending it. Various systems may be employed for the purpose, but one of the more recently interesting is a combination gravity and fan blast furnace system used in the new Borough School, at Kingston, Pa., which is regarded as among the most complete school buildings in the State, the architect, F. L. Olds of Wilkes-Barre, Pa., having spared no pains to make it strictly up to date in all respects. The building, a general view of which is presented in Fig. 1, is constructed of brick with stone trimmings, and is two stories and basement in hight. It contains eight rooms, 25 x 33 feet in size with ceilings 12 feet high, a library and director's room, in addition to a well appointed basement so arranged that it can be used for night school, manual training or playrooms in bad weather. The building faces to the southeast and has through the duct underground to each of the four air warmers, dampers being so placed as to cut off the supply from any furnace that is not in use. The plant is so arranged that instead of the building being heated by a blast fan system it can be readily heated by the gravity system without the use of the fan, and yet meet the requirements of the contract, which included a guarantee that the temperature should be maintained at 70 degrees F. in the coldest weather. In addition to the fan in connection with the air warmers there are two exhaust fans located in large stacks for ventilating the building. All the fans are driven by means of a gasoline engine made by the Otto Gas Engine Works of Philadelphia, Pa., located as shown in Fig. 3, and connected with a line of shafting from which belts run to the fan pulleys. The main exhaust fan shaft is connected with the ventilating flues from the different rooms at the bottom by means of a large underground foul air duct, so that when the fan is in operation the air is exhausted from the different rooms down through the ventilating flues to the foul air duct,

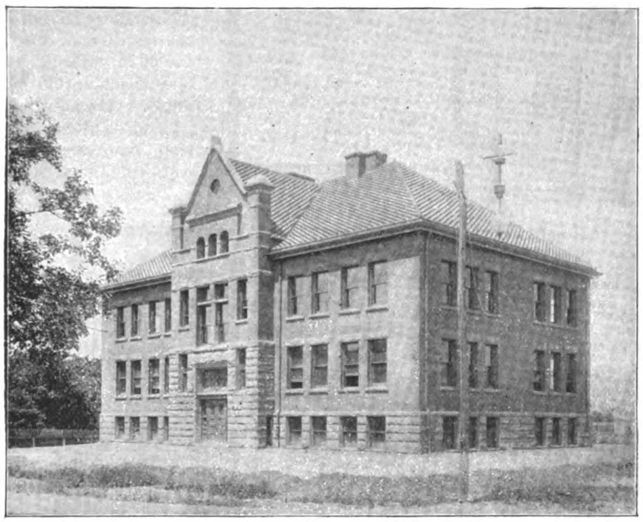


Fig. 1.—General View of Kingston Borough School.

Heating and Ventilating a School Building.—F. L Olds, Architect, Wilkes-Barre, Pa

broad roomy halls running its entire width. There are eight cloak rooms, and on each floor and in the basement are washstands. The roof is a noticeable feature of the structure, consisting as it does of rich terra cotta tiling furnished by the Celadon Terra Cotta Company of Alfred, N. Y. A plan of the main floor is given in Fig. 2, the second floor being a duplicate of the first. In Fig. 3 is presented a plan of the basement, showing the location and arrangement of the heating and ventilating system and the lavatories and sanitary provisions of the building, which were installed by B. G. Carpenter & Co., warming and ventilating engineers, of Wilkes-Barre, Pa.

The heating system is pointed out as being one of the most original to be found anywhere in the State. The building is warmed by four specially constructed mammoth air warmers, each presenting a heating surface approximating 100 square feet and located as shown in Fig. 3, the upper or radiator section of the air warmers being constructed of cast iron. They are connected with the chimney by means of a 10-inch smoke pipe. Two of the air warmers are placed on each side of the school building, and the dampers are so fixed that in mild weather one furnace can be used for heating the four rooms above it. The air supply to the air warmers is taken from the northern exposure into a small room where a fan is placed, specially designed for this plant, to drive the air and thence to the fan shaft and through it out of doors. This removal of air makes it easy for the warm air to enter from the air warmers through the flues which lead to each of the different rooms. Both the fresh air and the foul air ducts are underground and large dampers are so arranged that after school or during holidays the air from the rooms may be returned to the heater and thence to the rooms, effecting a circulating system, by which method a great economy of fuel is said to result.

The system is a complete gravity and mechanical pressure system combined, so that during a marked difference between the inside and outside temperatures the gravity system will suffice for maintaining the required standards both for heating and ventilation, while during the sultry days of spring and fall the fan and engine may be operated. With either system, however, the valves are so arranged and the flues so proportioned as to give to each schoolroom 1500 cubic feet of fresh warmed or tempered air per minute, and at the same time expel the foul or vitiated air so thoroughly as to keep the purity within 6-10,000 of the purity of the outside atmosphere. The registers used in both the heating and ventilating flues have an area of about 5 square feet. When the gravity system is in operation the aspiration in the stacks for the expulsion of foul air is rendered possible by the use of two stack heaters. The building contains, approximately, 175,000 cubic feet of space, which is reduced by the flues, partitions and furniture. A conspicuous feature in the basement is the absence of the lumbering, space consuming and dust collecting overhead ducts, so that it is as clean and commodious as the parlor of a thrifty housewife. All of the foul and warm air ducts being constructed of brick, the building is practically fire proof. The sanitaries are the Dr. Ross dry cremating closets and are arranged with nine on the girls' side and six on the boys' side, with a slate urinal, the platform, trough,

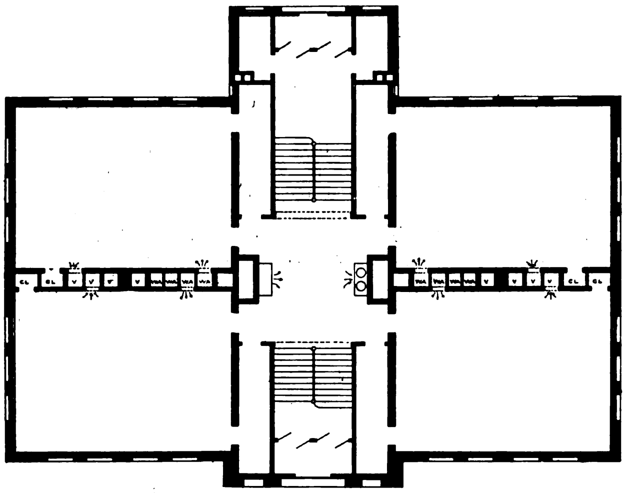


Fig. 2.—Plan of First and Second Floors of Building.

back and ends being made of the best grade of slate. The heating and ventilating system has been tested and has given evidence of its capacity to entirely satisfy all the demands made upon it.

Testing Fire Proof Floors.

An interesting test of the Roebling system of fire proof floors was recently made at the corner of Eighty-second street and the Western Boulevard by the Department of Buildings of New York City. For the purpose of the test a steel skeleton frame resting on open columns was erected and inclosed in a 12-inch brick wall. The floor to be tested was erected inside of the structure 12 feet above the ground, and consisted of iron beams framed into girders at the ends, the beams being spaced 4 feet apart and 16 feet between supports. Two of the arches were finished with a flat ceiling, and one arch had no plaster protection, the surface of the concrete being exposed to the direct action of the fire. The concrete consisted of 1 part Aalborg Portland cement, 2 parts of sand and 5 parts of steam ashes. The thickness of the crown at the middle of the arch was 3 inches over the top of this floor, and between the sleepers was a filling of concrete to a depth of 2 inches. A grating extending over the entire floor area of the interior of the structure was placed about 3 feet above the ground, and on this rested a layer of dry, hard wood about 2½ feet in depth. A secondary grate about 2 feet below the first was also supplied with fuel, with the object of heating the air entering the building and thus creating a higher final temperature. After the fire had burned for five hours the doors were opened and the flames extinguished. An examination of the interior showed that the concrete floor was apparently uninjured, the arches remaining whole and uniform, a small quantity of the concrete, however, having dropped from the under side. The next day a load, representing the ultimate strength of the floor, 600 pounds per square foot, was placed upon it to ascertain whether it was still safe after the severe fire test to which it had been subjected, and the floor sustained the load.

French Architecture in New York City.

What is regarded by architects as one of the best specimens which the recently increasing tendency toward French architecture in the larger office and hotel buildings has produced in New York City is the addition to the Hotel Renaissance, on Fifth avenue. The building is of Indiana limestone, six stories in hight without the mansard, in which there are two stories.

About the sixth story runs a balcony, and there is also a stretch of balcony with an iron railing on the side street façade of the building. The windows in some cases are topped with pointed cornices, while those in the mansard have alternately curved and pointed cornices, the rest of the windows having flat cornices. The ornamentation of the building is not florid, and it is regarded as a particularly successful adaptation of the modern French school to the needs of the city.

The architects are Howard & Cauldwell, who refer to the mansard roof as well calculated to diminish some of the

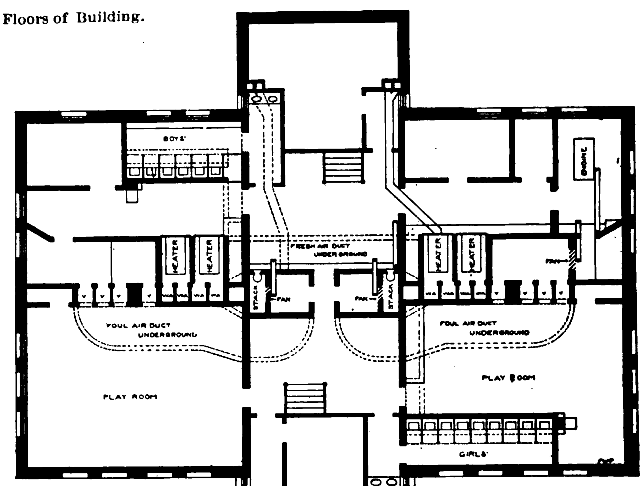


Fig. 3.—Plan of Basement, Showing Location of Fans, Furnaces, Ducts and Flues.

Heating and Ventilating a School Building.—Plans.—Scale, 1-24 Inch to the Foot.

difficulties which the tall office buildings are beginning to cause. By the use of the curved roof, it is claimed, a greater amount of sunlight reaches the street than the customary Italian cornice allows. The use of the mansard is customary in Paris, because the hight of buildings is limited, although under certain conditions additional stories may be built when the curved roof is used. The value of the device in the increased amount of sunlight which it allows has long been understood in that city.

Mr. Howard has studied for many years in Paris, and is one of the architects who believes that the French methods are the ones best adapted to the conditions that exist in New York.

The oldest wooden building in the world is said to be the church at Borgund, in Norway. It was built in the eleventh century and has been protected by frequent coatings of pitch. It is built of pine and in fantastic Romanesque design.

WHAT BUILDERS ARE DOING.

PRESENT indications point to an increase in activity in the building business in nearly if not all the larger cities of the country, provided those symptoms that are convincing to builders may be accepted as indications. It may be safely assumed that with the fixing of the financial policy of the Government for another Presidential term, capital will be much less timorous than it has been during the past few years. The postponement of projected work while capital was still reluctant to begin large operations has left the field more open, and developed a need for much new building of every sort. These projects which have been withheld from operation will doubtless be placed in the market as fast as possible; and such indications as are apparent at this time point to the truth of this conclusion.

Architects in the larger cities, especially of the extreme and middle East, state that they are finishing plans for extensive building to be begun as soon as possible.

It is too soon to predict with certainty what the effect of the election will actually be upon the building interests of the country, but it may be safely accepted as the general opinion that it will be greatly beneficial. No reports have been received that show any feeling of depression as the result of the election, even the silver States showing conditions that are no worse than they were prior to November 3. There have been no labor troubles of sufficient seriousness to involve more than those immediately concerned during the past month.

Baltimore, Md.

Little if any change is to be noted in the condition of the building business in Baltimore. No strikes or lockouts of importance have occurred recently, and the amount of building under way is neither large nor small for this season as compared with recent years.

During the month of November a very interesting display of designs and pictures of buildings was given by the Baltimore Architectural Club in the art gallery of the Peabody Institute, which was loaned for the occasion.

There were about 300 pictures shown. The local field was well represented, 70 of the pictures being likenesses of buildings in that city. Some of the older specimens of Baltimore architecture found room at the exhibit in the shape of photographs. Among these were the interior of the Cathedral, the McKim School, Baltimore and Aisquith streets; the First Unitarian Church, Charles and Franklin streets, and the Hanson Thomas residence, on Monument street. Some out of town buildings were the American Surety Building, in New York; Christ Church, in New Brighton; the Agricultural Building, at the World's Fair; the Boston Public Library, and the Washington Memorial Arch. There were many interesting specimens of foreign workmanship, submitted by architects from abroad.

Boston, Mass.

The present condition of the building business in Boston is very satisfactory. A large amount of work that has been projected during the past year, but held in abeyance until after November 3, is now being prepared for execution. One example, which may be accepted as being indicative of the general conditions in the city and vicinity, is the resumption of work on a building for business purposes after being suspended for nearly a year. The owner invested about $30,000 in the foundations and then abandoned work until financial conditions should become settled. The total cost of the building approximates $300,000. Building in the residential parts of the city shows the greatest recent increase in activity, and, from the amount of work of this character, dwellings, apartment houses, tenements, &c., now in the hands of architects the end of the present and beginning of next season will be marked by unusual activity.

Several small strikes have occurred during the past month, but have not been important enough to affect more than the jobs upon which they occurred.

The Master Builders' Association has recently bought two large American flags, which it proposes to keep flying on the roof of its building in the future—rain or shine.

The association was liberally represented at the meeting of the Massachusetts State Association at Lowell, sending a delegation of about 25. Everybody reported a satisfactory meeting and a delightful time.

Chicago, Ill.

Chicago builders are expecting an immediate and marked improvement in the condition of the building business. A large amount of new work is planned for the business parts of the city, and architects are reported as having a large quantity of work prepared for outlying districts. One of the most prominent architects is quoted as saying:

"The plans now in our hands that awaited election returns foot up $6,620,000. On one job that is tied up in our hands there is work for 400 men eight months. That is but one of the big mercantile buildings which will be put in course of erection in the very heart of the city. In several, the total cost of which ranges from $300,000 to $800,000, the contracts are signed and acknowledged, but in each there was an election cancellation clause."

One of the largest builders in the city is reported to have estimated the new building projected, and dependent upon the result of the November election, to be upward of $5,000,000. The Chicago *Record* of November 10 reports a representative of the George A. Fuller Company, which company take no contracts under $200,000, as saying: "Contracts for a building in Chicago, one in Boston and another in St. Louis have been released by us in the last two days. The total cost of the three structures will not be less than $1,500,000, and they are but the first of twelve or fifteen contracts of varying importance."

The erection of the Fair Building, at State and Adams streets, by the Fuller Company, is assured right after the holidays. This will give employment to hundreds of men.

A strike of the union marble workers on the public library, which was begun about October 1 against a reduction in wages from $3.50 to $3 per day, has finally been submitted to an arbitrating board consisting of Judge Egbert Jamieson, chairman; George A. Gilbert and Roger E. Skelly. Both sides have agreed to abide by the decision of the board. Aside from this strike, which seriously interfered with the progress of the work, no others of importance have occurred during the past month.

A new central labor organization, to take the place of the defunct Trades and Labor Assembly, under the name of the Chicago Federation of Labor, was formed on November 11. The new organization is reported as having declared against walking delegates.

The Builders and Traders' Exchange and the Building Trades Club are both reported as being in excellent condition. The club, by special arrangement, received the Presidential election returns in its rooms on the evening of November 3 for its members and their guests.

Cleveland, Ohio.

The builders of Cleveland are looking forward to increased business activity and base their hopes of improvement upon work already prepared by the architects and by the promise of new work that owners are reported as having held back until after the election.

Among the other new buildings to be begun as soon as possible is the new Chamber of Commerce, which is expected to cost about $250,000. Many of the contractors expect that a cosiderable part of the new work in sight will be commenced this fall.

It is stated that a great effort is to be made forthwith to increase the membership of the Builders' Exchange in the Arcade. A number of local contractors have from time to time signified their intention of joining as soon as the election was over and business had improved, and, both these conditions now having been fulfilled, these gentlemen will be urged to become members.

There have been no strikes or lockouts in the building trades of importance since the last report.

Denver, Col.

Denver real estate men and builders are predicting a revival of business in the near future. It seems to be the general opinion that the election was deemed a turning point, whichever way it went, and capital was waiting for the outcome in order to intelligently meet the conditions that ensued. It is claimed that the unsettled state of the money market, due to the uncertainty of the financial policy that existed prior to the election, will disappear now that a certainty has been reached. As compared with the years preceding 1893 the amount of work done in Denver by builders during the year just ending has been very small; and it is generally believed that an upward tendency is manifesting itself. There is very little actual movement in building as yet, the erection of a block of storerooms on the corner of Seventeenth and California and a terrace on Thirteenth and Glenarm streets being the only important buildings under way in or near the paved district. There are, of course, always a greater or less number of private residences in course of construction, but as a rule the timidity of capital still continues and several ambitious structures are set aside for the present.

Detroit, Mich.

The gradual improvement in the real estate interests of Detroit, combined with dullness of building during the past two years, is leading the builders of the city to hope for something like a normal amount of work at the opening of the spring season. It seems to be conceded that there is little likelihood of extensive increase in building work before snow flies, but all are hoping for better conditions in 1897. A controversy between the contractors for stone on the county building, involving the letting of a contract for about $350,000, has retarded the work and the matter is still unsettled at the time of this writing.

The Builders and Traders' Exchange is holding its own and is steadily adding to its membership.

The American Institute of Architects at its recent convention in Nashville selected Detroit as the next place of meeting, which will occur shortly after the convention of the National Association of Builders, which will be held in September next.

Indianapolis, Ind.

The following from a recent issue of the Indianapolis *Sentinel* indicates the condition of the building trades of that city: The condition of the building trade is reported very dull by architects and contractors generally. Most of them impute the cause to the excitement and unsettled condition of affairs attending the campaign, and the consensus of opinion is that the trade will be flush, rather than otherwise, now that the election is over.

A great deal of small repairing is being done, and the contractors say that depressed finances are accountable for this, just as the ordinary man, when "hard up," will furbish up the suit of clothes he now wears and make it do another season.

However, notwithstanding the adverse condition of the times a good deal of residence building is going on and some very pretty and creditable dwellings are being erected in different sections of the city. A residence that will rank among the most handsome in the city when completed is in course of construction at Eleventh and Delaware streets. Architect Dark drew the plans, and the house will be the home of H. A. Mansfield, the late city engineer. It will be a two-story brick residence, with ten rooms, hardwood interior finish and every modern convenience. The bare cost, without incidentals, will be in the neighborhood of $6000. James L. Bradley, who purchased the Gallup property last spring for a consideration of $8000, is having the house remodeled at an expense of $20,000. When completed it will be one of the finest residences in the city.

Lowell, Mass.

The members of the Bulders' Exchange at Lowell had the pleasure of entertaining the delegates and visitors to the recent meeting of the Massachusetts State Association of Builders. The principal feature of the entertainment was a banquet at the American House, which was a most enjoyable and successful affair.

Builders report business as being in fair condition at present, with excellent prospects for the future. No labor disturbances of importance have been reported for some time, and there is nothing to indicate a change in the present amicable relations between employers and workmen.

Milwaukee, Wis.

Milwaukee builders report the amount of work on hand, and the prospects for next year, as slowly but steadily improving. It is thought that the total of work done in 1896 will show but little increase over the amount done in 1895, which was one of the dullest of recent years. An increase in activity in real estate circles is being reported, and there is a considerable amount of "talk" of new building; although but little has yet reached the architects.

An attempt to create the office of city architect and to give into its charge the designing of all the city buildings is meeting with an amount of opposition that may be fatal to the project. The majority of the architects of the city favor the competitive method for securing designs for buildings, although many complain of the lack of specific conditions under which competition is at present conduted.

There has been an unusual freedom from labor troubles in the building trades for several months, due, it is claimed, to the dullness of business.

New York City.

Contractors and builders in New York City confidently expect an increase in the amount of building between now and the end of the year, and are looking forward to a still further improvement in 1897. Many of the more prominent contractors have been interviewed, and all seem to be unanimous in the opinion that work which for many months has been held back awaiting the outcome of the election will now be pushed to completion as soon as possible. There is an unusual amount of work in the market for this season of the year, and contractors are reported as being busy figuring.

The workmen in one of the large down town buildings, the St. Paul, at the corner of Broadway and Ann street, were ordered out by the walking delegate early in November because the painters were doing the varnishing. The painters and varnishers have separate unions; hence the trouble. After a short time the strike spread to some of the stone and marble cutters and polishers who were doing work in shops for the building. At the hour of going to press the painters, on whose account the strike was ordered, had just returned to work, and it was thought that this would lead to a speedy settlement of the trouble.

At the quarterly meeting of the Building Trades Club, held on Monday evening, November 9, Mr. Stephen M. Wright, its secretary, presented to the club a life-size portrait of Mr. William H. Sayward, in recognition of the latter's faithful, indefatigable and self-sacrificing devotion to the interest of the building industry throughout the past ten years. The portrait, massively framed, bears a metal tablet, with the inscription, 'William H. Sayward, Founder of the National Association of Builders."

The Mechanics and Traders' Exchange is in excellent condition financially, and its report to the recent convention of the National Association of Builders shows it to be actively interested in the welfare of the fraternity, not only in New York City, but throughout the whole country.

The following is the rate of wages paid and the hours of labor worked in the various branches of the building trades in New York City.

Stone setters	$4.50	8 hours.
Stone setters' tenders	2.75	8 hours.
Stone masons	3.50	8 hours.
Bricklayers	.50 per hour	8 hours.
Bricklayers' tenders	.30 per hour	8 hours.
Carpenters	3.50	8 hours.
Framers	3.00-$3.50	8 hours.
Inside carpenters (finishers)	3.50	8 hours.
Stair builders	3.50	8 hours.
Slaters	3 50	8 hours.
Coppersmiths	3.00 (average)	8 and 9 hours.
Iron workers	1.50-5.00 (according to class of work.)	8 hours.
Steam fitters	3.75 (average)	8 hours.
Plumbers	3.50	8 hours.
Painters	3.50	8 hours.
Fresco painters	4.00 $4.50	8 hours.
Plasterers	4.00	8 hours,
Plasterers' tenders	2.75	8 hours.
Gas fitters	3.75	8 hours.
Paper hangers	Piece work	
Stonecutters (hard and soft)	4.50 soft $4.00 hard	8 hours.
Ordinary laborers	.30 per hour	8 hours.

The Housesmiths and Bridegmen's Union is making arrangements for a general demand for an increase of wages, to meet increases in other trades, on July 1, 1897.

Omaha, Neb.

A report from Omaha about November 1 showed that the feeling among builders and real estate dealers is much more hopeful than it has been at any time since early in the year. There is a manifest desire upon the part of investors to "take hold" and indications seem to point to an early resumption of building. At present there is an unusual demand for small homes in the suburban districts.

The Builders and Traders' Exchange has been making an effort to hold its own against the tide of adverse conditions which has prevailed during the year, and the members are looking forward to additions to their number as soon as business brightens.

Philadelphia, Pa.

The prospect for building in Philadelphia has been improved since the election, and contractors are of the opinion that work which for various reasons has been held back will be immediately placed in the market. No trouble between employers and workmen has occurred during the past month and there appears to be little probability of any disturbance of present relations during the remainder of the season.

Pittsburgh, Pa.

An amendment to the building law of Pittsburgh has been recently offered seeking to compel all owners of high buildings to provide full and sufficient fire escapes. The building business appears to be gradually assuming a more active tone, though many of the contractors feel that the volume of new work coming into the market between now and spring will be small. The improvement in the outlook for general business is, however, accepted as a basis for the belief that the coming year will be a much better one for builders than the one now passing.

There have been no serious labor troubles during the past month.

St. Louis, Mo.

Builders in St. Louis are reported as being well satisfied with the prospect for new building. The number of building permits issued during October fell below the average, which was largely the result of no permits being taken out for large office buildings and similar enterprises. There is a great deal more work being done on small buildings than the returns indicate. This is especially true in the West End. Along the Lindell and Suburban electric roads, which intersect this district, new work can be seen in every direction. Building is quite active along Delmar avenue from Taylor avenue to more than a mile west.

The master builders of the city say that immediate reaction has followed the Presidential election. For months before that time trade was unusually dull, the result throwing the business of 1896 behind that of 1895 for that period. But now things are different. The fever of political excitement has passed, and people are settling down to work.

As an example of this it may be stated that on the day after the election one St. Louis firm of builders was given three sets of plans for three big buildings, upon which work is to begin at once. The parties from whom these orders came stated that they had been waiting until the political campaign was over, and there are many other similar instances that have come up since the election. The architects report already an improvement in business, and many of them are now engaged on the plans for buildings to go up in the spring. These orders have come since the elections and are sure indications of renewed and healthy activity in building circles.

Secretary Walsh of the Builders' Exchange has framed a bill to be presented to the incoming Legislature to amend the mechanics' lien law so as to prevent dealers in building material from taking advantage of the law. The purpose of the bill is to protect mechanics, builders and contractors. The amendment was introduced at the last session too late for action.

San Francisco, Cal.

No report has been received from San Francisco since November 3 as to the condition of the building business; but builders generally were looking for an improvement whichever way the election was decided.

The members of the Builders' Exchange Association recently gave a banquet in the exchange rooms in its new building on New Montgomery street

After the elaborate *menu* had been disposed of the following toasts were responded to:

"Architecture in San Francisco," W. J. Smith; "The Builders' Exchange," Oscar Lewis; "The Ladies' Association," S. H. Kent; "Masons and Builders' Association," James A. Wilson; "Master Plumbers' Association," H. Williamson; "Master Painters' Association," J. R. Frasier; "Millmen's Association," William Shaunessy; "Our Sister Exchanges," J. A. Smiley; "The Press," Oliver Everett.

George L. Dealey also made some appropriate remarks regarding the progress of the Builders' Exhange, and Louis Steigart amused the assembled builders by singing several songs in imitation of the pagan Chinese. After several hours of festivity the banquet was concluded by a song rendered by the Knickerbocker Male Quartette.

Worcester, Mass.

The building business in Worcester is reported as being in fair condition, with a good prospect for an active opening of the season of 1897.

The directors of the Builders' Exchange, desirous of making their organization more valuable and mutually helpful, are making an effort to establish a 'change hour between 11.30 and 12 o'clock, when representatives of the firms in the exchange will be at the rooms to meet parties that may have business with the individual firms. The Boston Builders' Exchange has long had 'change hours from 11 to 1 o'clock, and it is thought that the Worcester organization should have something in this line also.

The last monthly meeting of the Exchange was held November 4, President C. A. Vaughan presiding. The firm of E. D. Sisson & Co were admitted to membership, making a total list of 102 members. Delegates C. W. Walls, O. S. Kendall and C. C. Brown reported on the State Builders' Association meeting at Lowell, and resolutions in regard to legislation and certain building restrictions passed at the Lowell meeting were informally discussed.

Assurances are practically positive that at least two among the largest of Worcester's industrial interests will begin on the construction of new plants early in the coming season.

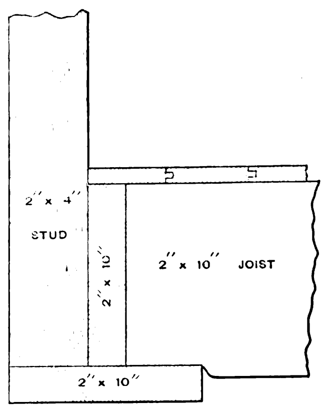
CORRESPONDENCE.

Plans for a Country House.

From R. E S., *Morris, Man* —I would like very much to have some of the readers of the paper furnish plans for a country house, suitable for erection out here on the prairie, the cost to range, say, from $1000 to $1500.

Making a Box Sill.

From W. H. C., *Logansport, Ind.*—I would like to contribute a few words in answer to " C. C. J." of New Bedford, Ill., whose inquiry in regard to making a box sill was published in the September number of the paper. The sketch which I send will, I think, explain the method I employ without extended description. I have made sills



Method of Making a Box Sill Suggested by " W H. C."

in other ways, but I think the method here illustrated the best. I do not, however, consider any box sill as good as a solid sill 6 x 8 inches, the size we use in this city.

Hektograph Copying Pad.

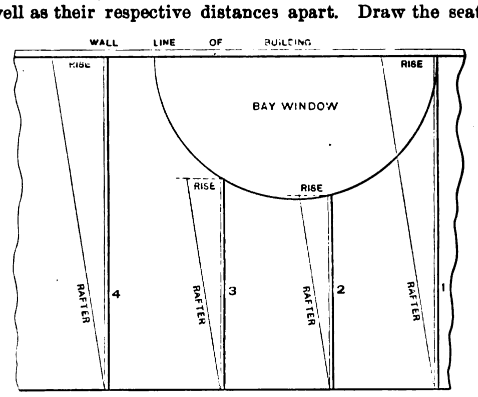
From J. S. S., *State College, Pa.*—In reply to the correspondent who recently asked in regard to a method for making a hektograph copying pad, I would suggest the use of the following ingredients: One ounce of white glue, 6 ounces of glycerin and 8 to 10 drops of carbolic acid. Cover the glue with hot water and let it dissolve. Warm the glycerin, mix with the dissolved glue and let the vessel containing it stand in hot water for five minutes, after which add the carbolic acid. Pour the mixture into a tin pan of the desired size and shape, and when the solution is cold and hard it is ready for use. In utilizing the pad, the first thing to be done is to make the drawing or writing with hektograph ink, which can be purchased of any druggist or dealer in drawing materials, and place it face down on the pad. Rub into even contact and then take it off. Place on the pad the paper on which it is desired to print, rub it into contact and peel off carefully, and so continue with successive sheets. The pad should be at once washed off with a sponge dipped in cold or tepid water as soon as the printing is completed. From 75 to 125 copies may be taken from a transfer, though in what way " O. A. S." expects to replace blue prints by this means is difficult to see, for the reason that only rough drawings can thus be made.

Rule for Figuring the Breaking Strain of Timber.

From W. S. K., *Wapello, Iowa.*—On page 211 of the September issue of the paper appears an inquiry from " Carpenter," Naugatuck, Conn., who asks for a rule by which to figure the breaking strain of timber such as spruce and yellow pine. As every carpenter at some time has felt the need of a simple rule to get at the approximate weight of joists or beams of timber, loaded at or near the middle—something every carpenter can carry in his head and have at the end of his pencil whenever he wants it—this contribution is offered with the hope that it may be of value to many readers. Bear in mind such rules are only approximate, since timber varies greatly, being young or old, straight or cross grained, clear or knotty, seasoned or green. Also that all timber is permanently injured if more than even one quarter of the breaking weight is placed on it ; therefore this limit should never be passed, and usually one-sixth of the breaking weight is taken as the safe load. The following rule is calculated for fir or English oak, but is applicable to white and yellow pine or spruce for ordinary purposes. White burr oak and best Southern pitch pine are believed to bear loads one-quarter greater. Use as a constant 400 Multiply the square of the depth or vertical hight in inches by the breadth or thickness in inches of the beam. Multiply this product by 400 and divide the result by the length of the beam in feet, this quotient giving the breaking weight. For example, a joist is 12 x 2 inches in size and 16 feet in length: $12 \times 12 \times 2 \times 400 \div 16 = 7200$ pounds, which is its breaking weight, and one-sixth of this is 1200 pounds, the safe load. According to Trautwine's Pocket Book, the same would be 1350 pounds, but his table is based on sound, clear, straight grained wood, seasoned and free from knots and other defects, a thing which does not often happen in practice. If the stick was laid flatwise its breaking weight would be $2 \times 2 \times 12 \times 400 \div 16 = 1200$ pounds. The safe load would be one-sixth of this, or 200 pounds, or one-sixth the strength of the timber set up edgewise and well bridged.

Lengths of Porch Rafters.

From L. W. G., *Bay City, Mich.*—I notice in the columns of the Correspondence department of *Carpentry and Building*, of which I am a reader, that " B. F. J." of Aliquippa, Pa., wishes to know how to find the lengths of rafters for a porch where a circular bay window cuts into the plan of the porch roof. I inclose a sketch showing how I do such things, and which I hope will prove a help to brother " B. F. J." First, make a plan to scale of the intended porch on a planed piece of board. Strike the circle of the bay window and then lay off the rafter seats as well as their respective distances apart. Draw the seats



Lengths of Porch Rafters —Diagram Submitted by " L. W. G "

square over to intersect the circular bay line in their different places. If the rise of the roof is 1 foot in 6—the width—it is an easy matter to find the rise where the rafter cuts the circular window line. This rise with its respective run will give the length of the rafter. The others are, of course, found in the same way.

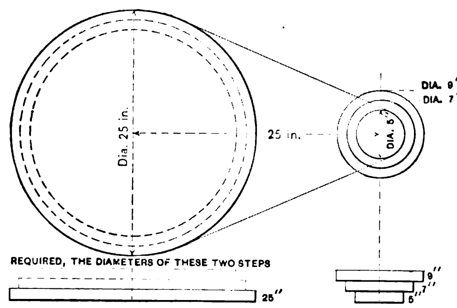
Strength of Floors.

From G. B., *New York.*—What weight per square foot will a floor carry, where the floor beams are 3 x 8 inches and 20 feet long, placed with 16-inch centers, supported by a girder 6 x 8 inch and 30 feet long, the girder placed in the center of the floor beams and supported by a brick pier 1 foot square ? Also what weight will the same floor carry without the girder or the brick pier ?

Answer.—The floor, with a coefficient of one third its breaking load for spruce beams, should bear a distributed load of 86 pounds per square foot without the girder. The girder, 30 feet long, supported by one brick pier in the center, with the ends supported by the walls, will add 20 pounds per square foot, or make the floor equal to a safe load of 106 pounds per square foot.

Rule for Finding the Diameters of Cone Pulleys.

From F. W., *Buffalo, N. Y.*—I desire to ask the practical readers of the paper for a solution of the problem indicated by the sketch inclosed. A cone pulley has steps

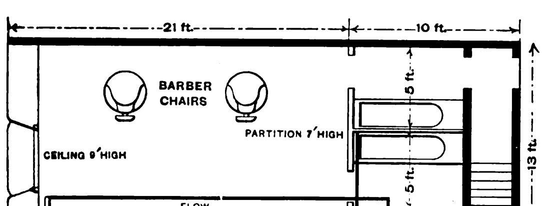


Rule for Finding the Diameters of Cone Pulleys

5, 7 and 9 inches respectively in diameter. Running with the 5 inch cone is a pulley 25 inches in diameter, and what I want to know is, what should be the diameters of the steps of this large pulley so as to use the same belt? In other words, what must be the two unknown diameters on the larger pulley so as to run the same belt with the 7 and 9 inch steps of the smaller pulley. I would like to have the correspondent answering the question state how it is figured out.

Heating a Barber Shop.

From W. F. S., *Bayfield, Wis.*—I send herewith a plan, shown in Fig. 1, of a barber shop which the proprietor wishes to have heated with hot water from his bath boiler. The building is 13 feet front, 31 feet deep and has a 9-foot ceiling. It has two stories and is plastered, but the upper rooms are not occupied. The front is mostly of glass, amounting to a space 7 x 13 feet. On the plan there is shown a 66-gallon galvanized iron boiler and a 16-inch Wilks heater. The heater is tapped on the top for two 1½-inch connections, and tapped on the sides near the bottom with four 1½-inch holes. Where is it best to connect the flow pipe—from the top of the boiler or from one of the unused holes in the top of the heater? Where should the return pipes be connected? What size of pipe should I use for the flow and return from the heating coil, and where should the heating coil be placed? What shape and size should the heating coil be? It will be noticed that the back part of the building is divided



Heating a Barber Shop — Fig 1.—Plan View.

into three rooms, two of which are bathrooms, and that the partition is only 7 feet high, leaving a space of 2 feet between the top of the partition and the ceiling for a circulation of air. The building faces north, and the space along the west side is occupied by chairs for the waiting customers.

Answer.—Considering the amount of heating surface that will be exposed by the heater, the boiler and the piping to and from the heating coil, it is quite probable that a coil, placed along the north end of the room, exposing 100 feet of surface, will be ample to secure a comfortable temperature. In order to make the circulation easy a 1½-inch flow pipe will probably be best. This should run up to a point a few inches below the ceiling, as shown in Fig. 2, where it should run into a tee in the top of which an air valve should be connected. From the side of the tee a flow main of the full size should be run over to the heating coil. It is quite probable that a radiator will be more ornamental and satisfactory, but either a manifold coil made of 1-inch pipes or a return bend coil made of 1½-inch pipes will render good service. The return from the radiator can readily be run along the floor on the west side, back of the waiting chairs, and where it comes into the small room where the heater and boiler are located it can be run across and connected at one of the openings in the side of the heater. Two lineal feet of 1½-inch pipe exposes 1 square foot of heating surface, and if a radiator exposing 100 square feet of surface is used 200 lineal feet of pipe will be required. If 1-inch pipe is used 3 lineal feet of pipe exposes 1 square foot of surface, and 300 lineal feet of 1-inch pipe will be needed. As the water heater will be connected to the boiler any expansion of water will work against the supply to the boiler, whether that be city pressure or tank pressure, and an expansion tank will not be necessary.

Questions About a Porch Roof

From E. W. H., *Santa Barbara, Cal.*—I have a porch roof, about 90 feet long by 12 feet wide and in section looks about as shown in Fig. 1. There is a shallow gutter 1 inch deep by 4 inches wide running at the edge, just behind the crown mold, and at intervals there are baluster posts 7 x 7 inches. The porch shown has a fall of ⅛ inch to the

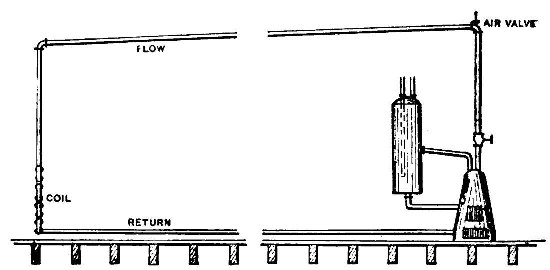


Fig. 2.—Sectional View Showing Run of Pipes.

foot and is to be covered with sheet metal, either lead, copper or zinc. How should the baluster posts be flashed around so as to allow room for the expansion and contraction of the sheet? Where the end of the sheet goes to the gutter will it do to turn it down sharp, as shown in Fig. 2, or must it be turned over in a bead, as shown in Fig. 3? With reference to the use of copper for flats and gutters I am met by the difficulty that the roof water is to be used for drinking water and with copper I suppose this would hardly be safe. Would it be policy (durability being of importance) to use a lighter weight of sheet lead than 6-pound and thus bring the cost down nearer that of copper? How would it be to use a good weight of zinc, say No. 12 weighing a trifle over 1 pound to the square foot, for all flats and gutters, laying it with flat seams, While not equal probably to lead or copper in durability, would not the zinc prove satisfactory in use and greatly exceed tin in durability? Zinc is much used abroad for roofing, many important structures being covered with it. The synagogue at Nuremburg, Germany, has a large dome covered many years ago with zinc that is reported as being yet in perfect condition. Does zinc present any difficulties in working that disqualify it? Bloxom, an English authority, says of zinc: "Being peculiarly fitted on account of its lightness for the construction of gutters, water pipes and roofs of buildings, zinc is less liable than iron to corrosion under the influence of moist air, for although the bright surface of zinc soon becomes tarnished when exposed to the air it merely becomes covered with a thin film of oxide of zinc (passing to basic carbonate by absorption of carbonic acid from the air), which protects the metal from further action." Another authority says, "but little affected by the air." I would be glad of any further light you can throw on the subject, or would be pleased if any of your readers having had practical experience in this line would give me the benefit of their knowledge.

Answer.—Replying to our correspondent's first question, we have prepared the diagram, Fig. 4, in which A represents the baluster post resting upon the roof line. At a sufficient hight above the roof, about 4 inches, cut a groove, B, around the four sides of the baluster about ¼ inch deep and as wide as the thickness of a saw cut. Let C C represent the metal roofing flashed up around the post, but not nailed, and D D a cap flashing with a ¼-inch edge bent on the top. Fill the groove shown by E E with white lead, insert the bent edge of the cap flashing into the groove, and put a few nails through the cap flashing at the top, as shown at F and F, being careful not to nail too far down so as to strike the lower flashing. This method permits the lower flashing to contract or expand. The corners of the lower flashing should be double seamed and

the mallet the edges of the sheets would be liable to crack. If the roof was steep enough zinc roofing could be laid as shown in Fig. 6 so as to allow for expansion and contraction.

The Value of Trade Schools.

From A GRADUATE, *Owen Sound, Ontario, Canada.*—I believe you are ever ready to give a sympathetic ear to any earnest thinker or inquirer through your good (that describes the meaning, perhaps, better than the phrase "valuable") paper, and the discussion now in progress on both sides of the Atlantic relating to the apprentice question is one in which every intelligent mechanic, or apprentice, or learner of any trade—after having done all in his power to inform himself of its past and present history, and sifted out from his own experience the facts bearing upon the question—should feel himself bound to make a stand in whatever direction his sincere convictions lead him. Many a journeyman if asked how he came to be in his present position would have to answer something like the following:

"I was one of a family of five boys, and it was impera-

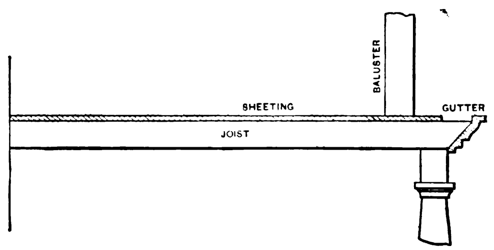


Fig. 1. Section through Roof.

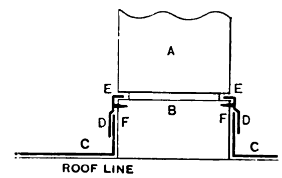


Fig. 4.—Flashing Against Baluster.

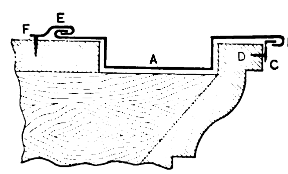


Fig. 5.—Square Gutter Finish.

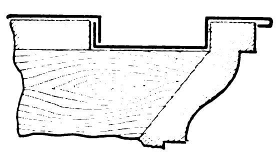


Fig. 2.—Square Gutter Finish.

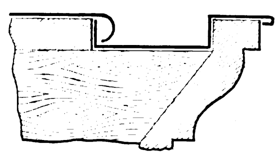


Fig. 3.—Beaded Gutter Finish.

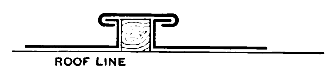


Fig. 6.—Section through Zinc Roof.

Questions About a Porch Roof.

soldered about 3 inches above the roof line, being careful to double seam so that the water will not run against the seam.

The methods shown in Figs. 2 and 3 will not make a good job, for the reason that if the gutter should stuff up at the spout or leader, the water would back up under the cap flashing in Figs. 2 and 3 and cause considerable leakage. The proper method, and that which allows for the contraction and expansion of the metal, is shown in Fig. 5. Let C represent an angle strip nailed against the wooden crown. A represents the gutter lining, being locked in the front to the angle strip at B, and having a lock at the back at E. The lock E is fastened to the roof board by means of the cleat F, and over this the following sheets are locked. There is not a nail driven in the gutter, which can thus expand and contract.

As the rain water is to be used for drinking our correspondent could obtain tinned copper, which would not affect the water. A lighter weight of sheet lead would certainly make just as durable a job as copper; but if our correspondent should decide on sheet lead, the gutter would have to be lined as shown in Fig. 5, minus the lock, letting it extend on to the roof from 6 to 8 inches, and laying the wooden rolls over this lead, being careful not to nail through the lead lining. The lead roof covering should then be flashed over the gutter lining as shown in Fig. 2. We would not advise the use of sheet zinc for flat roofing, for when locking the sheets and closing them with

tive for us to get employment. It was not so much a question of what profession I might choose to follow, but how to obtain a means of livelihood. After working as a messenger boy for the best part of two years, when conscience would ask what I intended to make of myself, common sense would tell me that to become a mechanic rather than a laborer would be preferable, even though it would take some five years ere I could call myself a journeyman However, my eyes and ears were open, and it came to my knowledge that Smudge & Tampin, who kept a large hardware store — with a workshop in connection — could accommodate an apprentice. I was told, upon application, that to drive the delivery wagon the first six months or so, until another boy was taken on, was the custom; so, after filling this programme for ten months and making application, I was promoted to the workshop, where it became my duty to keep the shop clean, tools in their places, &c., wait upon and do things for the "jours," and make myself generally useful. Some of the men were better than others in regard to imparting information about the business. 'Keep your eyes wide open and your mouth wide shut' was an answer always remembered, and, as a consequence, at the end of five years, many things were unknown to me that I should have learned during that time. Even now I can say that more things of real value have come to me through a trade paper than have come through three years of apprenticeship."

Many could say with truth that their experience tallied with or resembled this. But, be that as it may, the onward march of improvement is sure to continue. The time is past when a boy could be tied as fast as the lawyers could tie him as an indentured apprentice, not only to the mechanical part of a business, but also as to his moral "bringing up." He was likely in most cases to be brought up "by hand," as Dickens tells us in "Great Expectations" that Joe Gargery's wife brought up little Pip. Young America will not be kept working a treadmill, if he can help himself, any more than his forefathers would submit to the dictation of their mother country.

During the discussion of this subject at the Social Reform Club, on the East Side of New York City, great emphasis seems to have been placed upon the necessity of prohibiting so many boys from becoming skilled mechanics. Now, if the Painters' Union, and the plumbers and printers and masons, &c., say that they will allow only a few to learn their business, the question arises, "What would you have the boys to do?" You cannot make soldiers or sailors or farmers of them all. Must many boys be allowed to drift about without employment, to add to the number of loafers and become members of that class who earn their living by questionable means, a class that is already too large in all our great cities?

The trade school has its place and is doing a good work, and the fact that many eminent men—financiers, philanthropists, men of sound judgment and downright practical common sense—have indorsed it by aiding such, and establishing many other institutions on similar lines, should give it such a credit that any man should think twice before attempting to discount it. It is a slur upon the boys of the United States, upon their intelligence, that a German, a Dutchman, or any other foreigner almost, should be received with open arms into the various workshops, into the money making trades, into the citizenship of the country, to say nothing of the unions, &c., while her own boys—think of that, you patriotic Americans—shall be allowed to do anything but learn a trade. The youth of the land treated thus, what about her future men?

Let the graduates of trade schools give their testimony now; those who have gone out into the world and have become, many of them, employers of labor. Would you have their influence removed? Now that you are done with the ladder by which you attained success, would you have it removed that others cannot climb? All honor to the brave men, few in number, who first had the courage in face of opposition to give of their means and their life's best energies to establish that which has been a blessing to America's youth—the trade school.

Methods of Barn Framing.

From M. C. M., *Lorain, Ill.*—In looking over the June issue of the paper I notice particularly the letter of "J. J. D.," and his method of framing a barn. He shows an elevation of one of the bents in which some few things are very good and some are poor. I agree with him in part, but think he uses rather light timbers. For the hight of his posts and the width of the building I think he had better have used 8 x 8 stuff. I am not in favor of a big, heavy frame depending on the weight of the structure to hold it in place, like some in this part of the country, where they use 8 x 8 and 10 x 10, and there are some even that have 12 x 12 posts, with the length varying from 16 x 24 feet, for the outside. Another thing that I should criticise in the method of "J. J. D." is the size of the beams. To my mind it will not work well. It is not a good idea to use such thin stuff as that indicated, and the length for this part of the country is too great. It is pretty hard work to get a piece of timber 2 x 12 inches and 40 feet long. If it could be obtained I do not think it a good idea to run ⅝-inch bolts through it, for that cuts out valuable timber right at a point where it is most needed. I would also like to ask the correspondent how he is going to support his rafters, as he has no purlin plate. The roof portion is the strongest part of the bent, as it has 2 x 12 inch pieces on each side of the rafter. If this is simply to support the one rafter I should think a 1 x 12 or 2 x 6 inch piece would be sufficient without the 2 x 4 which is shown in the sketch. I also like a steeper roof than that shown. In this part of the country roofs vary from one-third to one-half pitch. Very seldom are they below one-third, and a great many of them run up to half way between one-third and one-half and some of them reach one-half pitch.

Area of Pipes.

From APPRENTICE, *Naperville, Ill.*—In glancing over old files of the paper, I notice a question from "Young Chip" relative to the capacity of different pipes. He requests a comparison of three 6-inch pipes with one 12 inches in diameter. I cannot agree with the reply given, and with the Editor's permission will give another. The problem is not strictly one of arithmetic, but involves a little simple algebra and hydraulics. We will suppose that the pipes are laid with the same slope or fall and have the same roughness on the inside.

Let v = velocity of water in 12-inch pipe.
Let v_1 = velocity of water in 6-inch pipe.
Let r = hydraulic radius of 12-inch pipe when full.
Let r_1 = hydraulic radius of 6-inch pipe when full.
Let s = slope of pipes.

For convenience call 12 inches, the diameter of larger pipe, d and 6 inches d_1. Then we know that $v = c\sqrt{r\,s}$ and $v_1 = c\sqrt{r_1\,s}$. Now $r = \frac{d}{4}$, $r_1 = \frac{d_1}{4}$, and c is a number depending on the roughness. Again, the quantity of water flowing per second = area of pipe × velocity, or, denoting the quantities by q and q_1, $q = \frac{\pi d^2 c \sqrt{d\,s}}{4 \times 2}$ and $q_1 = \frac{\pi d_1^2 c \sqrt{d_1\,s}}{4 \times 2}$; or, since there are three 6 inch pipes,

$$\frac{q}{q_1} = \frac{\frac{\pi d^2 c \sqrt{d\,s}}{4 \times 2}}{\frac{3\pi d_1^2 c \sqrt{d_1\,s}}{4 \times 2}} = \frac{d^{5/2}}{3\,d_1^{5/2}} = \frac{(12)^{5/2}}{3\,(6)^{5/2}} = 1.8$$

This means that the 12-inch pipe will carry 1.8 times as much water as the three 6-inch pipes.

In conclusion I will say that the quantities of water flowing through pipes of different diameter are always in the ratio $\frac{d^{5/2}}{d_1^{5/2}}$ This is probably more mathematics than is usually allowable in this valuable paper, but I believe the above is the correct and easiest way of solving such a problem. The essence of the above can be found in any of the architects' or engineers' pocketbooks, or in Merriman's "Hydraulics."

The solution already given in reply is not correct, because it supposes that the capacities of the pipes are in proportion to the areas. According to this five 6-inch pipes ought to carry more than one 12-inch pipe, but as a matter of fact the 12-inch pipe will carry 1.13 times as much as five 6-inch pipes.

Ventilating a Stable.

From R. E. S., *Morris, Man.*—Will some one please tell, through the columns of the paper, the best method of ventilating a stable in order to keep the interior dry and the doors from swelling.

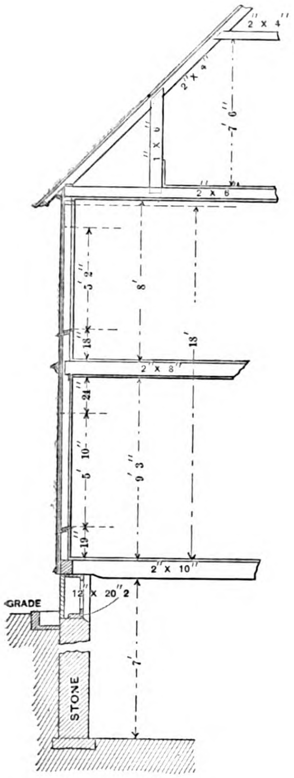
Remedy for a Cranky Door.

From F. T. H., *Ontario.*—I desire to say to "C. A. G." of Rankin, Ill., that the only true remedy for a cranky door is to "kill it," as it will cost as much to cure it as to make, hang and trim a new one. Sometimes new stiles may stop the trouble, but not always. I have cured them by taking down, running a plow groove deep in the hanging edge of the stile and inserting a thin piece of steel spring to counteract the wind. This, however, is expensive and not always certain. The plow groove must not be over 3-16ths inch wide, but may be 1½ inches or more in depth. A saw groove will answer if the door is not too much sprung. I am with "C. A. G." on the wood turning question, and believe it is a field which has not been much cultivated of late.

DESIGN OF A TWO-STORY FRAME DWELLING.

THE illustrations which we present herewith relate to a two-story frame building erected on the southwest corner of Twenty-eighth street and Seventh avenue, Rock Island, Ill., for M. J. Bowen, at a cost of about $2000. The floor plans clearly indicate the arrangement of the rooms, while the elevations give an idea of the external appearance of the building. From the architect's specifications we learn that the structure is of balloon frame, the material employed being pine. The outside walls are of 2 x 4 inch studding, with 2 x 4 inch plates doubled. The studding is also doubled at all windows, doors and other openings. Partition door openings are trussed and the floor joist is bridged with 1 x 2 inch cross bridging in the center of each span. The first-floor joist are 2 x 10 inches, the second floor joist 2 x 8 inches, the attic joist 2 x 6 inches, sills 6 x 8 inches, hip and valley rafters 2 x 6 inches, and common rafters 2 x 4 inches. The studding and floor joist are placed 16 inches on centers, and the rafters 24 inches on centers. The girders are built up of 2 x 10 inch stuff, as shown in the detail on another page. The exterior walls of the building are covered with ⅞-inch ship lap, on which is placed tar felt, this in turn being covered with 6 inch lap siding, the gables being covered with 6-inch pine shingles where shown. On the roof are 6-inch sheeting boards, surfaced on one side and laid with open joints, and covered with shingles laid 4½ inches to the weather. The exterior of the house is treated with two coats of paint, the colors being selected by the owner.

The flooring in the kitchen is of 4-inch white maple, well nailed to each joist, the other portions of the house being laid with 6-inch D flooring with close joints. All trim in the main rooms on the first floor is of yellow pine. The kitchen is wainscoted 3 feet high, while the trim of this room, as well as the rooms on the second floor, is white pine. The staircase in the sitting room is of yellow pine, and the remaining portion of the main stairs of white pine. The rail, balusters and newels are of yellow pine. The bathroom on the second floor is wainscoted 5 feet high with beaded ceiling 4 inches in width. The fixtures include a 12-ounce copper lined bathtub with 1¼-inch lead waste. The rooms on the first floor are finished with Wheeler's light wood filler, and given two coats of Berry Brothers' hard oil finish. The stairs of white pine are painted, as are also the pantry and closets. The stair-rails, balusters and newels are finished the same as the first floor. The wood work of the second story is given two coats of paint.



Section.

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

Design of a Two-Story Frame Dwelling.—O. I. Fitz, Architect, Rock Island, Ill.

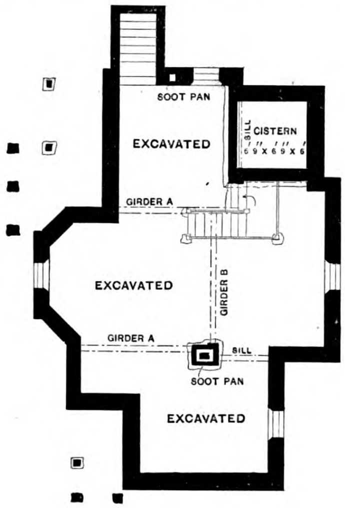
The drawings and specifications for the house were prepared by O. I. Fitz of Rock Island, Ill.

The Arch in Brick Work.

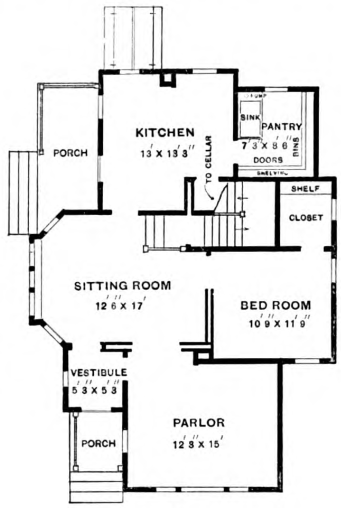
The arch, as an essential factor in modern construction, has almost disappeared. This is evinced more than anything else by the difficulty in finding workmen who understand how to properly build even so simple a thing as a brick arch in such manner that it will stand without any tendency to open at the joints or push out the haunches. There are two ways to build a brick arch, either one of which will give good results if carried out intelligently and with care. The first method is to lay the bricks dry, without any mortar, setting them in order, with proper bond, over the centering, resting against a skewback which is built with mortar if necessary, but better yet cut to proper slope. If the arch is turned between beams, a little mortar must be used to fit the skewback beams against the flanges. When all the bricks are in place the arch is carefully wedged up with either slate or brick chips, preferably the former, so that the whole construction is thoroughly keyed and will probably stand perfectly well of itself without any mortar at all. Next the whole surface is thoroughly grouted with thin cement mortar, which is run into all the joints, filling and compacting the whole together so that the arch ring is a unit and sets up like a single mass of concrete. If there is more than one ring to the arch, each layer is set in a similar manner.

The second method is the more usual, and in the hands of careless workmen is generally not well executed. The oughly good arch in this latter manner, one is not so sure of the results as if it were first built dry and then grouted.

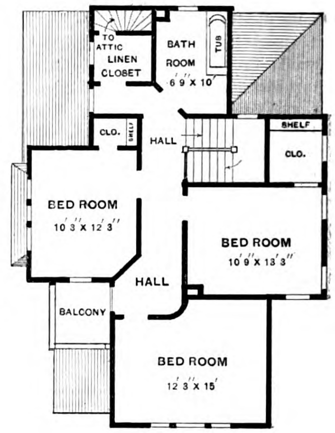
The form of centering used for arches should receive more consideration than is usually given to it. The center for an arch must be as absolutely rigid as the circum-



Foundation.



First Floor.



Second Floor.

Side (Left) Elevation.

Design of a Two-Story Frame Dwelling.—Plans.—Scale, 1-16 Inch to the Foot —Elevation.—Scale, 1/8 Inch to the Foot.

center is laid and the bricks are put thereon, course by course, with the joints filled with mortar, and after the whole ring is turned the surface is gone over and wedges of slate or brick are driven in from the top to key the whole together. The mortar, of course, is stiffer than the grout and usually does not fill all the spaces. Further more, there is no surety that the wedges do answer their purpose, and while it is perfectly possible to build a thor- stances will permit. If it is at all yielding the arch is apt to be distorted in the process of building, and any extraneous load coming upon it before the mortar is thoroughly hard may break the set and render the arch almost worthless. This is an extreme case, but it is not unfrequently found that arches are of no structural value because of the haste or the carelessness used in their building. While it is true that the arch no longer plays the part in our construction that it did once, this is no reason why it should ever be neglected.

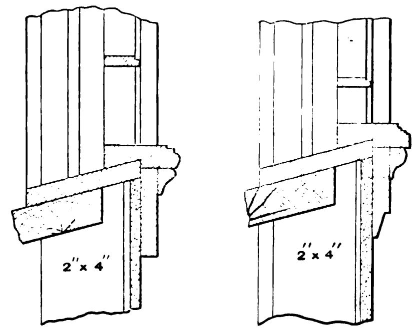
It is the custom with some masons to build several rings of the arch at once. This does not give the best results. Each ring should be made complete by itself, thoroughly keyed and grouted before the next is begun. Otherwise the arch is very apt to be distorted and unequal strains produced.

An arch which serves the purpose of a vault must be treated in a very different manner from an arch which is built into a solid wall over an opening. In the case of a vault the centering should be removed before the mortar is thoroughly hard, so that all the bricks will come down to a bearing, the mortar in some places being compressed so that all parts of the arch bear equally. Furthermore, if there are any defects in the arch they will be found at once and then can be remedied ; whereas if the center is kept in position until the mortar is thoroughly hard, it may be found when removed that the center was the real strength of the construction, and that the arch, by reason of careless workmanship and possibly of an unexpected broken brick, is not of sufficient strength. On the other hand, an arch which goes over an opening in a solid wall should have its centering retained as long as possible, and at least until the entire superimposed load has been placed upon it. Theoretically an arch in this position sustains the direct load of all the masonry directly above it. As a matter of fact, says a writer in the *Brickbuilder*, we know by experience that such is not the case, and that the amount of masonry which is really held by the arch is that inclosed within the lines of an acute angle triangle whose base is the span of the arch, and whose apex is about twice the span. The masonry above the arch keys itself together, and the reason for leaving the centering in is that the whole construction may have a chance to knit itself together by the setting of the mortar or cement so as to be virtually monolithic. If the centering were removed the arch might settle a little, and there then might come a crack between the crown of the arch and the surrounding masonry.

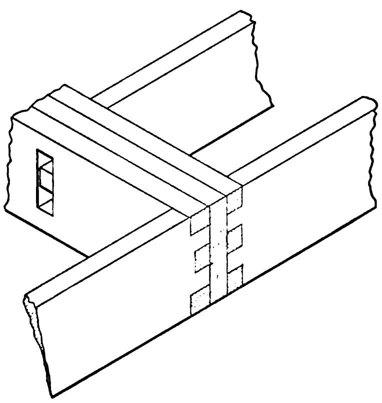
The strength of an arch is wholly an indeterminate quantity. There are no known rules which can determine it with any degree of reliability. When an arch is considered as being built of individual blocks and the adhesive power of the cement is disregarded, there are methods of calculating the probable resistance to crushing under given loads ; but the cement is so important a factor that a brick arch never acts in this way, and a stone arch very seldom. In building an arch or vault the common practice is to make the rise as many inches as there are feet in the span, or to make the radius of curvature equal the clear span ; either is ample. Beyond this, if the thickness of the crown is worked out by Trautwine's formula, namely,

$$\text{Depth of key, in feet} = \left(\frac{\sqrt{\text{radius} + \text{half span}}}{4}\right) + 0.2,$$

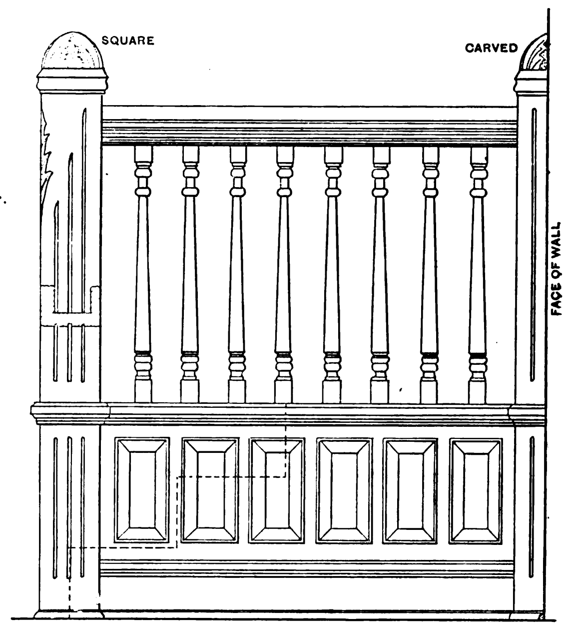
the arch is pretty sure to be amply strong for anything to be put upon it in an ordinary building, especially as the custom is to fill the haunches roughly with the grout in either concrete or brick. This insures stability, as the point where an arch is most apt to yield is about one-third of the way from the spring, where it fails by pushing out. In regard to the thickness of an arch in a wall, custom has established an arbitrary rule that the number of rings in brick work for first-class work should not be less than three and need never be more than six. Excessive spans, of course, need not be considered, as they are never used in modern construction.



Detail of Trim on First Floor. Detail of Trim on Second Floor. Scale, 1½ Inches to the Foot.



Detail of Girder A Shown on Foundation Plan.



Detail of Staircase in Sitting Room.—Scale, ¾ Inch to the Foot.

Miscellaneous Details of Two-Story Frame Dwelling.

AMONG the early prospective additions to the colony of office buildings in the lower portion of New York City may be mentioned two, for which Architect Ralph S. Townsend is drawing the plans. One will occupy a plot 57 x 87 feet in size on Maiden lane, will be 15 stories in hight and adapted for the jewelry trade, while the other will be a 12-story structure of similar style, and located on abutting property on John street. The removal of the old buildings will begin May 1, and work on the new structures will be carried on simultaneously.

THE AMERICAN INSTITUTE OF ARCHITECTS.

THE thirtieth annual convention of the American Institute of Architects, held in the rooms of the Engineering Association of the South, on October 20 to 22 inclusive, was of a most interesting character. At the first session President George B. Post of New York City delivered his annual address, which was well received, and then Secretary Alfred Stone presented the report of the Board of Directors, which had held a meeting the afternoon of the day previous and considered various features of the report. After the treasurer's report had been considered, an abstract of the reports of the chapters was read by the secretary, showing an encouraging outlook. A committee to consider the recommendations made in the president's address, the report of the Board of Directors and of various standing committees, was appointed by the chair. At the request of the president the report of the Legislative Committee on Government Architecture was read by John M. Carrère, the report giving a history of the efforts to secure the passage of a bill to change the present method of obtaining designs and awarding of contracts for the construction of Government buildings. The report was discussed at considerable length by Messrs. Carrère, O'Rourke (formerly Supervising Architect of the Treasury), Aiken and others, and many valuable suggestions were offered.

After a short recess the question of the establishment of a national headquarters was considered and Washington finally selected. Several additions were made to the corresponding members of the institute and also to the honorary list. The following amendment to the by-laws was adopted:

Any person who has been a member of the American Institute of Architects in good standing for ten years, upon attaining the age of 70 shall be exempt from the payment of dues and shall retain all the privileges of the institute, including that of voting, and the Board of Directors may extend the privilege to fellows who have been in good standing for ten years and who have been compelled to retire from the active practice of architecture by reason of physical disability, provided they do not engage in any other profession or business.

The second day's session began with the report of the standing Committee on Education, in which it was announced that arrangements had been made for a series of papers on the "Influence of Steel Construction and of Plate Glass on the Development of Modern Style." The first paper was read by J. W. Yost, who treated of the changes in methods of construction from ancient times and the present use of plate glass to furnish abundant light. The secretary read the paper prepared by Dankmar Adler, and also the paper prepared by G. F. Newton, while A. W. G. Preston read the paper prepared by Robert D. Andrews, all relating to the general topic indicated. The discussion which took place was of an exceedingly interesting character, and the tendency toward the present tall buildings which are to be found in the large cities of the country received a great deal of criticism.

In the afternoon one of the features of the session was a valuable paper on "National Architecture," by William M. Aiken, Supervising Architect of the Treasury Department. The paper was well received by the members, after which the question was taken up of appointing a committee to confer with the chapters of the institute in the various States, with reference to revising the by-laws and constitution in order that suitable legislation might be passed in the several States to regulate the practice of architects. The result of the discussion was that the president appointed as members of such committee George Kiester, J. W. Yost, J. H. Price, J. W. Rapp and William S. Eames. Among the resolutions adopted was one urging every chapter to work for a law in its own State forbidding architects taking a commission from contractors carrying out their designs.

At the final session, which was called to order on the morning of October 22, the Committee on Board of Directors made their report in the form of a series of resolutions, which were taken up in turn and adopted, and then the report adopted as a whole. The committee appointed to prepare a circular to the chapters urging active support of the Aldrich bill in Congress, which bill changes the present methods of designing Government buildings, reported in favor of also preparing a circular to be sent to all members of Congress.

Officers.

The officers elected for the ensuing year were:

President, George B. Post, New York City.

First vice-president, William G. Preston, Boston, Mass.

Second vice president, James S Rogers, Detroit, Mich.

Secretary, Alfred Stone, Providence, R. I.

Treasurer, Samuel A. Treat, Chicago, Ill.

Directors for Three Years.

John M. Carrère, New York.
William C. Smith, Nashville, Tenn.
W. M. Poindexter, Washington, D. C.
Levi T. Scofield, Cleveland, Ohio.
James C. Cook, Memphis, Tenn.
John M. Donaldson, Detroit, Mich.
Henry Van Brunt, Kansas City, Mo.
George B. Ferry, Milwaukee, Wis.

In the afternoon members of the institute visited the Centennial Grounds and in the evening a banquet was tendered the visitors at the Maxwell House.

It was decided to hold the next convention at Detroit, Mich.

Preventing Leaks in Slate Roofs.

The worst leaks in a slate roof come from improper position of the gutters, by which wet snow sliding from the roof is caught and held back. It soon freezes to the roof along the lower edge, the upper portion remaining free, and the water subsequently running down the slope is caught in a long, deep pocket, in which it rises rapidly until its level reaches that of the upper edge of a course of slates or shingles, over which it pours in a sheet, to find its way into the rooms below. Next to this defect, insufficient flashing in valleys is perhaps the worst, says T. M. Clark in *Building Superintendence.* As metal is expensive, the roofer's interest is to save as much of it as possible, and the superintendent must consider the circumstances of pitch and extent of roof surface draining into the valley, and the slope of the valley itself, which should determine the depth which the water will probably attain in it. In certain cases, where the roofs are large, this may be 18 inches or more in summer showers, and the only security is to make the valley flashings of corresponding size.

In estimating for slate work much depends on the quality of the slate and on the manner in which they are laid or "hung." The manner may be in the weathering and the lap, or in the finishing of the "tails" of the slates, as like shingles, they may be wrought with a circular, a pointed or an elliptical end, to which the cost will be very much increased. For an ordinary roof, slates left squared at their tails, the cost at the present time in the Middle and Western States will run from $7 to $12 per square of 100 feet. Near the quarries the lesser, or even a lower sum, may obtain.

A RINK recently constructed in Ottawa, Canada, is said to be among the largest ever put up in this country. It is of the arch style without posts and measures 246 feet in length, 100 feet in width and 58½ feet in hight. The roof will be covered with 2320 squares of shingles down to within 15 feet from the ground, from where it will be covered with iron sheeting. The ice space is 81 x 201 feet in size.

AN OLD HISTORIC BUILDING.

INTEREST always attaches to the old buildings which are to be found scattered here and there over the country, more especially if there are historic associations connected in any way with them. Several references have been made in these columns in the past to structures now in existence, which were erected long years ago, but it is doubtful if any of them is more interesting than the one here described by Architect John F. Lape, of Greenbush, N. Y., and known as old Fort Cralo, which was built more than 250 years ago. The picture which accompanies this story is a direct reproduction of a recent photograph of the building, showing it as it stands to-day.

One of the oldest buildings in the United States is old Fort Cralo, at Greenbush, Rensselaer County, N. Y., and erected by Killian Van Rensselaer of Amsterdam, Holland, about 1642 or 1643, to hold possession of a large tract of land given to him by the King of Holland. Van Gertrude Von Twiller, a daughter of Van Rensselaer's overseer, went out of its front door at twilight many, many years ago, and was instantly seized by a band of prowling Indians and carried away to the dense forest at the back of the house and was never heard of again. During the French and Indian wars, and at the time of the Revolutionary war the building was used as quarters for soldiers and barricaded to protect refugees from the adjoining farms and plantations. The northwest room on the second floor is known as the Lafayette room, as that celebrated general occupied it for a brief period. Washington and many of the leading men of his time have probably been comfortably quartered under its hospitable roof.

In the center of the west hallway there is a trap door that leads into the great cellar extending under the whole house. There are various legends connected with this

An Old Historic Building.—View of Fort Cralo, Looking Northwest.

Rensselaer, so it is said, was a dealer in diamonds at Amsterdam, and by getting into the good graces of the king he was presented with a tract of land 24 miles square on each side of the Hudson River, embracing a large portion of the city of Albany and surrounding country. The old building is located on a very commanding site on the east bank of the Hudson, and at the extreme southern edge of the village of Greenbush—in fact, just over the line in the town of East Greenbush. The structure is of brick that were made in Holland and will measure 60 feet north and south and about 55 feet east and west. The high Dutch gable roof is pierced with quaint dormers. The upper attic next to the peak is dark and spooky, with the dust and cobwebs of two and one-half centuries clinging to the beams and rafters.

The first and second stories of the ancient building are low, but there is something about the quaint old rooms and cozy old window seats that induces the visitor to linger, and dream of the time when old Rip Van Winkle climbed the distant Catskills, which are plainly visible from the southwest windows. Rumor has it that pretty mysterious trap door. One is, that during the disturbances of the seventeenth and eighteenth centuries, this cellar was used as a place of confinement for desperate Indians and freebooters, who were dropped into the cellar through this heavily battened door. Once within such a prison, with its heavy walls and barred windows, no person could possibly escape. The timbers supporting the first floor are 18 inches square, of white oak cut from the adjoining forest at the time of the erection of the building. The cellar walls are 3 feet thick and of field stone picked up far and near. The Holland brick are only 1¼ inches thick, 4 inches wide and 8 inchs long, of a rich terra cotta color.

On the front of the building is a brass tablet placed in position by the Albany Bi-Centennial Commission in 1886, which states that the building is "supposed to be the oldest house in the United States, and was the headquarters of General Abercrombie in 1755, and that the song 'Yankee Doodle' was composed by Major Shuckburg at the old well at the rear of the house near the cantonment." The aforesaid well is at the southeast corner of the grounds in a very neglected and dilapidated condition, covered with a few boards to prevent the children and animals in the neighorhood from falling in. The story runs that a call was issued for raw recruits by General Abercrombie and that such a miscellaneous collection of various sized men responded to the call that Major Shuckburg, who was a humorous individual, composed the song while quenching his thrist at the old well

About three years ago the old house was deserted, or rather vacated, and since that time no family has been in possession of its many capacious rooms. The boys of the neighborhood have stoned out its windows, relic seekers have carried away mantels and stair railings; doors have been torn from their hinges, even the shingles have been stripped from the roof, and to-day what was once one of the strongest and best equipped private dwellings on this continent is only a shadow of its former self. An attempt was made by a society to redeem the old house from vandalism and ruin, but it did not prove a success, and the old historical building was finally abandoned to the mercy of the elements, and it is only a question of a short time when nothing but the site will remain. On either side of the front door and at the north side are square blocks of brown stone pierced for musket barrels.

The empty rooms are as silent as the grave, while the happy birds flit through the old garret and sing merry songs on its chimneys and roofs. Chimneys of enormous proportions are located throughout the building, while the fire places will take a quarter of a cord of wood and ask for more. 1642-1896, what a reminder of the past! The whole North American continent cannot show such a wonderful building. Time, the great leveler, is busy with the old house, and if there is a person with but a spark of patriotism to thrill and encourage the effort, don't die until you have seen old Fort Cralo with its deserted rooms and smashed windows.

New Manual Training School.

The plans have recently been completed for the new manual training high school to be erected at Kansas City, Mo., the architects being Hackney & Smith of that city. The structure will be 190 feet in length by 150 feet in width, and three stories high. The basement will be of stone and the superstructure of buff brick, trimmed with white limestone, the roof being of slate. The shops and laboratories will be of what is known as mill construction. On the first floor will be the office, machine shops, stockrooms, physical and chemical laboratories and eight classrooms. On the second floor will be the pattern and joinery shops, laboratories, classrooms, &c. The third story will be devoted to domestic science and domestic artrooms, classrooms drawing room and an assembly hall with a seating capacity of 1200. In connection with each shop is a toolroom and a lavatory, with lockers for wearing apparel. In the manual training department the work of the boys will be carried on in four shops, covering joinery, turning, pattern making, forging and machine work, one year being given to each.

SHADOWS IN PERSPECTIVE DRAWING.*

IN previous articles the direction of the rays of light was parallel to the picture plane and cast on front planes and right angles, but in the present example, while the direction of the rays is the same, the shadows are cast on oblique planes and vertical lines. Before finding the shadows it will be well to study the true reflection of the building in the water after the natural laws of reflection and perspective. In the last issue it was mentioned that the reflection of an object is the inverse reproduction of the object; that the horizontal lines go to the same vanishing points, and that the various hights are the same, taken from the water level. But it must not be understood by this that the reflection of the building will be the exact reproduction of the lines of the building as drawn in perspective. The student will notice that this is not so on comparing the object and its reflection in the water, as shown in Fig. 6. The reflection of the vertical lines is, of course, the continuation of these lines downward. The horizontal lines go to the same vanishing points as those of the building; the hights are the same as regards the water levels, but these hights are in proportion as the respective points recede from the front plane of the picture, and also depend on the position of the horizontal line, thus changing in appearance the reflection of the object. For instance, the point *g* of the gable is in the drawing seen well above the wall *a*; in the reflection, however, this point *g* is found to be hidden behind the reflection of the wall *a a*. Again, the crest *k* of the dormer window appears in the reflection to be well above the crest of the large roof, while in the perspective this point is well below. The reason for this we shall understand further on, while constructing the reflections.

We will first find the true reflection of the front of the house, which is contained in one plane, from the angle of the wall *a a* to the angle *o o* against the tower. One water line will therefore suffice to find the reflected hights of all lines in this plane From the ground point of the wall angle *a* we draw a line from the vanishing point A, indicating the form of the bank from the wall to the surface of the water. From the point where the sloping bank meets the water we draw a line to the vanishing point A. This line will therefore represent the surface of the water if continued beneath the wall. We produce the angle *a a* of the wall until it meets the water level at point 1 *a*, and from this point 1 *a* we draw the line 1 *a*, *s*, *b*, *f*, &c., to the vanishing point B This line represents the angle of intersection of the surface of the water and the front wall of the house, if both these planes were continued. By means of this line, therefore, we can obtain the hights of the reflections of the front wall by projecting all the vertical lines to meet the water level, and producing them to the same distance beneath. We must not forget that the sloping bank will be reflected in the water to the distance *x z v* from the point *x z* on the water level. The reflection of the bank will hide to a certain degree the reflection of the lower portion of the building. From point 1 *a* we mark off the distance 1 *a*, *a* giving us the reflection of the point *a*, the crest of the wall. Similarly the doorway *s s* finds its reflection in *s s*. The soffit of the doorway will appear larger in the reflection than in the perspective, owing to the hight of the horizontal line B A. The angle of the gable *b b* will be reflected in *b b*, *f f* at *f f*, *o o* at *o o*, *s* at *s*, &c. The angle *d d* of the open door is contained by a different plane, more advanced than that of *a a*, and we must therefore, in order to obtain the reflection, draw the water line of this plane. From the vanishing point B through *d* we draw a line to the ground line at 2. Descending this point to the water level, and drawing another line to vanishing point B, we obtain the water line 2 *d*. From point *d* the projection of *d d* on the water line *d d*, we mark off the point *d*, the reflection of the top of the open door. We may notice that the reflection of *d* appears to be well above the crest of the wall, while in the perspective it is shown nearly level with the crest.

The front wall *m*, *n* of the square tower is contained in a different plane, and will therefore require a new water level, which, proceeding as for the other planes, we find to be water level 3, or line *m*, *n*, beneath the tower; and from these points we mark off the reflection *m*, *n*. By means of the two vanishing points we can easily find the reflection of the eaves of the tower roof *y*, *v*, *t*. We must now obtain the reflection of the other planes of the building. This is easily done by means of lines to the vanishing points from the various points already obtained and the intersection of the projection of the required points. Thus

* Continued from page 270 November issue.

point t of the tower is obtained by the intersection with the reflected line v, t, drawn to the vanishing point A. We will leave the student to carry out the reflection of the eaves of the gable x, y, z, found by means of a new water level on the y, x at x; also the reflections of the columns of the veranda and roof, found by means of a water line in the plane of the columns. The soffit $f\,f$ of the window under the veranda will be found to be almost visible in the reflection, although in the building it is well hidden by the roof. For the crest of the large roof and the hip point o we have first to find o of the roof produced, the line from the reflection to the vanishing point B, and the projection of the hip point o on this line gives us the true reflection of the crest of the roof and obviates the necessity of finding another water line for this plane. The reflection from the ground point of this vertical line, and for hypotenuse the line drawn in the direction of the rays of light and intersecting the ground line at a certain point—the point of shadow at the summit of the vertical angle. This may be noticed in the shadows of all the points of the object. For instance, the angle a a of the wall will cast its shadow on the ground plane in the horizontal line a a intersecting the hypotenuse a a drawn in the direction of the rays of light from point a. From this point a line is drawn to the vanishing point B, and forming the shadow of the cresting of the wall. But this shadow is cut into by the shadow thrown from the open door d d; a horizontal from the ground point d meets at d the shadow line drawn from the upper point d, forming thus the triangle d d d. The whole of the front surface of the

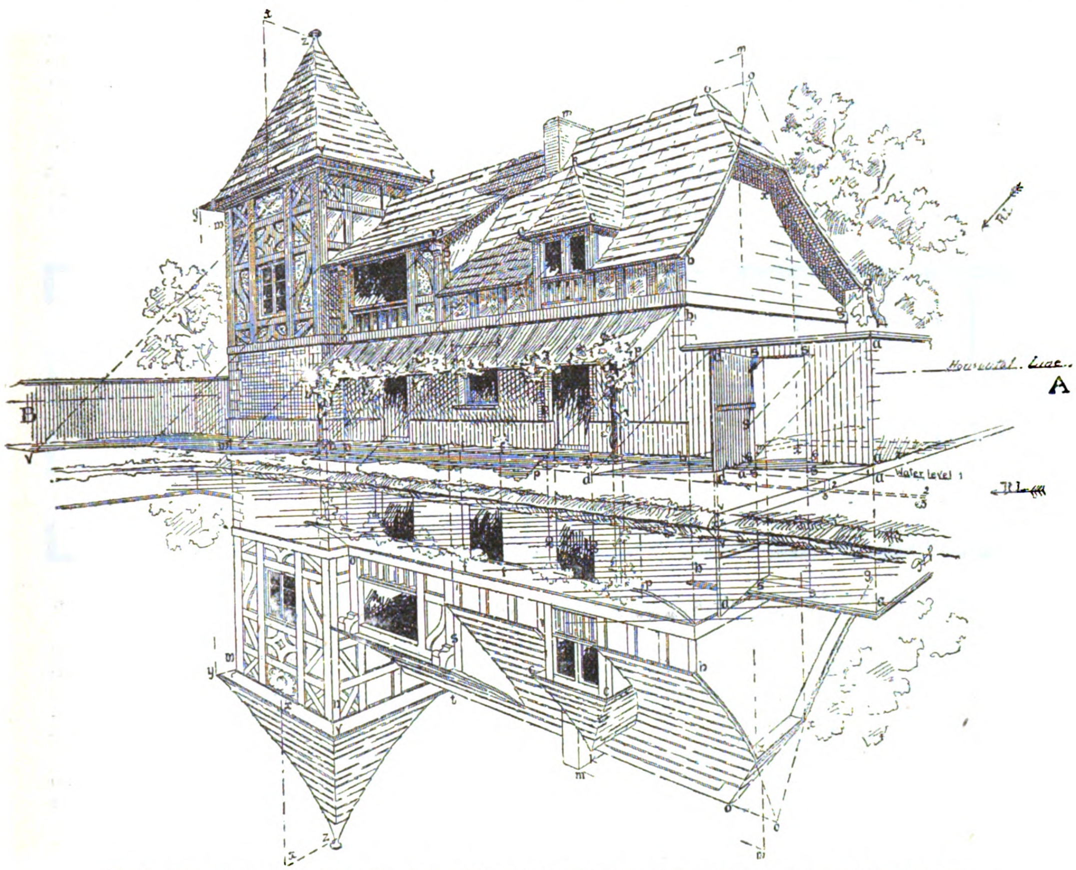


Fig. 6.—Rays of Light Parallel to the Picture Plane, but the Shadows Cast on Oblique Planes and Vertical Lines.

Shadows in Perspective Drawing.

of the chimney is likewise obtained by means of its trace, m. In a similar manner we may obtain the reflection of the point z of the roof of the tower by finding the reflection of its trace on the front wall plane by means of the water line m n and drawing x z to its vanishing point A.

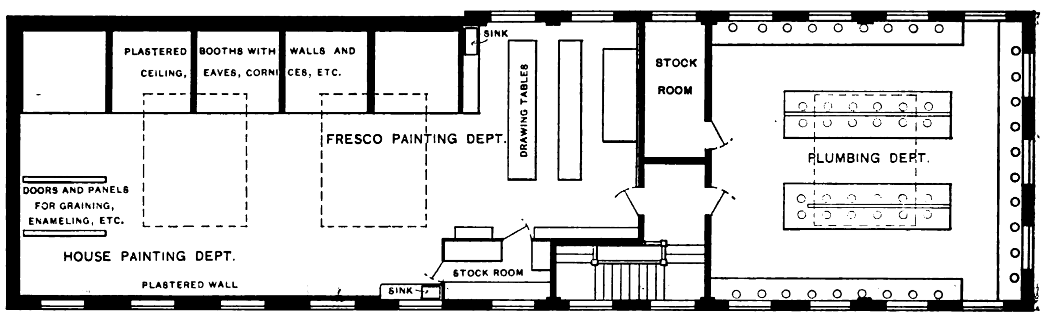
We have now the general reflection of the building found by means of different water levels for the different planes. Of course, having once well understood the rules, the student will find out for himself easy methods to construct, by means of the vanishing points and one or two water levels, the reflections of complicated objects.

We have now to construct the lines for the natural and cast shadows of the building, thrown by rays of light in the direction R L, parallel to the picture plane. We follow the same system of construction as for the preceding articles, the traces of the shadow thrown being always that of a triangle, having for one side the vertical line casting the shadow, for base the horizontal line drawn building is in natural shadow. The shadow from the point b on the wall and the angle of the roof p of the veranda have their shadow at p on the horizontal line drawn from the base of the wall and the projection of p on the ground plane. From this point p obtained, a line to the vanishing point B will give the shadow of the eaves of the veranda on the ground. The shadow of the eaves of the large roof b falls on to the veranda, and is then stopped; but the shadow of the eaves c c we find overreach the veranda and fall to the ground at c c on the horizontal lines from c c projected to the ground plane. The eave m has its shadow at m, that of v y at v, and then against the inclosing wall. The shadows against the walls at g g, x x, and the tower at t are easily obtained as already explained. We will leave the shadows thrown on the roof by the chimney and the dormer until we treat of shadows on oblique planes and lines. The shadows in the reflection of the building will follow the same rules as for the reflection.

(To be continued.)

New Trade School Building of the Pratt Institute.

During the past summer a new building was constructed for the use of the trade school of the Pratt Institute, Brooklyn, N. Y. Three courses of instruction are included in the trade school, the carpentry classes occupying a large space on the first floor of one of the old buildings of the institute. A plan of the upper floor of the new building is shown herewith, it being divided between the plumbing class and the painting class, the latter including house painting, sign painting and fresco painting. The first floor is devoted to the steam and electrical laboratory. The building is constructed of brick, has a truss roof, and is lighted on three sides, the roof containing large skylights as well for lighting the floor. Owing to the character of the trades taught in this building, special attention has been paid to secure good ventilation. It will be seen from an inspection of the floor plan that the greater portion of the space is taken up by the painting class, there being plastered booths with walls and ceiling for fresco work; doors and panels for graining, enameling, &c., drawing tables and a stock room. At the right is the plumbing department, occupying a space about 32 feet square, the work benches being arranged with a view to accommodating an increased number of applicants to the school, as this class has been very popular in the past. The entire space has been utilized as far as possible without crowding the young workmen. At night the building is lighted with arc lights, supplied from the central plant of the institute.



New Trade School Building of the Pratt Institute.—Plan of Second Floor, Showing Various Painting and Plumbing Departments.

Glass for the Walls of a Dwelling.

Slight reference has been made in the past to the use of glass for the walls of a dwelling house, but the particulars relating to the construction of a dwelling erected by Dr. W. Van der Heyden of Yokohama, Japan, give one a much better idea of the methods employed. The doctor is a bacteriologist, and while he has sought other scientific objects in the construction of the building the chief aim has been to devise a dwelling into which the germs of disease could not penetrate. The house is about 44 feet in length by 23 feet in width and stands 17 feet in hight. Large panes of glass fully ½ inch thick are arranged about 4 inches apart, and set in an iron frame so as to form the sides of a cellular building block. The blocks are fastened together at their ends, as well as at their upper and lower edges, by screws, while between a tier and the one above are interposed strips of felt and a board not over 5 inches wide. In this manner dust tight, insect proof joints are secured. There are no window sashes, but a row of small openings around the upper part of the second story allow the escape of air from within, while admitting no outside air. Entrance is effected through a long corridor leading to the lower room, and a visitor reaches the upper room by means of a staircase. Doors are so arranged in the corridor that almost no air can get in with a person except that which is already entangled in his clothing. There are gratings in the floor of the upper room to admit air from below, and plates of glass to assist in lighting the lower apartment, which is partially under ground.

What is intended to be the sole supply of air is obtained at a considerable distance, being forced through a pipe and carefully filtered with cotton wool before it reaches the dwelling. In this manner most of the microbes are excluded. But to make the sterilization more complete the air is driven against a glycerin coated plate on entering the lower rooms, and any microscopic life which passed the cotton wool is captured by a substitute for sticky fly paper. Inasmuch as strong sunlight kills nearly all bacteria, there is another agent at work destroying possible survivors, and, if necessary, the floors and walls can be sprayed with disinfectants. An evidence of the sterility of the air in the house is found in the fact that milk and unsalted butter remain sweet much longer than elsewhere.

Another remarkable feature of the construction is that the space between the two thicknesses of glass in the walls is filled with a solution of certain salts, alum or soda. Now, when the sunshine strikes the house, which stands in an open tract, the liquid absorbs the solar heat, which, consequently, does not penetrate to the interior, except very gradually. At the hottest hour of the hottest day, therefore, it is several degrees cooler in the upper room of this dwelling than in the shaded apartments of the adjacent residences where there are windows and doors wide open. The place is made even more comfortable by drying the air with chemicals before it enters.

On the other hand, the chill of evening is offset by radiation from the warm water in the walls. As the water itself cools it precipitates a part of the salt held in solution. This operation releases still more latent heat. So effective is this system in regulating the temperature of the room that even in freezing weather a few hours of sunlight daily are sufficient to render the place habitable. It is only when several cloudy days occur in succession that artificial heat is needed. This is supplied through the medium of the filtered air, which is pumped in. The quantity of fuel consumed for this purpose in the course of a winter is said to be insignificant.

It is stated that the new fire proof mercantile building for the Wyman-Partridge Company, at Minneapolis, Minn., is to be floored with brick arches instead of hollow terra cotta, as at first intended, the change being made in order to save expense. This is said to be the first time that this idea has been adopted in the Northwest. The brick is cemented together between I-beams in arches 16 inches high and about 10 feet span. The beam is being secured at extremities of concave side of arch by iron stringers to prevent spreading. A section of the main floor was subjected to a load of 650 pounds per square foot, under which there was a deflection of 1 inch. A further test was made by dropping an 800-pound piece of granite from a hight of from 6 to 8 feet. On the second drop a few bricks at the center of the arch were affected, but nothing further. The test was considered satisfactory by the architects.

The Builders' Exchange

Directory and Official Announcements of the National Association of Builders.

Officers for 1896-7.

President,
James Meathe of Detroit.

First Vice-President,
Thos. R. Bentley of Milwaukee.

Second Vice-President,
Wm. H. Alsip of Chicago.

Secretary,
William H. Sayward of Boston.

Treasurer,
George Tapper of Chicago.

Directors.

Samuel B. Sexton	Baltimore.
E. Noyes Whitcomb	Boston.
John Feist	Buffalo.
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Alexander Chapoton	Detroit.
Frank L. Weaver	Lowell.
C. A. Sercomb	Milwaukee.
Chas. A. Cowen	New York City.
Stacy Reeves	Philadelphia.
J. J. L. Friederichs	Rochester.
T. J. Moynihan	St. Louis.
Maynard T. Roach	Worcester.

The Annual Meeting of the Massachusetts State Association of Builders

The second annual meeting of the Massachusetts State Association of Builders, which was held in the rooms of the Builders' Exchange in Lowell on October 28, was unexpectedly satisfactory in point of numbers and for the interest manifested in the business of the meeting and the purposes of the association. The meeting was called to order by President Chas. A. Vaughan of Worcester, and the delegates were welcomed by President Frank L. Weaver of the Lowell Exchange. President Vaughan briefly addressed the meeting, and Treasurer E. Noyes Whitcomb of Boston presented his report, showing a balance of $121.50 in the treasury. Next in order was the secretary's address, a summary of which is subjoined

After a short recess for luncheon, which was served in the rooms as part of the entertainment offered by the Lowell Exchange, the delegates were called to order and the Board of Management reported the election of the following officers for the ensuing year:

President, Frank L. Weaver of Lowell.
Vice-president, E. Noyes Whitcomb of Boston.
Secretary, Wm. H. Sayward of Boston.
Treasurer, F. H. Goddard of Worcester.

The business of the meeting was largely confined to the subjects indicated in the following resolutions, which, after unusually free and full discussion, were all adopted:

Resolved, That this association recommends all constituent bodies to move in the direction of establishing the policy among their members in the various lines of building work, of refusing to contract for building operations where the builder is expected to contract for labor alone, the owner furnishing the material.

Resolved, That a committee, to consist of the president, vice-president and secretary, be appointed with power to add to their numbers, the special purpose and duty of which shall be to encourage the establishment upon proper lines of builders' exchanges in the various cities or towns in the Commonwealth and secure their adherence to the State and National Association.

Resolved, That a committee of three be appointed by the president to consider as to the feasibility and advisability of the establishment of a system by and through which material dealers will only sell materials for building operations generally direct to contractors, and that a cash discount be secured from material dealers—members of exchanges—to purchasers—members of exchanges—greater than to purchasers who are not members. This committee to report at the next meeting of this association.

Resolved, That a committee, to consist of three from each constituent body, be established, to be known as the Legislative Committee, whose duty shall be to watch all legislation affecting the interests of contractors in the building trades that may be presented at the coming session of the Legislature, and to report thereon to the Executive Committee for instructions. The said committee, acting under instructions from the Executive Committee or the association, to appear before legislative committees in support of the interests of our constituency, and to use legitimate efforts in the direction of protecting those interests. The representative of each constituent body on this committee to be selected by each body in such manner as may be agreeable and satisfactory to them.

Upon the adjournment of the afternoon session the delegates and visitors repaired to one of the principal hotels, where a banquet was spread. The after dinner exercises were equally delightful with the dinner itself, and many appropriate toasts were interestingly responded to by the prominent members of the association and citizens of Lowell.

The total attendance, including representatives from several exchanges not yet members of the association, was about 50.

The Secretary's Report.

The following is a summary of the report or annual address of Secretary Wm. H. Sayward:

The secretary began his address by showing the lesson of the experience of organization among builders and the relation between the benefits of organization and the understanding of its nature and possibilities by the individual builder.

Continuing, he said:

"The average builder in Massachusetts, or elsewhere, for that matter, whether a member of an organization or not, could not give an intelligent answer if asked: What constitutes associated effort? or: What is the character and functions of a builders' exchange or other association of builders? The average member of a builders' exchange, if asked his object in joining such an organization, and how he expected to be benefited, would be very likely to answer that he joined because others did, and expected to receive benefit by being given work simply because of his membership, without any reciprocal action on his part. Few members of exchanges recognize that the obligation to give exists in direct proportion with the desire to take, and one of the principal reasons why exchanges are not more directly beneficial to their members is because those same members do not sufficiently understand the nature of associated effort to recognize that they must give as well as take. It is self evident that either all giving or all taking would be so one sided that, from lack of equal advantage to all, any organization in which the members all seek their own advantage without regard to the welfare of the others would soon go to pieces.

PURPOSE OF THE ASSOCIATION.

"The purpose of this association is to provide the means for securing associated effort by builders—that is, to so foster and extend the knowledge of proper organization that, in time, builders will work in harmony instead of opposition. Associated effort among builders implies a recognition on the part of the individual of the mutual interest of builders as a body, and a joining together for the purpose of acting in unison for the protection of those mutual interests. It is clearly evident to the most careless observer that inharmony of action among builders acts to the injury of all; and it should be quite as clearly evident that harmonious action results in benefit to all. No builder can defy the principles of honest competition without damaging every other builder; for every other builder is immediately put upon the defensive, and without associated effort (organization) the only defense is to do likewise. When one builder adopts illegitimate methods of competition, every other builder believes he is compelled to adopt the same course to secure his contracts. Associated effort is the means whereby those practices which are legitimate and those which are illegitimate may be defined, which definition offers the path to protection and profit. Associated effort means the effort (the action) of many in a given direction; and the direction in which this association seeks to guide the effort of the builders of Massachusetts is toward the weeding out of all dishonest, irresponsible and incompetent builders, for the protection of every one concerned in the building business in the State, whether general contractor, sub-contractor, owner, architect or dealer in building materials.

"As the best men among builders come to recognize the immense protection of proper organization the solidarity of the fraternity be increased, and it will become more and more difficult for the irresponsible contractor to secure work of any importance. To-day, an architect may demand almost anything he sees fit of the contractor, for he knows by experience that as a set of business men they are so at the mercy of the unscrupulous members of the craft that if they expect to secure a contract they must let down the bars and compete with those whose methods, as proven by their estimates, must be unfair.

"It is safe to say that all men who are in the building business, in whatever department, are in it to make money, and it is safe to say that a majority would prefer to make their money by means which are honorable and sure. Organization offers the means whereby that majority may become united and associate its effort for mutual protection, and in time control the methods by which the building business is conducted. It would be exceedingly difficult for a general contractor who was in the habit of trading upon sub bids or misusing the moneys that belong to sub contractors, to withstand the associated effort of the majority; he would soon be compelled to transact his business by fair means, or quit. The sub-bidder whose methods were unfair would be compelled to do likewise, if subjected to the associated opposition of the majority; the architect and the dealer in builders' supplies would be controllable by the same power.

"As it is at present, the average builder is so anxious to secure contracts at any cost that proper organization is difficult of establishment. He is so shortsighted that he fails to understand that by weakening the strength of the majority he is undermining his own business safety, and making his profit not only less in volume but less secure. He is fearful that some unscrupulous contractor will get the work, and to protect himself, as he thinks, he adopts the same methods as those he knows will be adopted by the unscrupulous builder of whom he is afraid. Proper organization means, among other things, a body of men who will censure or expel any of its members detected in those methods the wiping out of which is essential to the well being of those who compose the body.

"It must be admitted that proper organization is very rare. So long as one member whose methods are unfair is retained in membership, so long will the organization as a means of protection fail of success. The principles of an organization must first be protective, on true and tried lines, and then must be rigidly enforced. Once all members of an organization refuse to have any business dealings whatever with a contractor, an owner, a dealer in builders' supplies or an architect whose methods are dishonest, then that individual's future success is at least precarious, and his power to damage the fraternity by compelling others to work down to his level is limited.

SUCCESSFUL ORGANIZATION.

"The success of an organization depends upon the fidelity with which the individuals of which it is composed live up to the principles which the organization represents. Upon the individual depends the success of all. No man can perform associated effort alone, but no man does business alone. Every business agreement implies at least two persons, and the builder in his agreements may justly and without the least inconvenience to any one require the other party to assist at associated effort. If his organization is a proper one, he will have the support of his fellow members, and his demand for that which the body to which he belongs considers fair makes it so much easier for the next member to make a similar demand. Instantly any one in the building business improves his methods, whether voluntarily or through force, he becomes a contributor to the associated effort undertaken by an exchange. Just as every concession to custom and the practices of irresponsible builders weakens the resisting power of all builders, so will every successful stand for right methods and fair dealing strengthen their power to protect themselves. Protection must be understood to mean true protection, which means justice to all concerned.

"Builders are brought face to face with the strength and practicability of organization every day in their experiences with labor unions. One of the phases of their strength which should be convincing of the benefit of similar organization among employers, is the fact that the workmen are steadily developing harmony of policy and national strength. Workmen may demand legislation today with the assurance of harmonious and enthusiastic support, while employers must depend upon individual and disorganized effort should they wish to oppose bad legislation or to secure the enactment of that which would be beneficial. Suppose, for example, that legislation were petitioned by the workmen which would menace the welfare of the employer; in such a case the opposition from the employers would undoubtedly be practically unanimous, so far as they were individually concerned; but how much more efficient would that opposition be if it represented the united and harmonious action of an organization of builders in every city of importance in the State. This example is applicable to every case that may arise wherein the safety and profitable transaction of business is attacked. It is self evident that builders, as a body, would be much stronger to resist the attack of the evils of which all complain if they were properly organized. It should be our purpose to insist steadily upon the protective character of organization, and to insist upon it year after year until we shall have gained so many converts to our beliefs that we shall be able to accomplish whatever we may set our hands to do. No new theory has ever been adopted without years of insistence, and while organization is neither a new theory nor a new practice, its application as a means of protection to separate classes of business men is comparatively new. The result of our meeting together from time to time cannot be estimated, for however small may be our numbers to-day, we represent the progressive element of the fraternity, and progress is the inevitable experience of the age We have but to bide our time, and no matter how slowly the results of our efforts may manifest themselves, a beneficial result is certain to follow."

New Publications.

STEAM AND HOT WATER FITTERS' TEXT BOOK. By Thomas E. McNeill. Size, 5 x 7½ inches; 140 pages; profusely illustrated; bound in cloth; published by David Williams, 232–238 William street, New York; price, $1.

The series of lectures given by Thomas E. McNeill before the steam and hot water fitting class at the New York Trade School, and which ran as a serial article in *The Metal Worker*, is now published in book form. The book is dedicated by the author to Charles J. Gillis, one of the oldest and best known, as well as highly esteemed, members of the Master Steam and Hot Water Fitters' Association of the United States, to whose continued efforts the establishment of this class of instruction at the New York Trade School was largely due. In the preface the author states that when he undertook the work at the school mentioned he discovered that no text book had ever been prepared for the use of the steam fitter and his helper and his lectures before the class were made to serve the double purpose of instructing the young men and forming a manual for the guidance of those who do this work. The book is divided into 15 chapters, devoted to various systems of piping for both high and low pressure steam and direct and indirect steam and hot water heating, and also to the blower system of steam heating and ventilation. One chapter is devoted to the work of laying out and preparing the specification for heating plants and to estimating the cost of materials. To better exemplify this important branch of the instruction, a chapter is devoted to the specification, articles of agreement, calculations and the plans, showing the piping of a successful steam heating job. A feature of the calculation is the size of each room with its cubic contents, the amount of radiation used and the ratio of the radiation to the contents. The work is compiled on the question and answer style, beginning with the tools and fittings with which a steam fitter must become familiar before he goes on to the more intricate part of the work, and finally to the installation and designing of plans for special buildings.

CONTENTS.

Carpentry and Building

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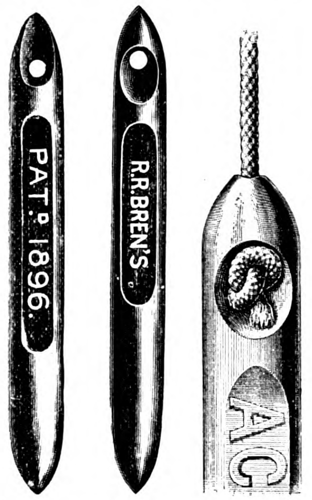
NOVELTIES.

Self Adjusting Plumb Sash Weight.

The accompanying cuts represent different views of the R. R. Bren pat-



Figs. 1 and 2.—General Appearance of the Weight. Fig. 3. — The Cord Attached to the Weight.

Novelties.—Self Adjusting Plumb Sash Weight.

ent sash weight, being introduced by the Acme Sash Weight Company, 18 Cliff street, New York. The eye of the weight, shown in Fig. 1, beginning at the top and extending down 1½ to 2½ inches, depending upon the size of the weight, is a flared groove, ending in a flared recess. The opposite side of the weight has a deep flared recess, Fig 2, to receive the knot. These two flaring recesses meet, forming a smooth eye shown in Fig. 2. In hanging the weights the cord is passed through the hole to the side shown in Fig. 2, when a knot is tied in the end of the cord, as in Fig. 3. The weight, it is claimed, will adjust itself plumb as soon as it reaches its place. The flare grooved eye, it is stated, prevents the possibility of the cord being cut by the pulley, as they do not come in contact. Among the points of excellence claimed for the weights by the manufacturers are the following: That they are free from lumps, bumps, sand holes and fins, hence cannot injure the hands of those handling them; that being smooth they require but a minimum of space, enough only to enable them to pass each other; that they are uniform in size and reliable as to weight, which is plainly indicated on each; that the ends taper so that they are not liable to catch upon each other, avoiding the consequent clanging of the weights, or twisting and tangling of the cords, and that the grooved flare allows the eye to come up flush with the top of the pulley, the head of the weight being thus carried 2 to 5 inches higher than the ordinary weight. It is pointed out that the smoothness of the eye and of the weight, and the ease with which either cord or chain can be attached, enables the mechanic to save at least one-third the time usually expended in hanging weights; also that from 6 to 8 inches of cord is saved on each weight hung. Samples of the weight will be furnished by the makers upon application.

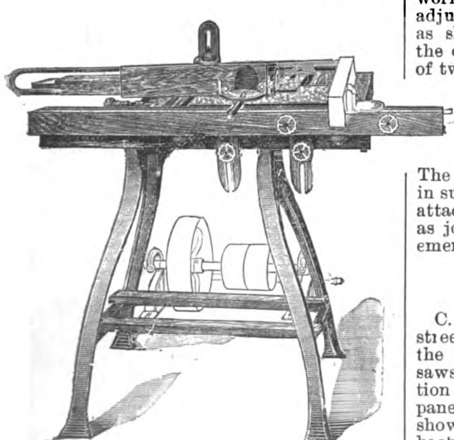


Fig. 4.—Guide for Parks, Light Power Wood Working Machine.

Guide for Parks' Light Power Wood Working Machine.

An improved form of guide intended for use in connection with the Parks light power wood working machine, and illustrated in Fig. 4 of the engravings, has been brought out by L. F. Parks of Cincinnati, Ohio This guide has been introduced to take the place of the flat bar of iron which has heretofore accompanied the machine named. The device is fitted to a slot cut in the upper surface of the saw table and mounted on a cold rolled steel shaft having babbitt metal bearings so arranged as to readily permit of taking up all wear. The guide may be used either for cross cutting or ripping work, and for the latter purpose it is adjusted at the right of the machine, as shown by the outlined portion of the engraving, and clamped by means of two hand wheels The guide is also provided with an adjustable stop for cutting to lengths, and can be set to catch against the shoulders of tenons It may also be set to any angle for miter work, &c. The combination machine is arranged in such a way as to permit of readily attaching a variety of other tools, such as jointer, scroll saw, shaper, lathe, emery wheel and boring tool.

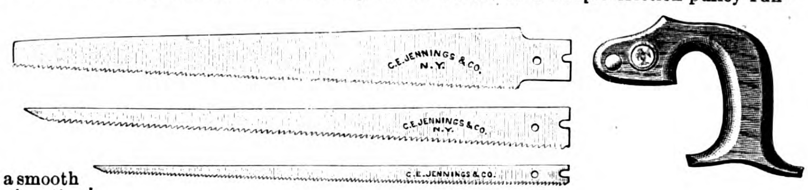


Fig. 5.—Jennings, Nest of Saws.

Jennings' Nest of Saws.

C. E Jennings & Co. of 79 Reade street, New York City, are offering the trade a very convenient nest of saws, three in number, the combination embracing a keyhole, compass and panel saw. These saws, which are shown in Fig. 5, are made with thin back, are evenly tempered from butt to point by an improved process, are full bevel and are filed and set ready for use. The construction is such that the saw can be easily detached from the handle by simply removing a screw, but the saw cannot be pulled out when in use. A point to which the manufacturers refer is that the handle is of the ordinary form, so that in case it breaks a new one can easily be obtained from any hardware store. The saws are adapted not only for the use of mechanics, but are very convenient to have about the house for doing cdd jobs of work. The saws are put up in paper boxes, four nests to the box.

Standard Sash Holder.

A device in which architects, builders and carpenters generally are likely

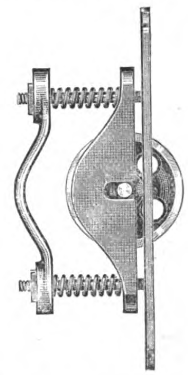


Fig 6.—View of the Standard Sash Holder.

to be interested is what is known as the Standard sash holder, lately introduced to the trade by W. L. Bellinger & Co. of St. Johnsville, N. Y. The device consists, as may be seen from an inspection of Fig. 6 of the cuts, of a simple friction pulley running in a loose hanger, adjusted by spiral springs and back plated. The holder is mortised into one side of the window frame and allows the sash to move over the friction pulley with constant tension, at the same time permitting an easy movement of the win-

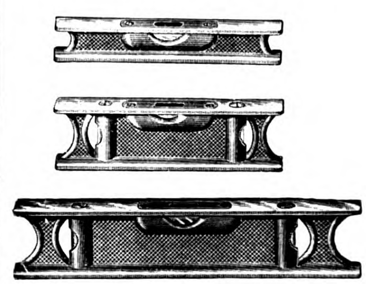
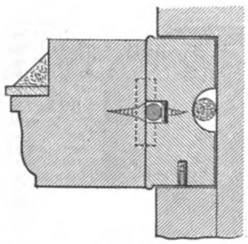


Fig. 7.—Steel Spirit Levels.

dow without the usual rattling of weight hangings, and avoiding the unsightly appearance of the spring bolt. The manufacturers state that this holder does away with the common sash cord and weights, and at the same time gives excellent results at about one-third their cost. The statement is made that the holder can be used in all ordinary windows up to 32 inch glass, and is adapted to old as well as new frames. Those who have used the holder refer to it as giving entire satisfaction

Steel Spirit Levels.

In Fig. 7 of the cuts are represented different styles and sizes of steel spirit levels being put on the market by the



Novelties.—The Bradshaw Safety Reversible Window.—Fig. 8.—Sectional View of Sash, Showing the Sealing Rod Between the Sliding Strip and the Window Frame.

Sawyer Tool Company, Athol, Mass. The levels are referred to as overcoming many objections to the ordinary cast iron level, these being made of steel, receiving a fine finish. It is explained that should they be dropped there is no danger of breaking them. The levels have wide faces, making a large, firm leveling surface, and are ground and warranted by the makers to be accurate. The levels are nickel

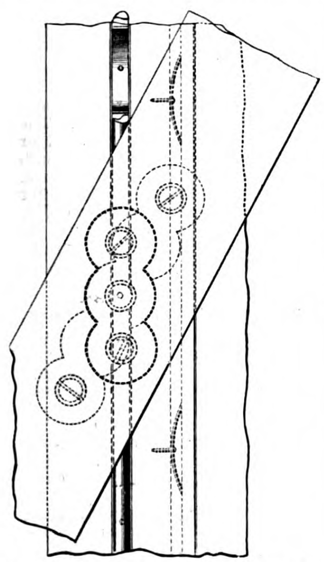


Fig. 9.—View Showing the Pivot Plates and the Sealing Rods.

plated, which is spoken of as an advantage, from the fact that if they are carried in stock they are not so liable to rust. The smallest level of the three shown is made in 6-inch only. The ones with double plumb are made in 6, 9 and 12 inch sizes.

The Bradshaw Safety Reversible Window.

Another candiate for popular favor in the way of a window which can be readily reversed for cleaning both sides from within the room is the Bradshaw safety reversible window, which is being placed upon the market by the Bradshaw Safety Reversible Window Company, 206 Broadway, New York City. The illustrations which are presented herewith give an idea of the construction employed. The manufacturers claim that this window removes all of the objections incident to the old forms of sealing strip and locking device ; that it is adapted to old as well as new buildings ; that it is an anti rattler; that it is dust, air, water and storm proof ; that it can be applied to circular headed windows ; always works true and smooth and does not require any change in the system of applying burglar fixtures. One of the features to which special reference is made by the company is a sealing device, which closes the joint between the sliding strips and the window frame proper, so that not only the joint between the sliding strips and the sash, but also the joint between the sliding strips and the window frame proper, are sealed against the passage of cold air, rain, dust, &c., and the latches draw the parts together so that they maintain their position relative to each other. In Fig. 8 of the

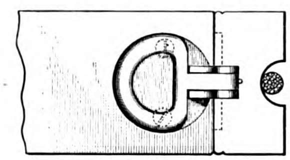


Fig. 10.—The Sash Locked to the Sliding Strip.

illustrations is represented a sectional view of the sash, showing the sealing rod between the sliding strip and the window frame. As the parts shear past one another, the sealing devices between the sliding strips and the sash are not only pressed back into the grooves provided therefor, thus creating a close contact between them and the surface against which they seal, but they are also moved latterally to one side or the other of that groove and press firmly against it. This is shown in Fig. 9, in which are indicated the pivot plates of the sealing rods. The sealing device between the sliding strips and sash also perform the function of a weather strip particularly in dwelling houses, while at the same time they serve as an anti-rattling device. The locking devices are referred to as being very simple and inexpensive, and may be applied to the wood work with great rapidity, no chisel work except a single cut with a gouge to accommodate the lugs on the plate being necessary. Special attention is directed to the fact that when the locking devices are in position they are concealed from view on the upper and under side of the sash, so that the

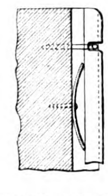


Fig. 11.—The Spring Used for the Sealing Rods.

window presents the same appearance as one which is non-reversible. The manufacturers also refer to the fact that since the locking devices are concealed from view they can be made from cheaper metal and less expensively than if they were open to inspection and had to possess decorative features. Fig. 10 shows the sash locked to the sliding strip, Fig. 11 represents the spring used for the sealing rods, while Fig. 12 shows one of the locks open so as to tilt the sash.

House Moving and Shoring.

Under the title of "Modern House Moving and Shoring," a very interesting little volume of 52 pages has been issued by Harvey Sheeler of 83 Washington street, Chicago, Ill. Mr. Sheeler was the contractor who so successfully moved the Immanuel Church, a large stone edifice, at Michigan avenue and Twenty-third street, Chicago, about a

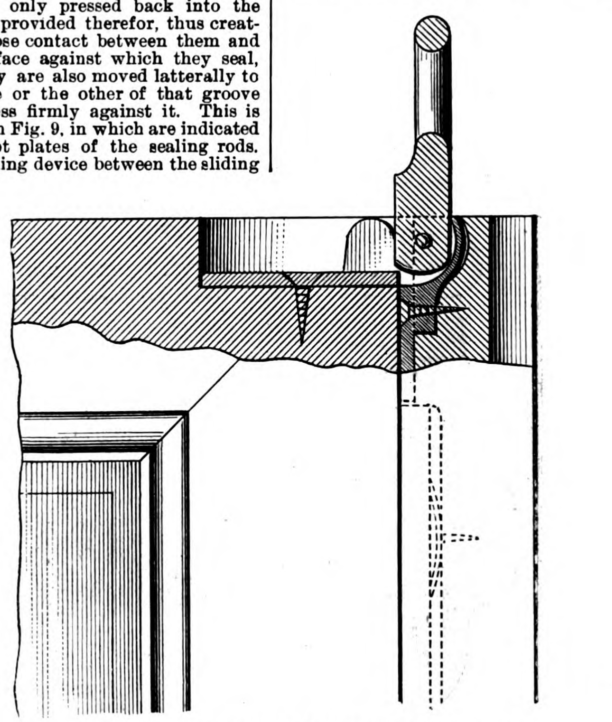
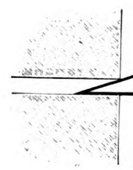


Fig. 12—Showing One of the Locks Open so as to Tilt the Sash.

year since. Full details of this great undertaking were published in the January number of *Carpentry and Building*, and that article has been reproduced by Mr. Sheeler in his book. Illustrations of this church and some of the details connected with its moving are given, together with a considerable number of illustrations of other buildings moved or shored up by the same contractor in various parts of the country. Much of the work shown is of a surprising character. In one case a four story brick building, 76 x 146 feet, was shored throughout from bottom to top, all posts and girders removed, all foundations rebuilt, and new iron columns and steel girders put in place, making practically a new house throughout the interior as well as the exterior to the second floor, and the work was completed under heavy penalty in 21 days, making a record surpassing anything of the kind



Novelties.—Fig. 13.—White's Elastic Crack Closer.

ever known to have been done. Not the least interesting among the illustrations is a view of Mr. Sheeler's yard at 15 to 31 York street, in which are stored the immense quantities of material required to conduct such a peculiar business. It appears to be a complete lumber yard, an iron warehouse, a rigger's storehouse and a heavy hardware outfit. All the views are reproductions of photographs.

White's Elastic Crack Closer.

A device for effectually sealing open joints around floors, window and door casings, weather boards, &c., in a permanent and attractive manner is shown in Fig. 13, the illustration representing a sectional view of the device as it enters a crack. It consists of a strip of spring brass, or tinned or painted steel, pressed into the shape shown. The wedge end is inserted in a crack as far as it will go and the strip is then held by friction, a barb like tendency preventing it from working loose. The strips are sold in length of 28 inches, and when in use the maker states they render buildings rain, snow, wind, dust and insect proof. The device is being placed on the market by Howard White of 31 North Seventh street, Philadelphia, Pa.

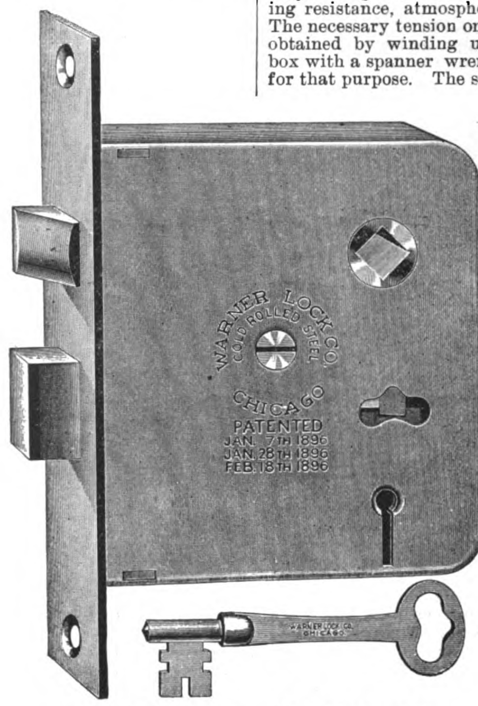


Fig. 15.—Warner's Simplicity Mortise Lock.

Columbia Pneumatic Door Spring and Check.

A pneumatic door check and spring known as the Columbia, which can be used on right as well as left hand doors and which is recommended by the makers for front, storm, corridor, basement, office, butler's pantry and apartment house doors, is being introduced to the trade by the Russell & Erwin Mfg. Company of New Britain, Conn., and 43-47 Chambers street, New York City. Compressed air is used as a checking force, obviating the use of fluids and liquids. It is made in five sizes, Nos. 450 to 454 inclusive. Among the advantages to which the makers call especial attention are compactness, simplicity and strength, combined with ease of application and facility with which it may be regulated to overcome varying resistance, atmospheric or other. The necessary tension on the spring is obtained by winding up the spring box with a spanner wrench furnished for that purpose. The speed is regulated by means of the vent screw and check nut on end of cylinder. The arm at the top can be lengthened or shortened by the use of the thumb screw. A general view of the device, which is so simple that any carpenter can easily put it up, is shown in Fig. 14 of the cuts. The goods are put up regularly gold bronzed, but will be supplied in other finishes if so ordered.

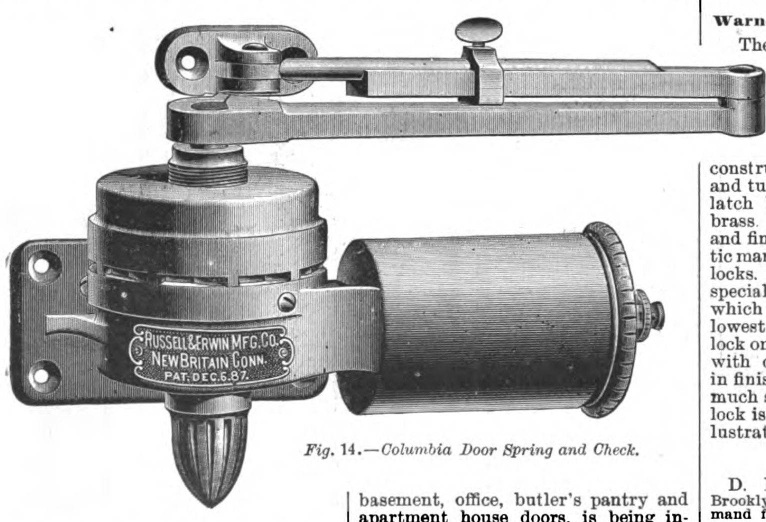


Fig. 14.—Columbia Door Spring and Check.

Warner's Simplicity Mortise Lock.

The Warner Lock Company of 410-412 Manhattan Building, Chicago, Ill., have brought out a new high grade steel mortise lock which they call Simplicity, on account of its very simple and original construction. The bolt tail, latch tail and tumbler are of steel, the bolt and latch head, hub spring and front of brass. The company refer to it as made and finished in the thorough and artistic manner characteristic of their other locks. In view of its quality they call special attention to the low price at which it is offered, describing it as the lowest priced high grade steel mortise lock on the market, competing in price with ordinary cast iron locks, while in finish and quality of material it is much superior. A general view of the lock is presented in Fig. 15 of the illustrations.

D. B. Hilton, 256 State Street, Brooklyn, N. Y., reports an increasing demand for the Hilton expanded steel lath among the building trade and has found it necessary to increase his manufacturing facilities by the introduction of a duplicate machine for manufacturing the lath. He has recently made shipments of his expanded lath to Cape Town, South Africa, South America and England.

TRADE NOTES.

THE SPRAGUE ELECTRIC ELEVATOR COMPANY, 253 Broadway, New York City, have secured the contract for the elevators in the 29-story building now in course of erection on Park row, this city, and of which R. H. Robertson is the architect. The plant will consist of ten passenger elevators to run 28 stories, two passenger elevators in the towers, two sidewalk elevators and two dumb waiters. We understand that the average rise for the ten machines is over 300 feet. That the Sprague electric elevator is proving quite popular is very evident from the fact that the company have recently installed 23 of their machines in the Siegel-Cooper Building on Sixth avenue and 17 in the new Astor Hotel.

THE PHILADELPHIA & BOSTON FACE BRICK COMPANY of 5 Liberty street, Boston, Mass., have issued from the press an exceedingly attractive pamphlet relating to some of the ornamental fire place mantels to which they are inviting the attention of architects, builders and house owners generally. The company state that their brick are formed in molds, prepared from patterns of the most artistic Greek and Renaissance designs, and the appearance of them when set in mantels is that of carved work. The joints between the courses of brick serve to break up any tendency to a heavy or monumental effect, giving to the mantels a general appearance which is soft, rich and harmonious. Their brick mantels are referred to as well adapted for use in any room wherever a fire place mantel is desired. The mantels are made in six different colors, and any good brick mason, it is stated, can set them up easily with the aid of the working plans which the company furnish with every order. The little pamphlet is tastefully illustrated with half-tone engravings of beautiful designs, showing the class of work which the company are prepared to supply. We understand that the company will send to any address on application a copy of a sketch book containing 40 designs of various sizes of mantels.

N. & G. TAYLOR COMPANY, Philadelphia, Pa., as manufacturers' agents for the Pancoast ventilator, have issued a striking circular showing a half-tone picture of a 66-inch Pancoast ventilator 11 feet in diameter, which, with one of 84 inches, weighing over 1000 pounds and nearly 14 feet in diameter, were sold to the Crittenden Mfg. and Roofing Company of Minneapolis, Minn.

FORD BIT COMPANY of Holyoke, Mass., announce in their advertisement in another column that they will send to any user one of their patent bits of ½-inch size ready for use on receipt of five 2-cent stamps. The Ford bit has a peculiar twist, which is described as a single concave twist. This gives it a single cut and edge and a single projecting lip. The thread of the screw point is a continuation of the twist of the upper part, so that it merges into the other, and the concave shape of the upper surface of the twist has the effect of drawing the borings toward the center of the bit, thus preventing friction by boring against the sides of the tool and rendering choking almost impossible. In the use of this bit the necessity of constantly withdrawing it for the removal of chips is done away with. The tool is referred to as being made of the best material, and it has already had the advantage of several seasons' trial.

WE HAVE RECEIVED from the Gordon Technical College, Geelong, Australia, a copy of their annual report covering the year 1895. It contains much interesting information relative to this institution, and shows the results of the examinations of the classes in carpentry, free hand drawing, mechanical drawing, plumbing, &c.

AN INTERESTING FEATURE of the industrial situation the past month was the number of establishments which, immediately after the result of the Presidential election was known, either increased their working hours or the number of hands employed. Among these concerns were included the Rowley & Hermance Company, manufacturers of wood working machinery, of Williamsport, Pa. On November 9 they commenced to run full time, giving employment to a full force of men. The plant employs several hundred hands, and previous to the election had been running short-handed.

WE HAVE RECEIVED from the Von Culin Incubator Company of Delaware City, Del., a copy of a very interesting catalogue which they have issued relating to the incubators, poultry fixtures and supplies which they manufacture. The company have been engaged in the business for something like 20 years, and have brought the manufacture of incubators down to a science. The catalogue contains over 60 pages of letterpress, and is illustrated by many half-tone engravings showing various departments in their works from the setting up of incubators to their crating ready for shipment. There are also numerous testimonial letters from those who have used the goods of the company, while directions for feeding poultry and illustrations from the "Art of Incubation and Brooding" cannot fail to prove interesting in this connection. Several outline engravings of brooding houses are presented, which are reduced from plans which the company offer at 25 cents a set. A feature of the catalogue is what the company designate as their trial offer, which is to the effect that if their Improved Simplicity Hatcher does not give entire satisfaction after a trial of one hatch, the purchaser can return the machine and keep the money, as the manufacturers do not ask for payment until the machine has been tried.

THE NOVEMBER CALENDAR issued by the F. A. Requarth Company of Dayton, Ohio, is a *fac-simile* in its general design of those which have been sent out from month to month during the past year. The appearance of the card is neat and attractive, and, as it is only 3½ x 6 inches in size, it can readily be utilized about the desk or hung up in a small space.

MURRAY & HILL, for many years located at 437-441 West Forty-second street, New York City, have found it necessary, in order to meet the growing demands of their business in sash, doors, blinds and house trim, to secure larger quarters, and they have therefore removed to the commodious factory at 617-621 West 130th street. Here they have facilities which will enable them to handle all orders with which they may be intrusted, and serve their customers promptly.

"FACTS AND INFORMATION, OR BENEFITS DERIVED FROM A MODERN CREAMERY," is the inscription which appears on a 24-page pamphlet sent out by Moseley & Stoddard Mfg. Company of Rutland, Vt. The pamphlet has been issued in reply to many letters of inquiry regarding the organizing, equipping and benefits derived from the modern co-operative creamery, and accompanying the text are illustrations of various creameries which have been erected, together with floor plans and elevations. The company named state that they are prepared at all times to furnish a large variety of plans for butter and cheese factories and private dairies, with working drawings and specifications, as well as any information pertaining to the manufacture of milk products.

WE HAVE RECEIVED from William T. Comstock a copy of the third edition of a little work entitled "The Architects' Directory for 1896-97." It contains a list of the architects in the United States and Canada classified by States and towns, and with the architectural associations to which they belong indicated against each name. The list has been prepared with a great deal of care and every effort made to render it the most complete which has been published of practicing architects. There is also a classified list of prominent dealers and manufacturers of building materials and appliances. The price is $1.

EDWIN A. JACKSON & BROTHER of 50 Beekman street, New York City, favor us with a copy of their 1897 catalogue of the Jackson ventilating grate. The volume consists of 44 pages profusely illustrated with some of the many designs of grate manufactured by this concern, while the binding is in neat paper covers. In referring to their grates the manufacturers state that the principle applied is the same as that of the furnace, combined with the direct radiation of the open fire, the grate being practically a furnace set directly in the room. The claim is made that "there is not the immense loss of heat in the cellar and in the ascending hot air pipe, and because of this saving the grates will heat a residence with two-thirds of the fuel of a furnace." One grate, it is stated, will heat about 7000 cubic feet of space, or two or three rooms of ordinary size. There are given in the catalogue directions for ordering goods, directions for setting the grate, while numerous diagrams show the construction of the ventilating and hot air flues, as arranged in a two-story cottage. The various styles of Jackson ventilating grates are described in a way to interest architects and builders, and the catalogue, considered as a whole, is one which they will find convenient to have on hand for reference.

YERKES & FINAN WOOD WORKING MACHINERY COMPANY, St. Louis, are sending out their new catalogue, series C. The catalogue contains 160 pages, is made pocket size, and is a complete index of what this concern make in the way of wood working machinery. The title page carries an engraving of their works, at Ninth and Dock streets, which has a frontage of 60 feet on Ninth street and runs back on Dock street over 200 feet. They show a full and complete line of planers, molders, surfacers, scroll saws, band saw machines, rip saws, saw and dado machines, shapers, mortising, dovetailing and boring machines. In fact, they are making a line of goods which will enable them to furnish complete entire outfits for furniture factories, planing mills, wagon factories, box factories, chair and coffin factories and car works. Each machine made by this concern is carefully tested on actual work before it leaves the factory. The entire catalogue is extremely tasty, and will find a welcome in the hands of all who use wood working machinery of any description.

THE MCCABE MFG. COMPANY OF New York City have issued an illustrated catalogue devoted to ball bearing and tubular door hangers for use on parlor, fire, barn, elevator, car and mill doors, store step ladder service and overhead carrying of all kinds. Illustrations are also given of the heavy ball bearing double carriage and track.

SELDOM does a business card present such an interesting history as one which Chas. L. Dean, vice-president of the Ludlow-Saylor Wire Company of St. Louis, Mo., while on the steamship "Leona," en route from New York to Galveston, Texas, in 1894, placed in a bottle, which was then corked and tossed into the sea. The captain had previously made an entry in his log, so that the exact location of the steamer at the time the bottle was consigned to the deep was put on the card. Mr. Dean was surprised to receive recently a letter from a gentleman living in Aripeka, a new town on the west coast of Florida, saying the bottle was picked up at his place, on the Gulf of Mexico, on September 29, 1896. The bottle had been floating around from February 9, 1894, or nearly three years, and was finally washed ashore about 350 miles from where it was thrown overboard. The card and the bottle were returned to Mr. Dean at his request and the former will be framed and hung in his office. The washing ashore of the bottle at this point is considered a remarkable occurrence, as the captain of the steamer states in a letter that the general impression has been that anything set adrift in the Gulf of Mexico would, after a while, find its way out through the Gulf Stream.

IN the Providence *Journal* of November 1 appeared an account of the monster sound money parade, which took place in that city on Saturday evening, October 31, the following reference being made to the display of the Nicholson File Company: First came a large low gear, tastefully trimmed with flags, bunting and lanterns and loaded with cases addressed to firms in the different States and countries of the world where this concern's goods are shipped, thus representing the extensiveness of the market of its product. Following this marched a compact body of several hundred men. The rear was brought up by another large team, laden with more cases, and decorated with transparencies on which were humorous verses as follows: "If McKinley wins, We'll sharpen our wits to enjoy Fortune's smile, By using the Standard Nicholson File;" while, to show the indifference, caused by the file's popularity, as to who should win, the second verse went: "If Bryan wins, We'll smooth our bad temper and rub off the bile, By using the Standard Nicholson File." Another rhyme read: "Would'st see our symbol? Look about, It's on the street for miles, For these men march in what we make, And that is—Files." The whole display represented in a modest, yet dignified manner, the position and products of the company.

"WOOD WORKERS, VARIETY AND UNIVERSAL" is the title of an attractively printed pamphlet of 32 pages, which is being distributed by J. A. Fay & Co., 221-241 West Front street, Cincinnati, Ohio. The present pamphlet has been brought out to call the attention of the trade to some novel improvements which have been introduced since the publication of the company's previous catalogue. The manufacturers are constructing the machines in two styles, distinguishing them by the words "Variety" and "Universal." The Variety wood workers are those which are not provided with a molder at the opposite side, but are fitted with a boring and routing attachment in place of it. The Universal wood workers are those that combine the Variety wood worker with a large molding machine having a capacity to work material on one, two, three or four sides. The manufacturers state that they have been careful to study the demands of the users of this class of machinery for range and variety of product, facility of adjustment, stability of workmanship, economy of shop room and moderate cost. Reference is made in the catalogue to the uses to which the wood worker can be applied, among the number being surfacing, planing out of wind, tapering, rabbeting, jointing, beveling, chamfering, cross cutting, tenoning, squaring, raising panels and working straight, circular or waved molding. The pamphlet illustrates and describes in detail the various machines in such a way as to give the reader a clear insight as to the importance of the machines to the manufacturers of building material, sash, doors, blinds, furniture, wagons, street cars, railway coaches, &c. The parts for the machines and the supplies used with them will be furnished by the manufacturers upon application. The closing pages are devoted to testimonial letters from some of those who have used the company's goods.

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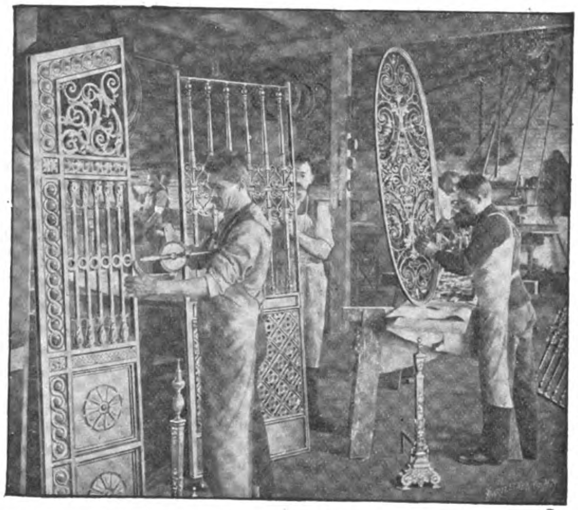

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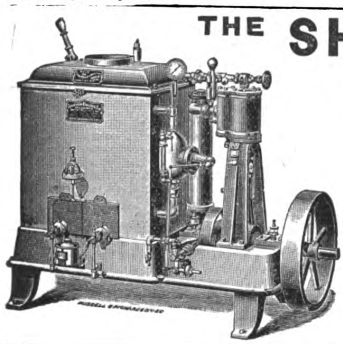

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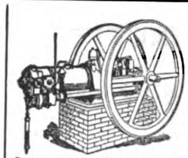

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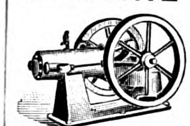

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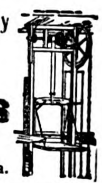

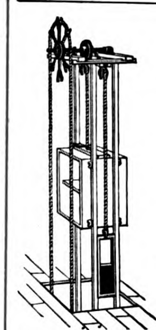

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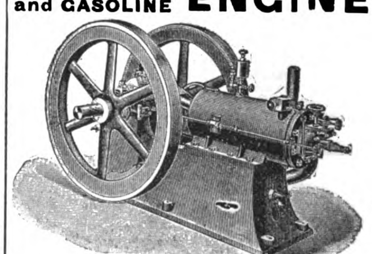

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VOL. XVIII. No. 1. NEW YORK, JANUARY, 1896. Ten Cents a Copy. One Dollar a Year.

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Powhatan Clay Mfg. Co.

Builders' Hardware.
Hammacher, Schlemmer & Co.
Russell & Erwin Mfg. Co.
Shannon, J. B., & Sons.
Stanley Works.

Building Paper and Felt.
Cabot, Samuel.
Voorhis & Co.
Warren-Ehret Co.

Butts and Hinges.
Stanley Works.

Ceiling, Iron and Steel.
Canton Steel Roofing Co.
Eller, J. H. & Co.
Kinnear & Gager Co.
Lyles & Mills.
Moeslein & Crane.
Wheeling Corrugating Co.

Cements.
Fisher, E. W.

Clamps.
Tatum, S. C. Co.

Clothes Dryer.
Hill Dryer Co.

Conductor Pipe.
Canton Steel Roofing Co.

Cornices, Sheet Metal.
Barber, J. F. & Co.
Berger Mfg. Co.
Chattanooga Steel Roofing Co.
Eller, J. H. & Co.
Lee, Thos.
Mesker & Bro.
Roanoke Roofing & Metal Cornice Co.

Cresting.
Barnum, E. T.
Mast, Foos & Co.
Springfield Architectural Iron Works.
Van Dorn Iron Works Co.

Designs and Details. (See House Plans.)

Door Hangers.
Lane Bros.
McCabe Mfg. Co.
Prescott Hdw Mfg. Co.
Stearns, E. C. & Co.
Van Wagoner & Williams Hdw. Co.

Door Locks.
Russell & Erwin Mfg. Co.

Drawing Inks.
Higgins, C. M. & Co.

Drawing Instruction.
Academy of Architecture and Building.
International Correspondence Schools.

Drawing Instruments.
Abbott, A. H. & Co.
Comstock, Wm. T.

Dumb Waiter Fixtures.
Hammacher, Schlemmer & Co.

Eave Troughs.
Eller, J. H. & Co.

Elevators & Dumb Waiters.
Curran, J. H.
Hutchinson, F. S. Co.
Kimball Bros.
Maynard, J. Q.
Morse, Williams & Co.
Salem Foundry & Machine Co.
Sedgwick Mch. Wks.
Springfield Foundry Co.
Variety Mch. Co.
Voorhis & Company.
Warner Elevator Mfg. Co.

Elevator Fronts, &c.
Ludlow-Saylor Wire Co.

Engines, Gas.
Otto Gas Engine Works.

Expansion Bolts.
Church, Isaac.
Steward & Romaine Mfg. Co.

Fencing.
Barnum, E. T.
Ellis & Helfenberger.
Ludlow-Saylor Wire Co.
Mast, Foos & Co.
Springfield Arch. Iron Works.
Van Dorn Iron Works Co.

Files and Rasps.
Barnett, G. & H. Co.

Fire Places.
Phila. & Boston Face Brick Co.

Furnaces & Heaters.
Howard Furnace Co.
Jackson, E. A. & Bro.
Sheppard, I. A., & Co.

Gas and Electric Fixtures.
Frink, I. P.

Gauges.
Leavitt Mch. Co.

Glass, Ornamental.
Keystone Stained Glass Works.
Matthews, The Firm of John.
Redding, Baird & Co.
Wallis, A. H.

Grates. (See Mantels, &c.)

Heaters, Steam and Hot Water.
Howard Furnace Co.
Nason Mfg. Co.
N. Y. Central Iron Works.

House Plans.
Barber, Geo. F. & Co.
Comstock, Wm. T.
Hicks, I. P.

Iron House Fronts.
Barber, J. F. & Co.
Mesker & Bro.

Iron Shutters.
Garry Iron & Steel Roofing Co.

Iron Work.
Barnum, E. T.
Ludlow-Saylor Wire Co.
Mast, Foos & Co.
Phoenix Iron Co.
Springfield Arch. Iron Wks.
Van Dorn Iron Works Co.

Levels.
Richardson, C. F. & Son.

Machine Knives.
Fox Machine Co.

Mantels and Grates.
Fischer, Leaf & Co.
Jackson, E. A. & Bro.
Jackson, W. & Son.
Philadelphia & Boston Face Brick Co.
Schwartz, L. & Co.

Mantels, Wood.
Ironton Wood Mantel Co.
Requarth, F. A. & Co.
Schwartz, L. & Co.

Mineral Wool.
American Mineral Wool Co.

Mortar Colors.
French, Sam'l H. & Co.

Oil Stones.
Pike Mfg. Co.

Paint.
Devoe, F. W. & Co.

Painters' Materials.
Devoe, F. W. & Co.

Parquet Flooring.
Johnson, S. C.

Pencils.
Dixon, Jos., Crucible Co.
Taylor, Fredk. & Co.

Planes.
Gage Tool Co.
Siegley, Jacob.
Smith, Otis A.

Plaster Ornaments.
French, Samuel H. & Co.

Printing.
The Williams Printing Co.

Ranges.
Noble, C. & Co.
Sheppard, I. A. & Co.

Reflectors.
Frink, I. P.

Refrigerator Work.
Stevens, B. A.

Registers.
Ferrosteel Co

Roofing.
Berger Mfg. Co.
Burton, W. J. & Co.
Canton Steel Roofing Co.
Chattanooga Steel Roofing Co.
Eller, J. H. & Co.
Garry Iron and Steel Roofing Co.
Roanoke Roofing & Metal Cornice Co.
Sykes Iron and Steel Roofing Co.
Warren-Ehret Co.

Roofing Brackets.
Stanley Rule and Level Co.

Roofing Paint.
Devoe, F. W. & Co.
Dixon, Jos. Crucible Co.

Roofing Slate.
Auld & Conger.
Johnson, E. J. & Co.
Lloyd, W. E. Slate Co.
Penn Roofing Co.
Slatington-Bangor Slate Syndicate.

Safety Windows.
Heydebrand Safety Window Co.

Sash Balances.
Caldwell Mfg. Co.
Gardner Sash Balance Co.
Stearns, E. C. & Co.

Sash Chains.
Morton, Thos.
Smith & Egge Mfg. Co.

Sash Fixtures.
Fox Machine Co.
Gardner Sash Balance Co.
Ives, H. B. & Co.
Palmer Hardware Mfg. Co.

Sash Weights.
Raymond Lead Co.

Saws.
Disston, H. & Sons, Inc.
National Saw Co.

Saw Filers.
Wilkinson, A. J. & Co.

Saw Filing Guides.
Disston, Henry & Sons, Inc.
Koch, J. & Sons.

Saw Sets.
Disston, Henry & Sons, Inc.
Taintor Mfg. Co.

Schools.
Academy of Architecture and Building.
International Correspondence Schools.

Screw Drivers.
Decatur Coffin Co.
Mueller, H. Mfg. Co.

Shelf Brackets.
Atlas Mfg. Co.

Shingles and Tiles, Metallic.
Berger Mfg. Co.
Burton, W. J. & Co.
Cortright Metal Roofing Co
Garry Iron and Steel Roofing Co.
Montross Metal Shingle Co.
Thorn Shingle & Ornament Co.

Shingle Stains.
Cabot, Samuel.
Dexter Bros.

Shutters. (See Blinds)

Skylights.
Van Noorden, E. & Co.

Snow Guards.
Folsom Snow Guard Co.

Speaking Tubes.
W. R. Ostrander & Co.

Spring Hinges.
Bommer Bros.

Stable Fittings.
J. L. Mott Iron Works
Ludlow-Saylor Wire Co.

Stained Glass Windows.
Keystone Stained Glass Works.
Matthews, the Firm of John.
Redding, Baird & Co.
Wallis, A. H.

Stair Builders.
Smith, S. E. & Bro.

Steel Figures and Letters.
Sackman, F. A.

Tiling.
Star Encaustic Tile Co.

Tools.
Deane, E L.
Decatur Coffin Co.
Gage Tool Co.
Hammacher, Schlemmer & Co.
Leavitt Mch. Co.
Millers Falls Co.
Mueller, H , Mfg. Co.
Siegley, Jacob.
Smith, Otis A.
Stanley Rule & Level Co.
Starrett, L. S. Co.
Tatum, S. C. Co.
Walter's Sons, Wm. P.
Wilkinson, A. J. & Co.

Turn'd, Mold'd, Carv'd Wk.
Dickey, A. & Co.
Mertz's Sons, Geo.
Requarth, F. A. & Co.
Standard Wood Turning Co.

Varnish.
Devoe, F. W. & Co.

Ventilators
Doerge, H.
Washburne, E. G. & Co.

Wax, Floor.
Butcher Polish Co.

Weather Strips.
Burcaw, F. P.

Weather Vanes.
Jones, Thos. W.
Mott, J. L. Iron Works.

Whetstones.
Pike Mfg. Co.

Wire Work.
Barnum, E. T.

Wood-working Machinery.
Barnes Tool Co.
Barnes, W. F. & John.
Clement, F. H.
Cordesman, Meyer & Co.
Dutchess Tool Co.
Fay, J. A. & Co.
Fox Machine Co.
Indiana Machine Works.
Little, C. E.
Marston, J. M. & Co.
Park, L. F.
Place, Geo.
Pryibil, P.
Rogers, C. B. & Co.
Rowley & Hermance Co.
Seneca Falls Mfg. Co.
Shimer, Samuel J. & Sons.
Seymour & Whitlock.
Witherby, Rugg & Richardson.
Yerkes & Finan Woodworking Mch. Co.

Woods, Ornamental.
Albro, E. D. & Co.

Alphabetical Index to Advertisers.

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Miss Buzbuz: "Well, let me have five twos, please, and give me nice ones, won't you? The last ones I bought all stuck together in my pocket before I'd been carrying them around a week."—*Roxbury Gazette.*

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"Yes," said he, "by making a few passes I can cause a man to go to any part of the city I choose."

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Manufacturers of Ornamental Glass in Sheets or from Special Designs by the Sand-Blast, and other Patented Processes.

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Gold and Silver Embossed and Transparent Glass Signs. Marbleized Glass for Ceilings.

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WROUGHT STEEL DOOR LOCKS.

They excel in lightness and strength, beauty of design and novelty of finish, and being made from wrought metal, are uniform in size and exact in measurement, and are sold in competition with those made from cast iron.

Ask Hardware Dealers for them, or send for Illustrated Catalogue.

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The Best Oilstone

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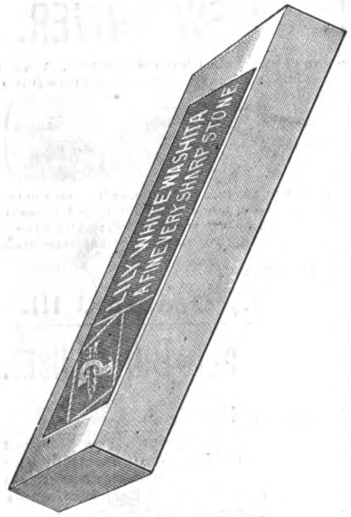

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Lily White Washita

Cuts steel rapidly, imparting a fine razor edge.
Will not harden or glaze over.
Every stone **warranted.** All first-class Hardware dealers or send $1.00 for sample stone by mail.

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Wrought Steel, Bronze and Brass.

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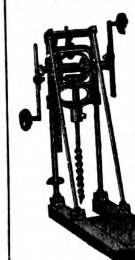

This Steel Machine, as seen in the cut, has all the improvements found on other machines, and several which others have not. It is as nearly automatic as good working will permit, and for strength and durability has no equal.

The price may seem high, but it will seem low when the machine is put to use. Sent by freight or express on receipt of $7.50; or may be had of most Hardware Dealers.

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PARAGON

Dumb Waiters

hold the load at any point without the aid of brakes or rope clamps. Simple in construction and operation. Strong and durable. Send for Catalogue. Handled by hardware trade.

F. S. HUTCHINSON CO.,
32 Warren St., NEW YORK.

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PATENTEE AND MANUFACTURER OF

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WOOD BLOCK FLOORS.**

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1895 Catalogue of Architectural, Scientific Industrial and Technical Books. . . .

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Also manufacturers of Iron Cresting, Iron Turbine and Buckeye Wind Engines, Buckeye Force Pumps, Buckeye, Globe and Champion Lawn Mowers. Send for Illustrated Catalogue and Prices to
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SAMPLE FREE.
To introduce the BRADLEY

Steel Shelf Bracket,

A sample will be mailed free to any one sending postal card request and mentioning this advertisement.

PAT. NOV. 8, 1892. ATLAS MFG. CO., New Haven, Ct.

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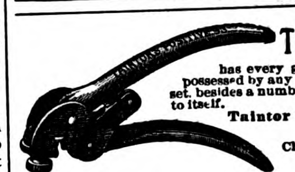

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N. Y.

Salem Foundry and Machine Co.,
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OF ALL KINDS,
ALSO
DUMB WAITERS.
SEND FOR ILLUSTRATED CATALOGUE.

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PAGE XIII.

Carpentry and Building

WITH WHICH IS INCORPORATED

The Builders' Exchange

VOL. XVIII. No. 2. NEW YORK, FEBRUARY, 1896. Ten Cents a Copy. One Dollar a Year.

Classified List of Advertisers.

Annunciators.
Ostrander, W. R. & Co.

Auger Bits.
Adams, A. L.

Barrel Swing.
Leavitt Machine Co

Bevels.
Hill Bevel Co.

Blinds.
Burlington Venetian Blind Co.
Flexible Door & Shutter Co.
Hartman Sliding Blind Co.
Morstatt & Son.
Phoenix Sliding Blind Co.
Wilson, Jas. G.

Books, &c.
Barber, Geo. F. & Co.
Comstock, Wm. T.
Hicks, I. P.

Boring Machines.
Millers Falls Co.

Brick Machinery.
Eastern Machinery Co.

Bricks, Plain and Ornamental.
Jarden Brick Co.
Powhatan Clay Mfg. Co.

Builders' Hardware.
Hammacher, Schlemmer & Co.
Russell & Erwin Mfg. Co.
Shannon, J. B., & Sons.
Stanley Works.

Building Paper and Felt.
Cabot, Samuel.
Voorhis & Co.
Warren-Ehret Co.

Butts and Hinges.
Stanley Works.

Ceiling, Iron and Steel.
Canton Steel Roofing Co.
Eller, J. H. & Co.
Kinnear & Gager Co.
Lyles & Mills.
Moeslein & Crane.

Cements.
Fisher, E. W.

Clamps.
Tatum, S. C. Co.

Clothes Dryer.
Hill Dryer Co.

Conductor Pipe.
Canton Steel Roofing Co.

Cornices, Sheet Metal.
Barber, J. F. & Co.
Berger Mfg. Co.
Chattanooga Steel Roofing Co.
Eller, J. H. & Co.
Lee, Thos.
Mesker & Bro.

Cresting.
Barnum, E. T.
Mast, Foos & Co.
Springfield Architectural Iron Works.
Van Dorn Iron Works Co.

Designs and Details. (See House Plans.)

Door Hangers.
Lane Bros.
McCabe Mfg. Co.
Prescott Hdw. Mfg. Co.
Stearns, E. C. & Co.
Van Wagoner & Williams Hdw. Co.

Door Knobs.
Bardsley, J.

Door Locks.
Russell & Erwin Mfg. Co.

Drawing Inks.
Higgins, C. M. & Co.

Drawing Instruction.
Academy of Architecture and Building.
International Correspondence Schools.

Drawing Instruments.
Abbott, A. H. & Co.
Comstock, Wm. T.

Dumb Waiter Fixtures.
Hammacher, Schlemmer & Co.

Eave Troughs.
Eller, J. H. & Co.

Elevators & Dumb Waiters.
Curran, J. H.
Hutchinson, F. S. Co.
Kimball Bros.
Maynard, J. Q.
Morse, Williams & Co.
Sedgwick Mch. Wks.
Springfield Foundry Co.
Variety Mch. Co.
Voorhis & Company.
Warner Elevator Mfg. Co.

Elevator Fronts, &c.
Ludlow-Saylor Wire Co.

Engines, Gas.
Otto Gas Engine Works.

Expansion Bolts.
Church, Isaac.
Steward & Romaine Mfg. Co.

Fencing.
Barnum, E. T.
Ellis & Helfenberger.
Ludlow-Saylor Wire Co.
Mast, Foos & Co.
Springfield Arch. Iron Works.
Van Dorn Iron Works Co.

Files and Rasps.
Barnett, G. & H. Co.

Fire Places.
Phila. & Boston Face Brick Co.

Fly Screens.
Pease, C. H.

Furnaces & Heaters.
Howard Furnace Co
Sheppard, I. A., & Co.

Gas and Electric Fixtures.
Frink, I. P.

Gauges.
Leavitt Mch. Co.

Glass, Ornamental.
Keystone Stained Glass Works.
Matthews, The Firm of John.
Redding, Baird & Co.
Wallis, A. H.

Grates. (See Mantels, &c.)

Heaters. *Steam and Hot Water.*
Howard Furnace Co.
Nason Mfg. Co.
N. Y. Central Iron Works.

House Plans.
Barber, Geo. F. & Co.
Comstock, Wm. T.
Hicks, I. P.

Iron House Fronts.
Barber, J. F. & Co.
Mesker & Bro.

Iron Shutters.
Garry Iron & Steel Roofing Co.

Iron Work.
Barnum, E. T.
Ludlow-Saylor Wire Co.
Mast, Foos & Co.
Phœnix Iron Co.
Springfield Arch. Iron Wks.
Van Dorn Iron Works Co.

Levels.
Richardson, C. F. & Son.

Machine Knives.
Fox Machine Co.

Mantels and Grates.
Jackson, W. & Son.
Philadelphia & Boston Face Brick Co.

Mantels, Wood.
Ironton Wood Mantel Co.
Requarth, F. A. & Co.

Mineral Wool.
American Mineral Wool Co.

Mortar Colors.
French, Sam'l H. & Co.

Oil Stones.
Pike Mfg. Co.

Paint.
Devoe, F. W. & Co.

Painters' Materials.
Devoe, F. W. & Co.

Parquet Flooring.
Johnson, S. C.

Patent Solicitors.
Wedderburn, J. & Co.

Pencils.
Dixon, Jos., Crucible Co.
Taylor, Fredk. & Co.

Planes.
Gage Tool Co.
Siegley, Jacob.
Smith, Otis A.

Plaster Ornaments.
French, Samuel H. & Co.

Printing.
The Williams Printing Co.

Ranges.
Noble, C. & Co.
Sheppard, I. A. & Co.

Reflectors.
Frink, I. P.

Refrigerator Work.
Stevens, B. A.

Registers.
Ferrosteel Co

Roofing.
Berger Mfg. Co.
Burton, W. J. & Co.
Canton Steel Roofing Co.
Chattanooga Steel Roofing Co.
Eller, J. H. & Co.
Garry Iron and Steel Roofing Co.
Sykes Iron and Steel Roofing Co.
Warren-Ehret Co.

Roofing Brackets.
Stanley Rule and Level Co.

Roofing Paint.
Devoe, F. W. & Co.
Dixon, Jos. Crucible Co.

Roofing Slate.
Auld & Conger.
Galt, John & Sons.
Johnson, E. J. & Co.
Lloyd, W. E. Slate Co.
Penn Roofing Co.
Slatington-Bangor Slate Syndicate.

Sash Balances.
Caldwell Mfg. Co.
Gardner Sash Balance Co.
Stearns, E. C. & Co.

Sash Chains.
Morton, Thos.
Smith & Egge Mfg. Co.

Sash Fixtures.
Fox Machine Co.
Gardner Sash Balance Co.
Ives, H. B. & Co.
Palmer Hardware Mfg. Co.

Sash Weights.
Raymond Lead Co.

Saws.
Disston, H. & Sons, Inc.
National Saw Co.

Saw Filers.
Wilkinson, A. J. & Co.

Saw Filing Guides.
Disston, Henry & Sons, Inc.
Koch, J. & Sons.

Saw Sets.
Disston, Henry & Sons, Inc.
Taintor Mfg. Co.

Schools.
Academy of Architecture and Building.
International Correspondence Schools.

Screw Drivers.
Decatur Coffin Co.
Mueller, H. Mfg. Co.

Shelf Brackets.
Atlas Mfg. Co.

Shingles and Tiles, Metallic.
Berger Mfg. Co.
Burton, W. J. & Co.
Cortright Metal Roofing Co
Garry Iron and Steel Roofing Co.
Montross Metal Shingle Co.
Thorn Shingle & Ornament Co.

Shingle Stains.
Cabot, Samuel.
Dexter Bros.

Shutters. (See Blinds)

Skylights.
Van Noorden, E. & Co.

Snow Guards.
Folsom Snow Guard Co.

Speaking Tubes.
W. R. Ostrander & Co.

Spring Hinges.
Bardsley, J.
Bommer Bros.

Stable Fittings.
J. L. Mott Iron Works
Ludlow-Saylor Wire Co.

Stained Glass Windows.
Keystone Stained Glass Works,
Matthews, the Firm of John.
Redding, Baird & Co.
Wallis, A. H.

Stair Builders.
Smith, S. E. & Bro.

Steel Figures and Letters.
Sackman, F. A.

Tiling.
Star Encaustic Tile Co.

Tools.
Deane, E L.
Decatur Coffin Co.
Gage Tool Co.
Hammacher, Schlemmer & Co.
Leavitt Mch. Co.
Millers Falls Co.
Mueller, H , Mfg. Co.
Siegley, Jacob.
Smith, Otis A.
Stanley Rule & Level Co.
Starrett, L. S. Co.
Tatum, S. C. Co.
Walter's Sons, Wm. P.
Wilkinson, A. J. & Co.

Turn'd, Mold'd, Carv'd Wk.
Dickey, A. & Co.
Mertz's Sons, Geo.
Requarth, F. A. & Co.
Standard Wood Turning Co.

Varnish.
Devoe, F. W. & Co.

Ventilators
Doerge, H.

Wax, Floor.
Butcher Polish Co.

Weather Vanes.
Jones, Thos. W.
Mott, J. L. Iron Works.

Whetstones.
Pike Mfg. Co.

Wire Work.
Barnum, E. T.

Wood-working Machinery.
Barnes Tool Co.
Barnes, W. F. & John.
Clement, F. H.
Cordesman, Meyer & Co.
Dutchess Tool Co.
Edinburgh Foundry & Machine Co.
Egan Co.
Fox Machine Co.
Indiana Machine Works.
Little, C. E.
Marston, J. M. & Co.
Park, L. F.
Place, Geo.
Pryibil, P.
Rogers, C. B. & Co.
Rowley & Hermance Co.
Seneca Falls Mfg. Co.
Shimer, Samuel J. & Sons.
Seymour & Whitlock.
Witherby, Rugg & Richardson.
Yerkes & Finan Woodworking Mch. Co.

Woods, Ornamental.
Albro, E. D. & Co.

Alphabetical Index to Advertisers.

Carpentry and Building

WITH WHICH IS INCORPORATED

The Builders' Exchange

Vol. XVIII. No. 3. New York, March 1896. Ten Cents a Copy. One Dollar a Year.

Classified List of Advertisers.

Alphabetical Index to Advertisers.

Carpentry and Building

WITH WHICH IS INCORPORATED

The Builders' Exchange

Vol. XVIII. No. 4 — New York, April 1896. — Ten Cents a Copy. One Dollar a Year.

Classified List of Advertisers.

Alphabetical Index to Advertisers.

Carpentry and Building

WITH WHICH IS INCORPORATED

The Builders' Exchange

VOL. XVIII. NO. 5. | NEW YORK, MAY, 1896. | Ten Cents a Copy. One Dollar a Year.

Classified List of Advertisers.

Annunciators.
Ostrander, W R. & Co.

Architectural Ornaments.
McCune, Alex.

Auger Bits.
Adams, A. L

Barrel Swing.
Leavitt Machine Co.

Bath Tubs.
Steel Bath Mfg. Co.

Bevels.
Hill Bevel Co.

Blinds.
Burlington Venetian Blind Co.
Flexible Door & Shutter Co.
Hartman Sliding Blind Co.
Morstatt & Son.
Phœnix Sliding Blind Co.
Willer Mfg. Co.

Books, &c.
Comstock, Wm. T.
Hicks, I. P.

Boring Machines.
Millers Falls Co.

Box Anchors.
Goetz Box Anchor Co.

Brick Machinery.
Eastern Machinery Co.

Bricks, Plain and Ornamental.
Powhatan Clay Mfg. Co.

Builders' Hardware.
Hammacher, Schlemmer & Co.
Russell & Erwin Mfg. Co.
Shannon, J. B. & Sons.
Stanley Works.

Building Paper and Felt.
Cabot, Samuel.
Warren-Ehret Co.

Butts and Hinges.
Stanley Works.

Ceiling, Iron and Steel.
Canton Steel Roofing Co.
Eller, J. H. & Co.
Kinnear & Gager Co.

Cements.
Fisher, E. W.

Clamps.
Tatum, S. C. Co.

Clothes Dryer.
Hill Dryer Co.

Conductor Pipe.
Canton Steel Roofing Co.

Cornices, Sheet Metal.
Barber, J. F. & Co.
Berger Mfg. Co.
Eller, J. H. & Co.
Lee, Thos.
Mesker & Bro.

Cresting.
Barnum, E. T.
Mast, Foos & Co.
Springfield Architectural Iron Works.
Van Dorn Iron Works Co.

Designs and Details. (See House Plans.)

Door Hangers.
Lane Bros.
McCabe Mfg. Co.
Prescott Hdw. Mfg. Co.
Stearns, E. C. & Co.
Van Wagoner & Williams Hdw. Co.
Wilcox Mfg. Co.

Door Knobs.
Bardsley, J.

Door Locks.
Russell & Erwin Mfg. Co.

Drawing Inks.
Higgins, C. M. & Co.

Drawing Instruction.
Academy of Architecture and Building.
International Correspondence Schools.

Drawing Instruments.
Abbott, A. H. & Co.
Comstock, Wm. T.

Dumb Waiter Fixtures.
Hammacher, Schlemmer & Co.

Eave Troughs.
Eller, J. H. & Co.

Elevators and Dumb Waiters.
Curran, J. H.
Hutchinson, F. S. Co.
Kimball Bros.
Maynard, J. Q.
Morse, Williams & Co.
Sedgwick Mch. Wks.
Variety Mch. Co.
Warner Elevator Mfg. Co.

Elevator Fronts, &c.
Ludlow-Saylor Wire Co.

Engines, Gas.
Otto Gas Engine Works.
Proctor & Percy.

Engines, Steam.
Leffel, Jas. & Co.

Expansion Bolts.
Church, Isaac.
Steward & Romaine Mfg. Co.

Fencing.
Barnum, E. T.
Ludlow-Saylor Wire Co.
Mast, Foos & Co.
Van Dorn Iron Works Co.

Files and Rasps.
Barnett, G. & H. Co.
Nicholson File Co.

Fire Places.
Philadelphia & Boston Face Brick Co.

Furnaces & Heaters.
Howard Furnace Co.
Kelsey Furnace Co.
Sheppard, I. A. & Co.

Gas and Electric Fixtures.
Frink, I. P.

Gauges.
Leavitt Mch. Co.

Glass, Ornamental.
Keystone Stained Glass Works.
Matthews, The Firm of John.
Wallis, A. H.

Grates. (See Mantels, &c.)

Heaters. *Steam and Hot Water.*
Howard Furnace Co.
Nason Mfg. Co.
N. Y. Central Iron Works.

House Plans.
Comstock, Wm. T.
Hicks, I. P.
Payne, Geo. W. & Son.

Iron House Fronts.
Barber, J. F. & Co.
Mesker & Bro.

Iron Shutters.
Garry Iron & Steel Roofing Co.

Iron Work.
Barnum, E. T.
Ludlow-Saylor Wire Co.
Mast, Foos & Co.
Phœnix Iron Co.
Van Dorn Iron Works Co.

Joist Hangers.
Goetz Box Anchor Co.

Levels.
Akron Spirit Level Co.
Richardson, C. F. & Son.

Machine Knives.
Fox Machine Co.

Mantels and Grates.
Jackson, W. & Son.
Philadelphia & Boston Face Brick Co.

Mantels, Wood.
Ironton Wood Mantel Co.
Requarth, F. A. & Co.

Mineral Wool.
American Mineral Wool Co.

Mortar Colors.
French, Sam'l H. & Co.

Paint.
Devoe, F. W. & Co.

Painters' Materials.
Devoe, F. W. & Co.

Parquet Flooring.
Johnson, S. C.

Patent Solicitors.
Wedderburn, J & Co.

Pencils.
Dixon, Jos., Crucible Co.
Taylor, Fredk. & Co.

Planes.
Gage Tool Co.
Siegley, Jacob.
Smith, Otis A.

Plaster Ornaments.
French, Samuel H. & Co.

Post Caps.
Goetz Box Anchor Co.

Printing.
The Williams Printing Co.

Pumping Motors.
Schnebles, Martin Sons Co.

Rafter Supports.
Safety Rafter Co.

Ranges.
Noble, C. & Co.
Sheppard, I. A. & Co.

Reflectors.
Frink, I. P.

Refrigerator Work.
Stevens, B. A.

Roofing.
Bangor Excelsior Slate Co.
Berger Mfg. Co.
Burton, W. J. & Co.
Canton Steel Roofing Co.
Chattanooga Steel Roofing Co.
Eller, J. H. & Co.
Garry Iron & Steel Roofing Co.
Sykes Iron & Steel Roofing Co.
Warren Chemical & Mfg. Co.
Warren-Ehret Co.

Roofing Brackets.
Stanley Rule & Level Co.

Roofing Cement.
Connors, William.

Roofing Paint.
Devoe, F. W. & Co.
Dixon, Jos., Crucible Co.
Connors, William.

Roofing Slate.
Auld & Conger.
Bangor Excelsior Slate Co.
Galt, John & Sons.
Johnson, E. J. & Co.
Lloyd, W. E. Slate Co.

Sash Balances.
Caldwell Mfg. Co.
Gardner Sash Balance Co.
Stearns, E. C. & Co.

Sash Chains.
Morton, Thos.
Smith & Egge Mfg. Co.

Sash Fixtures.
Fox Machine Co.
Gardner Sash Balance Co.
Ives, H. B. & Co.
Palmer Hardware Mfg. Co.

Sash Weights.
Raymond Lead Co.

Saws.
Disston, H. & Sons, Inc.
National Saw Co.

Saw Filers.
Wilkinson, A. J. & Co.

Saw Filing Guides.
Disston, Henry & Sons, Inc.

Saw Sets.
Disston, Henry & Sons, Inc.
Taintor Mfg. Co.

Schools.
Academy of Architecture and Building.

Screw Drivers.
Decatur Coffin Co.
Mueller, H. Mfg. Co.

Shelf Brackets.
Atlas Mfg. Co.

Shingles and Tiles, Metallic.
Berger Mfg. Co.
Burton, W. J. & Co.
Cortright Metal Roofing Co.
Garry Iron & Steel Roofing Co.
Merchant & Co.
Montross Metal Shingle Co.
Thorn Shingle & Ornament Co.

Shingle Stains.
Cabot, Samuel.
Dexter Bros.

Shutters. (See Blinds.)

Skylights.
Van Noorden, E. & Co.

Snips.
Herbrand Co.

Snow Guards.
Folsom Snow Guard Co.

Speaking Tubes.
W. R. Ostrander & Co.

Spring Hinges.
Bardsley, J.
Bommer Bros.
Van Wagoner & Williams Hardware Co.

Stable Fittings.
Broad Gauge Iron Stall Works.
J. L. Mott Iron Works.
Ludlow-Saylor Wire Co.

Stained Glass Windows.
Keystone Stained Glass Works.
Matthews, The Firm of John.
Wallis, A. H.

Stair Builders.
Smith, S. E. & Bro.

Steel Figures and Letters.
Sackman, F. A.

Tiling.
Star Encaustic Tile Co.

Tools.
Deane, E. L.
Decatur Coffin Co.
Fox, P. L. & Co.
Gage Tool Co.
Hammacher, Schlemmer & Co.
Leavitt Mch. Co.
Millers Falls Co.
Mueller, H. Mfg. Co.
Siegley, Jacob.
Smith, Otis A.
Stanley Rule & Level Co.
Starrett, L. S. Co.
Tatum, S. C. Co.
Walter's Sons, Wm. P.
Wilkinson, A. J. & Co.

Turn'd, Mold'd, Carv'd Wk.
Dickey, A. & Co.
Requarth, F. A. & Co.
Standard Wood Turning Co.

Varnish.
Devoe, F. W. & Co.

Ventilators.
Doerge, H.

Wax, Floor.
Butcher Polish Co.

Weather Vanes.
Jones, Thos. W.
Mott, J. L. Iron Works.

Window Sashes.
Revolving Sash Co.

Wire Work.
Barnum, E. T.

Wood Filler.
Bridgeport Wood Finishing Co.

Wood Working Machinery.
Barnes Tool Co.
Barnes, W. F. & John.
Clement, F. H.
Cordesman, Meyer & Co.
Edinburgh Foundry & Machine Co.
Fay, J. A. & Co.
Fox Machine Co.
Indiana Machine Works.
Little, C. E.
Marston, J. M. & Co.
Park, L. F.
Place, Geo.
Pownall, F. H.
Pryibil, P.
Rogers, C. B. & Co.
Rowley & Hermance Co.
Seneca Falls Mfg. Co.
Shimer, Samuel J. & Sons.
Seymour & Whitlock.
Witherby, Rugg & Richardson.
Yerkes & Finan Woodworking Mch. Co.

Woods, Ornamental.
Albro, E. D. & Co.

Alphabetical Index to Advertisers.

7 Iras ii 6

Carpentry and Building

WITH WHICH IS INCORPORATED

The Builders' Exchange

VOL. XVIII. No. 6 | NEW YORK, JUNE, 1896. | Ten Cents a Copy. One Dollar a Year.

Classified List of Advertisers.

Annunciators.
Ostrander, W R. & Co.

Architectural Ornaments.
McCune, Alex.

Auger Bits.
Adams, A. L

Barrel Swing.
Leavitt Machine Co.

Bath Tubs.
Steel Bath Mfg. Co.

Bevels.
Hill Bevel Co.

Blinds.
Burlington Venetian Blind Co.
Flexible Door & Shutter Co.
Hartman Sliding Blind Co.
Morstatt & Son.
Phœnix Sliding Blind Co.
Willer Mfg. Co.

Books, &c.
Comstock, Wm. T.
Hicks, I. P.

Boring Machines.
Millers Falls Co.

Box Anchors.
Goetz Box Anchor Co.

Brick Machinery.
Eastern Machinery Co.

Bricks, Plain and Ornamental.
Powhatan Clay Mfg. Co.

Builders' Hardware.
Hammacher, Schlemmer & Co.
Russell & Erwin Mfg. Co.
Shannon, J. B. & Sons.
Stanley Works.

Building Paper and Felt.
Cabot, Samuel.
Warren-Ehret Co.

Butts and Hinges.
Stanley Works.

Ceiling, Iron and Steel.
Canton Steel Roofing Co.
Eller, J. H. & Co.
Kinnear & Gager Co.

Cements.
Fisher, E. W.

Clamps.
Tatum, S. C. Co.

Clothes Dryer.
Hill Dryer Co.

Conductor Pipe.
Canton Steel Roofing Co.

Cornices, Sheet Metal.
Barber, J. F. & Co.
Berger Mfg. Co.
Eller, J. H. & Co.
Lee, Thos.
Mesker & Bro.

Cresting.
Barnum, E. T.
Mast, Foos & Co.
Springfield Architectural Iron Works.
Van Dorn Iron Works Co.

Designs and Details. (See House Plans.)

Door Hangers.
Lane Bros.
McCabe Mfg. Co.
Prescott Hdw. Mfg. Co.
Stearns, E. C. & Co.
Van Wagoner & Williams Hdw. Co.
Wilcox Mfg. Co.

Door Knobs.
Bardsley, J.

Door Locks.
Russell & Erwin Mfg. Co.

Drawing Inks.
Higgins, C. M. & Co.

Drawing Instruction.
Academy of Architecture and Building.
International Correspondence Schools.

Drawing Instruments.
Abbott, A. H. & Co.
Comstock, Wm. T.

Dumb Waiter Fixtures.
Hammacher Schlemmer & Co.

Eave Troughs.
Eller, J. H. & Co.

Elevators and Dumb Waiters.
Curran, J. H.
Hutchinson, F. S. Co.
Kimball Bros.
Maynard, J. Q.
Morse, Williams & Co.
Sedgwick Mch. Wks.
Variety Mch. Co.
Warner Elevator Mfg. Co.

Elevator Fronts, &c.
Ludlow-Saylor Wire Co.

Engines, Gas.
Otto Gas Engine Works.
Proctor & Percy.

Engines, Steam.
Leffel, Jas. & Co.

Expansion Bolts.
Church, Isaac.
Steward & Romaine Mfg. Co.

Fencing.
Barnum, E. T.
Ludlow-Saylor Wire Co.
Mast, Foos & Co.
Van Dorn Iron Works Co.

Files and Rasps.
Barnett, G. & H. Co.
Nicholson File Co.

Fire Places.
Philadelphia & Boston Face Brick Co.

Furnaces & Heaters.
Howard Furnace Co.
Kelsey Furnace Co.
Wood & Bishop Co.

Sheppard, I. A. & Co.

Gas and Electric Fixtures.
Frink, I. P.

Gauges.
Leavitt Mch. Co.

Glass, Ornamental.
Keystone Stained Glass Works.
Matthews, The Firm of John.
Wallis, A. H.

Granite Cleaning.
Cross Bros,

Grates. (See Mantels, &c.)

Heaters. *Steam and Hot Water.*
Howard Furnace Co.
Nason Mfg. Co.
N. Y. Central Iron Works.

House Plans.
Comstock, Wm. T.
Hicks, I. P.
Payne, Geo. W. & Son.

Iron House Fronts.
Barber, J. F. & Co.
Mesker & Bro.

Iron Shutters.
Garry Iron & Steel Roofing Co.

Iron Work.
Barnum, E. T.
Ludlow-Saylor Wire Co.
Mast, Foos & Co.
Phœnix Iron Co.
Van Dorn Iron Works Co.

Joist Hangers.
Goetz Box Anchor Co.

Levels.
Akron Spirit Level Co.
Richardson, C. F. & Son.

Machine Knives.
Fox Machine Co.

Mantels and Grates.
Jackson, W. & Son.
Philadelphia & Boston Face Brick Co.

Mantels, Wood.
Ironton Wood Mantel Co.
Requarth, F. A. & Co.

Mineral Wool.
American Mineral Wool Co.

Mortar Colors.
French, Sam'l H. & Co.

Paint.
Devoe, F. W. & Co.

Painters' Materials.
Devoe, F. W. & Co.

Patent Solicitors.
Wedderburn, J & Co.

Pencils.
Dixon, Jos., Crucible Co.
Taylor, Fredk. & Co.

Planes.
Gage Tool Co.
Siegley, Jacob.
Smith, Otis A.

Plaster Ornaments.
French, Samuel H. & Co.

Post Caps.
Goetz Box Anchor Co.

Printing.
The Williams Printing Co.

Pumping Motors.
Schnebles, Martin Sons Co.

Rafter Supports.
Safety Rafter Co.

Ranges.
Noble, C. & Co.
Sheppard, I. A. & Co.

Reflectors.
Frink, I. P.

Roofing.
Berger Mfg. Co.
Burton, W. J. & Co.
Canton Steel Roofing Co.
Chattanooga Steel Roofing Co.
Eller, J. H. & Co.
Garry Iron & Steel Roofing Co.
Sykes Iron & Steel Roofing Co.
Warren Chemical & Mfg. Co.
Warren-Ehret Co.

Roofing Brackets.
Stanley Rule & Level Co.

Roofing Cement.
Connors, William.

Roofing Paint.
Devoe, F. W. & Co.
Dixon, Jos., Crucible Co.
Connors, William.

Roofing Slate.
Auld & Conger.
Bangor Excelsior Slate Co.
Galt, John & Sons.
Johnson, E. J. & Co.
Lloyd, W. E. Slate Co.

Sash Balances.
Caldwell Mfg. Co.
Gardner Sash Balance Co.
Stearns, E. C. & Co.

Sash Chains.
Morton, Thos.
Smith & Egge Mfg. Co.

Sash Fixtures.
Fox Machine Co.
Gardner Sash Balance Co.
Ives, H. B. & Co.
Palmer Hardware Mfg. Co.

Sash Weights.
Raymond Lead Co.

Saws.
Disston, H. & Sons, Inc.
National Saw Co.

Saw Filers.
Wilkinson, A. J. & Co.

Saw Filing Guides.
Disston, Henry & Sons, Inc.

Saw Sets.
Disston, Henry & Sons, Inc.
Taintor Mfg. Co.

Schools.
Academy of Architecture and Building.

Shelf Brackets.
Atlas Mfg. Co.

Shingles and Tiles, Metallic.
Berger Mfg. Co.
Burton, W. J. & Co.
Cortright Metal Roofing Co.
Garry Iron & Steel Roofing Co.
Merchant & Co.
Montross Metal Shingle Co.
Thorn Shingle & Ornament Co.

Shingle Stains.
Cabot, Samuel.
Dexter Bros.

Shutters. (See Blinds.)

Skylights.
Van Noorden, E. & Co.

Snips.
Herbrand Co.

Snow Guards.
Folsom Snow Guard Co.

Speaking Tubes.
W. R. Ostrander & Co.

Spring Hinges.
Bardsley, J.
Bommer Bros.
Van Wagoner & Williams Hardware Co.

Stable Fittings.
Broad Gauge Iron Stall Works.
J. L. Mott Iron Works.
Ludlow-Saylor Wire Co.

Stained Glass Windows.
Keystone Stained Glass Works.
Matthews, The Firm of John.
Wallis, A. H.

Stair Builders.
Smith, S. E. & Bro.

Steel Figures and Letters.
Sackman, F. A.

Tiling.
Star Encaustic Tile Co.

Tools.
Deane, E. L.
Fox, P. L. & Co.
Gage Tool Co.
Hammacher, Schlemmer & Co.
Leavitt Mch. Co.
Millers Falls Co.
Siegley, Jacob.
Smith, Otis A.
Stanley Rule & Level Co.
Starrett, L. S. Co.
Tatum, S. C. Co.
Walter's Sons, Wm. P.
Wilkinson, A. J. & Co.

Turn'd, Mold'd, Carv'd Wk.
Dickey, A. & Co.
Requarth, F. A. & Co.
Standard Wood Turning Co.

Varnish.
Devoe, F. W. & Co.

Ventilators.
Doerge, H.

Wax, Floor.
Butcher Polish Co.

Weather Vanes.
Jones, Thos. W.
Mott, J. L. Iron Works.

Window Sashes.
Revolving Sash Co.

Wire Work.
Barnum, E. T.

Wood Filler.
Bridgeport Wood Finishing Co.

Wood Working Machinery.
Barnes Tool Co.
Barnes, W. F. & John.
Clement, F. H.
Cordesman, Meyer & Co.
Edinburgh Foundry & Machine Co.
Egan Co.
Fay, J. A. & Co.
Fox Machine Co.
Indiana Machine Works.
Little, C. E.
Marston, J. M. & Co.
Park, L. F.
Place, Geo.
Pownall, F. H.
Pryibil, P.
Rogers, C. B. & Co.
Rowley & Hermance Co.
Seneca Falls Mfg. Co.
Shimer, Samuel J. & Sons.
Seymour & Whitlock.
Witherby, Rugg & Richardson.
Yerkes & Finan Woodworking Mch. Co.

Woods, Ornamental.
Albro, E. D. & Co.

Alphabetical Index to Advertisers.

H. Trask

Carpentry and Building

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The Builders' Exchange

VOL. XVIII. NO. 7. NEW YORK, JULY, 1896. Ten Cents a Copy. One Dollar a Year.

Classified List of Advertisers.

Annunciators.
Ostrander, W. R. & Co.

Architectural Ornaments.
McCune, Alex.

Auger Bits.
Adams, A. L.

Barrel Swing.
Leavitt Machine Co.

Bath Tubs.
Steel Bath Mfg. Co.

Bevels.
Hill Bevel Co

Blinds.
Burlington Venetian Blind Co.
Flexible Door & Shutter Co.
Hartman Sliding Blind Co.
Morstatt & Son.
Phœnix Sliding Blind Co.
Willer Mfg. Co.

Books, &c.
Comstock, Wm. T.
Hicks, I. P.
Weber, E. D.

Boring Machines.
Millers Falls Co.

Brick Machinery.
Eastern Machinery Co.

Builders' Hardware.
Hammacher, Schlemmer & Co.
Russell & Erwin Mfg. Co.
Shannon, J. B. & Sons.
Stanley Works.

Building Paper and Felt.
Cabot, Samuel.
Warren-Ehret Co.

Butts and Hinges.
Stanley Works.

Ceiling, Iron and Steel.
Canton Steel Roofing Co.
Eller, J. H. & Co.

Cements.
Fisher, E. W.

Clamps.
Josef, E. E. Mfg. Co.
Tatum, S. C. Co.

Clothes Dryer.
Hill Dryer Co.

Conductor Pipe.
Canton Steel Roofing Co.

Cornices, Sheet Metal.
Berger Mfg. Co.
Eller, J. H. & Co.
Lee, Thos.
Mesker & Bro.

Cresting.
Barnum, E. T.
Mast, Foos & Co.
Springfield Architectural Iron Works.
Van Dorn Iron Works Co.

Designs and Details. (See House Plans.)

Door Hangers.
Lane Bros.
Prescott Hdw. Mfg. Co.
Stearns, E. C. & Co.
Van Wagoner & Williams Hdw. Co.
Wilcox Mfg. Co.

Door Knobs.
Bardsley, J.

Door Locks.
Russell & Erwin Mfg. Co.

Drawing Inks.
Higgins, C. M. & Co.

Drawing Instruction.
Academy of Architecture and Building.
International Correspondence Schools.

Drawing Instruments.
Abbott, A. H. & Co.
Comstock, Wm. T.

Dumb Waiter Fixtures.
Hammacher Schlemmer & Co.

Eave Troughs.
Eller, J. H. & Co.

Elevators and Dumb Waiters.
Curran, J. H.
Hutchinson, F. S. Co.
Kimball Bros.
Maynard, J. Q.
Morse, Williams & Co.
Sedgwick Mch. Wks.
Variety Mch. Co.
Warner Elevator Mfg. Co.

Elevator Fronts, &c.
Ludlow-Saylor Wire Co.

Engines, Gas.
Norman, J. J. Co.
Otto Gas Engine Works.
Proctor & Percy.

Engines, Steam.
Leffel, Jas. & Co.

Expansion Bolts.
Church, Isaac.
Steward & Romaine Mfg. Co.

Fencing.
Barnum, E. T.
Ludlow-Saylor Wire Co.
Mast, Foos & Co.
Van Dorn Iron Works Co.

Files and Rasps.
Barnett, G. & H. Co.
Nicholson File Co.

Fire Places.
Philadelphia & Boston Face Brick Co.

Furnaces & Heaters.
Giblin & Co.
Howard Furnace Co.
Kelsey Furnace Co.
Wood & Bishop Co.
Sheppard, I. A. & Co.

Gas and Electric Fixtures.
Frink, I. P.

Gauges.
Leavitt Mch. Co.

Glass, Ornamental.
Keystone Stained Glass Works.
Matthews, The Firm of John.
Wallis, A. H.

Granite Cleaning.
Cross Bros.

Grates. (See Mantels, &c.)

Heaters. *Steam and Hot Water.*
Howard Furnace Co.
Nason Mfg. Co.
N. Y. Central Iron Works.

House Plans.
Comstock, Wm. T.
Hicks, I. P.
Payne, Geo. W. & Son.

Iron House Fronts.
Mesker & Bro.

Iron Shutters.
Garry Iron & Steel Roofing Co.

Iron Work.
Barnum, E. T.
Ludlow-Saylor Wire Co.
Mast, Foos & Co.
Phœnix Iron Co.
Van Dorn Iron Works Co.

Levels.
Akron Spirit Level Co.
Richardson, C. F. & Son.

Machine Knives.
Fox Machine Co.

Mantels and Grates.
Jackson, W. & Son.
Philadelphia & Boston Face Brick Co.

Mantels, Wood.
Ironton Wood Mantel Co.
Requarth, F. A. & Co.

Mineral Wool.
American Mineral Wool Co.

Mortar Colors.
French, Sam'l H. & Co.

Paint.
Devoe, F. W. & Co.

Painters' Materials.
Devoe, F. W. & Co.

Patent Solicitors.
Wedderburn, J. & Co.

Pencils.
Dixon, Jos., Crucible Co.

Planes.
Gage Tool Co.
Siegley, Jacob.
Smith, Otis A.

Plaster Ornaments.
French, Samuel H. & Co.

Printing.
The Williams Printing Co.

Pumping Motors.
Schnebles, Martin Sons Co.

Rafter Supports.
Safety Rafter Co.

Ranges.
Sheppard, I. A. & Co.

Reflectors.
Frink, I. P.

Roofing.
Berger Mfg. Co.
Burton, W. J. & Co.
Canton Steel Roofing Co.
Chattanooga Steel Roofing Co.
Eller, J. H. & Co.
Garry Iron & Steel Roofing Co.
Sykes Iron & Steel Roofing Co.
Warren Chemical & Mfg. Co.
Warren-Ehret Co.

Roofing Brackets.
Stanley Rule & Level Co.

Roofing Cement.
Connors, William.

Roofing Paint.
Devoe, F. W. & Co.
Dixon, Jos., Crucible Co.
Connors, William.

Roofing Slate.
Auld & Conger.
Bangor Excelsior Slate Co.
Galt, John & Sons.
Johnson, E. J. & Co.
Lloyd, W. E. Slate Co.

Sash Balances.
Caldwell Mfg. Co.
Gardner Sash Balance Co.
Stearns, E. C. & Co.

Sash Chains.
Morton, Thos.
Smith & Egge Mfg. Co.

Sash Fixtures.
Fox Machine Co.
Gardner Sash Balance Co.
Ives, H. B. & Co.
Palmer Hardware Mfg. Co.

Sash Weights.
Raymond Lead Co.

Saws.
Disston, H. & Sons, Inc.
National Saw Co.

Saw Filers.
Wilkinson, A. J. & Co.

Saw Filing Guides.
Disston, Henry & Sons, Inc.

Saw Sets.
Disston, Henry & Sons, Inc.
Taintor Mfg. Co.

Schools.
Academy of Architecture and Building.

Shingles and Tiles, Metallic.
Berger Mfg. Co.
Burton, W. J. & Co.
Cortright Metal Roofing Co.
Garry Iron & Steel Roofing Co.
Merchant & Co.
Montross Metal Shingle Co.
Thorn Shingle & Ornament Co.

Shingle Stains.
Cabot, Samuel.
Dexter Bros.

Shutters. (See Blinds.)

Skylights.
Van Noorden, E. & Co.

Snow Guards.
Folsom Snow Guard Co.

Speaking Tubes.
W. R. Ostrander & Co.

Spring Hinges.
Bardsley, J.
Bommer Bros.
Van Wagoner & Williams Hardware Co.

Stable Fittings.
Broad Gauge Iron Stall Works.
J. L. Mott Iron Works.
Ludlow-Saylor Wire Co.

Stained Glass Windows.
Keystone Stained Glass Works.
Matthews, The Firm of John.
Wallis, A. H.

Stair Builders.
Smith, S. E. & Bro.

Steel Figures and Letters.
Sackman, F. A.

Tiling.
Star Encaustic Tile Co.

Tools.
Deane, E. L.
Fox, P. L. & Co.
Gage Tool Co.
Hammacher, Schlemmer & Co.
Leavitt Mch. Co.
Millers Falls Co.
Siegley, Jacob.
Smith, Otis A.
Stanley Rule & Level Co.
Starrett, L. S. Co.
Tatum, S. C. Co.
Walter's Sons, Wm. P.
Wilkinson, A. J. & Co.

Turn'd, Mold'd, Carv'd Wk.
Dickey, A. & Co.
Requarth, F. A. & Co.
Standard Wood Turning Co.

Varnish.
Devoe, F. W. & Co.

Ventilators.
Doerge, H.

Wax, Floor.
Butcher Polish Co.

Weather Vanes.
Jones, Thos. W.
Mott, J. L. Iron Works.

Wire Work.
Barnum, E. T.

Wood Filler.
Bridgeport Wood Finishing Co.

Wood Working Machinery.
Barnes Tool Co.
Barnes, W. F. & John.
Clement, F. H.
Cordesman, Meyer & Co.
Edinburgh Foundry & Machine Co.
Fay, J. A. & Co.
Fox Machine Co.
Indiana Machine Works.
Little, C. E.
Marston, J. M. & Co.
Park, L. F.
Place, Geo.
Pownall, F. H.
Pryibil, P.
Rowley & Hermance Co.
Seneca Falls Mfg. Co.
Shimer, Samuel J. & Sons.
Seymour & Whitlock.
Witherby, Rugg & Richardson.
Yerkes & Finan Woodworking Mch. Co.

Woods, Ornamental.
Albro, E. D. & Co.

Alphabetical Index to Advertisers.

Carpentry and Building

WITH WHICH IS INCORPORATED

The Builders' Exchange

VOL. XVIII. No. 8. NEW YORK, AUGUST, 1896. Ten Cents a Copy. One Dollar a Year.

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Est. 1863. Inc. 1895.

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—OF AWARD AT—

International Expositions.

SPECIAL PRIZE,

GOLD MEDAL,

At ATLANTA, 1895.

G. & H. BARNETT COMPANY,

PHILADELPHIA, PA.

Durable—Easily Applied. This roofing is manufactured from natural Trinidad asphalt materials, and will not dry up and become brittle under exposure to the weather as coal-tar roofings do. ☞ *Send for free sample of roof 12 years old, with circular and price list to* WARREN CHEMICAL & MFG. CO., 49 Fulton Street, New York, U. S. A.

METAL SKYLIGHTS.

Guaranteed not to Leak.

Non-condensing, fire-proof, ventilating. Strong, Light and Durable.

—ALSO—

METAL SHINGLES.

E. VAN NOORDEN & CO.,
383 Harrison Ave., BOSTON, MASS.

Sound-Proof Floors,
Cold-Proof Walls
can be got if you line them with
Cabot's Sheathing "Quilt."

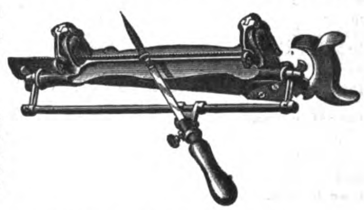
It is an elastic, clean, odorless, non-decaying, non-inflammable cushion of dead-air spaces—and dead-air space is the best insulator of heat or sound. Low cost, high service. We would send you a sample if we knew your address. Made by SAMUEL CABOT, 67 Kilby St., Boston, Mass., Prop. of Cabot's Creosote Shingle Stains.

The Elkins Saw Filer and Clamp.

Carpenters say it will hold and file a saw to perfection.

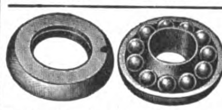
If your dealer does not carry them in stock, we will send one express paid on receipt of price.

Send for Reduced Price.



The Elkins Saw Filer and Clamp is a **Vise** to which is fixed a **File Handle** moving through guides which can be instantly set to any pitch or bevel desired. The handle holding the file moves freely through the guide, making every tooth exactly alike in pitch and bevel.

A. J. WILKINSON & CO., Boston, Mass.



Ball Bearing Washers

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STANLEY'S STEEL BUTTS.

Each ball will stand 1000 lbs. pressure. Unequalled for heavy doors. An artistic pamphlet describing these and other good things to be had for the asking.

THE STANLEY WORKS, NEW BRITAIN, CONN., 79 CHAMBERS ST., N. Y.

SEND FOR BOOK OF KENNEBUNKPORT COTTAGES Stained with DEXTER BROS.' English Shingle Stains. BOSTON, MASS.

Sample Boards and Book free.

7 ft. 6 in. wide. 4 ft. 4 in. high.

These dimensions can be varied if so desired.

THIS FIREPLACE $31.

A simple and inexpensive mantel, made of ORNAMENTAL BRICK.

Our mantels are the newest, best and most artistic in the market. We make them of Red, Cream, Buff, Pink, Brown and Gray Brick at prices from $14 upwards. They cost no more than other kinds, are easily set in place and meet every requirement.

Send 10 cts. for 40-design Sketch-book.

Philadelphia and Boston Face Brick Co.,
4 LIBERTY SQUARE, BOSTON, MASS.

Classified List of Advertisers.

Annunciators.
Ostrander, W. R. & Co.

Architectural Ornaments.
McCune, Alex.

Auger Bits.
Adams, A. L.

Barrel Swing.
Leavitt Machine Co.

Bath Tubs.
Steel Bath Mfg. Co.

Bevels.
Hill Bevel Co

Blinds.
Burlington Venetian Blind Co.
Flexible Door & Shutter Co.
Hartman Sliding Blind Co.
Morstatt & Son.
Phœnix Sliding Blind Co.
Willer Mfg. Co.

Brackets.
Atlas Mfg. Co.

Books, &c.
Comstock, Wm. T.
Hicks, I. P.

Boring Machines.
Millers Falls Co.

Brick Machinery.
Eastern Machinery Co.

Builders' Hardware.
Hammacher, Schlemmer & Co.
Russell & Erwin Mfg. Co.
Shannon, J. B. & Sons.
Stanley Works.

Building Paper and Felt.
Cabot, Samuel.
Warren-Ehret Co.

Butts and Hinges.
Stanley Works.

Ceiling, Iron and Steel.
Canton Steel Roofing Co.
Eller, J. H. & Co.

Cements.
Fisher, E. W.

Clamps.
Tatum, S. C. Co.

Clothes Dryer.
Hill Dryer Co.

Conductor Pipe.
Canton Steel Roofing Co.

Cornices, Sheet Metal.
Berger Mfg. Co.
Eller, J. H. & Co.
Lee, Thos.
Mesker & Bro.

Cresting.
Barnum, E. T.
Mast, Foos & Co.
Springfield Architectural Iron Works.
Van Dorn Iron Works Co.

Designs and Details. (See House Plans.)

Door Hangers.
Lane Bros.
Prescott Hdw. Mfg. Co.
Stearns, E. C. & Co.
Van Wagoner & Williams Hdw. Co.
Wilcox Mfg. Co.

Door Knobs.
Bardsley, J.

Door Locks.
Russell & Erwin Mfg. Co.

Drawing Inks.
Higgins, C. M. & Co.

Drawing Instruction.
Academy of Architecture and Building.
International Correspondence Schools.

Drawing Instruments.
Abbott, A. H. & Co.
Comstock, Wm. T.

Dumb Waiter Fixtures.
Hammacher Schlemmer & Co.

Eave Troughs.
Eller, J. H. & Co.

Elevators and Dumb Waiters.
Curran, J. H.
Hutchinson, F. S. Co.
Kimball Bros.
Maynard, J. Q.
Morse, Williams & Co.
Sedgwick Mch. Wks.
Variety Mch. Co.
Warner Elevator Mfg. Co.

Elevator Fronts, &c.
Ludlow-Saylor Wire Co.

Engines, Gas.
Norman, J. J. Co.
Otto Gas Engine Works.
Proctor & Percy.
Van Duzen Gasoline Engine Co.

Expansion Bolts.
Church, Isaac.
Steward & Romaine Mfg. Co.

Fencing.
Barnum, E. T.
Ludlow-Saylor Wire Co.
Mast, Foos & Co.
Van Dorn Iron Works Co.

Files and Rasps.
Barnett, G. & H. Co.
Nicholson File Co.

Fire Places.
Philadelphia & Boston Face Brick Co.

Furnaces & Heaters.
Giblin & Co.
Howard Furnace Co.
Kelsey Furnace Co.
Wood & Bishop Co.
Sheppard, I. A. & Co.

Gas and Electric Fixtures.
Frink, I. P.

Gauges.
Leavitt Mch. Co.

Glass, Ornamental.
Keystone Stained Glass Works.
Matthews, The Firm of John.
Wallis, A. H.

Granite Cleaning.
Cross Bros.

Grates. (See Mantels, &c.)

Heaters. *Steam and Hot Water.*
Howard Furnace Co.
Nason Mfg. Co.
N. Y. Central Iron Works.

House Plans.
Comstock, Wm. T.
Hicks, I. P.
Payne, Geo. W. & Son.

Iron House Fronts.
Mesker & Bro.

Iron Shutters.
Garry Iron & Steel Roofing Co.

Iron Work.
Barnum, E. T.
Ludlow-Saylor Wire Co.
Mast, Foos & Co.
Phœnix Iron Co.
Van Dorn Iron Works Co.

Levels.
Akron Spirit Level Co.
Richardson, C. F. & Son.

Machine Knives.
Fox Machine Co.

Mantels and Grates.
Jackson, W. & Son.
Philadelphia & Boston Face Brick Co.

Mantels, Wood.
Ironton Wood Mantel Co.
Requarth, F. A. & Co.

Mineral Wool.
American Mineral Wool Co.

Mortar Colors.
French, Sam'l H. & Co.

Paint.
Devoe, F. W. & Co.

Painters' Materials.
Devoe, F. W. & Co.

Patent Solicitors.
Wedderburn, J. & Co.

Pencils.
Dixon, Jos., Crucible Co.

Planes.
Gage Tool Co.
Siegley, Jacob.
Smith, Otis A.

Plaster Ornaments.
French, Samuel H. & Co.

Printing.
The Williams Printing Co.

Pumping Motors.
Schnebles, Martin Sons Co.

Rafter Supports.
Safety Rafter Co.

Ranges.
Sheppard, I. A. & Co.

Reflectors.
Frink, I. P.

Roofing.
Berger Mfg. Co.
Burton, W. J. & Co.
Canton Steel Roofing Co.
Chattanooga Steel Roofing Co.
Eller, J. H. & Co.
Garry Iron & Steel Roofing Co.
Sykes Iron & Steel Roofing Co.
Warren Chemical & Mfg. Co.
Warren-Ehret Co.

Roofing Brackets.
Stanley Rule & Level Co.

Roofing Cement.
Connors, William.

Roofing Paint.
Devoe, F. W. & Co.
Dixon, Jos., Crucible Co.
Connors, William.

Roofing Slate.
Auld & Conger.
Bangor Excelsior Slate Co.
Galt, John & Sons.
Johnson, E. J. & Co.
Lloyd, W. E. Slate Co.

Sash Balances.
Caldwell Mfg. Co.
Gardner Sash Balance Co.
Stearns, E. C. & Co.

Sash Chains.
Bridgeport Chain Co.
Morton, Thos.
Smith & Egge Mfg. Co.

Sash Fasteners.
Wooster, F. V.

Sash Fixtures.
Fox Machine Co.
Gardner Sash Balance Co.
Ives, H. B. & Co.
Palmer Hardware Mfg. Co.

Sash Weights.
Raymond Lead Co.

Saws.
Disston, H. & Sons, Inc.
National Saw Co.

Saw Filers.
Wilkinson, A. J. & Co.

Saw Filing Guides.
Disston, Henry & Sons, Inc.

Saw Sets.
Disston, Henry & Sons, Inc.
Taintor Mfg. Co.

Schools.
Academy of Architecture and Building.

Shingles and Tiles, Metallic.
Berger Mfg. Co.
Burton, W. J. & Co.
Cortright Metal Roofing Co.
Garry Iron & Steel Roofing Co.
Merchant & Co.
Montross Metal Shingle Co.
Thorn Shingle & Ornament Co.

Shingle Stains.
Cabot, Samuel.
Dexter Bros.

Shutters. (See Blinds.)

Skylights.
Van Noorden, E. & Co.

Snow Guards.
Folsom Snow Guard Co.

Speaking Tubes.
W. R. Ostrander & Co.

Spring Hinges.
Bardsley, J.
Bommer Bros.
Van Wagoner & Williams Hardware Co.

Stable Fittings.
Broad Gauge Iron Stall Works.
J. L. Mott Iron Works.
Ludlow-Saylor Wire Co.

Stained Glass Windows.
Keystone Stained Glass Works.
Matthews, The Firm of John.
Wallis, A. H.

Stair Builders.
Smith, S. E. & Bro.

Steel Figures and Letters.
Sackman, F. A.

Tiling.
Star Encaustic Tile Co.

Tools.
Deane, E. L.
Fox, P. L. & Co.
Gage Tool Co.
Hammacher, Schlemmer & Co.
Leavitt Mch. Co.
Millers Falls Co.
Siegley, Jacob.
Smith, Otis A.
Stanley Rule & Level Co.
Tatum, S. C. Co.
Walter's Sons, Wm. P.
Wilkinson A. J. & Co.

Turn'd, Mold'd, Carv'd Wk.
Dickey, A. & Co.
Requarth, F. A. & Co.
Standard Wood Turning Co.

Varnish.
Devoe, F. W. & Co.

Ventilators.
Doerge, H.

Wax, Floor.
Butcher Polish Co.

Weather Strips.
Church, E. I. & Co.

Weather Vanes.
Jones, Thos. W.
Mott, J. L. Iron Works.

Wire Work.
Barnum, E. T.

Wood Filler.
Bridgeport Wood Finishing Co.

Wood Working Machinery.
Barnes Tool Co.
Barnes, W. F. & John.
Clement, F. H.
Cordesman, Meyer & Co.
Edinburgh Foundry & Machine Co.
Egan Co.
Fox Machine Co.
Indiana Machine Works.
Little, C. E.
Marston, J. M. & Co.
Park, L. F.
Place, Geo.
Pownall, F. H.
Pryibil, P.
Rogers, C. B. & Co.
Rowley & Hermance Co.
Seneca Falls Mfg. Co.
Shimer, Samuel J. & Sons.
Seymour & Whitlock.
Witherby, Rugg & Richardson.
Yerkes & Finan Woodworking Mch. Co.

Woods, Ornamental.
Albro, E. D. & Co.

Alphabetical Index to Advertisers.

Carpentry and Building

WITH WHICH IS INCORPORATED

The Builders' Exchange

VOL. XVIII. NO. 9. NEW YORK, SEPTEMBER, 1896. Ten Cents a Copy. One Dollar a Year.

Classified List of Advertisers.

Annunciators.
Ostrander, W. R. & Co.

Architectural Ornaments.
McCune, Alex.

Auger Bits.
Adams, A. L.

Barrel Swing.
Leavitt Machine Co.

Bevels.
Hill Bevel Co.

Blinds.
Burlington Venetian Blind Co.
Flexible Door & Shutter Co.
Hartman Sliding Blind Co.
Morstatt & Son.
Phœnix Sliding Blind Co.
Willer Mfg. Co.

Books, &c.
Comstock, Wm. T.
Hicks, I. P.

Boring Machines.
Millers Falls Co.

Builders' Hardware.
Hammacher, Schlemmer & Co.
Russell & Erwin Mfg. Co.
Shannon, J. B. & Sons.
Stanley Works.

Building Paper and Felt.
Cabot, Samuel.
Warren-Ehret Co.

Butts and Hinges.
Stanley Works.

Ceiling, Iron and Steel.
Canton Steel Roofing Co.
Eller, J. H. & Co.

Cements.
Fisher, E. W.

Clamps.
Tatum, S. C. Co.

Clothes Dryer.
Hill Dryer Co.

Conductor Pipe.
Canton Steel Roofing Co.

Cornices, Sheet Metal.
Berger Mfg. Co.
Eller, J. H. & Co.
Lee, Thos.
Mesker & Bro.

Cresting.
Barnum, E. T.
Mast, Foos & Co.
Springfield Architectural Iron Works.

Designs and Details. (See House Plans.)

Door Hangers.
Lane Bros.
McCabe Mfg. Co.
Prescott Hdw. Mfg. Co.
Stearns, E. C. & Co.
Van Wagoner & Williams Hdw. Co.
Wilcox Mfg. Co.

Door Knobs.
Bardsley, J.

Door Locks.
Russell & Erwin Mfg. Co.

Drawing Inks.
Higgins, C. M. & Co.

Drawing Instruction.
Academy of Architecture and Building.
International Correspondence Schools.

Drawing Instruments.
Abbott, A. H. & Co.
Comstock, Wm. T.

Dumb Waiter Fixtures.
Hammacher Schlemmer & Co.

Eave Troughs.
Eller, J. H. & Co.

Elevators and Dumb Waiters.
Curran, J. H.
Hutchinson, F. S. Co.
Kimball Bros.
Maynard, J. Q.
Morse, Williams & Co.
Sedgwick Mch. Wks.
Warner Elevator Mfg. Co.

Elevator Fronts, &c.
Ludlow-Saylor Wire Co.

Engines, Gas.
Otto Gas Engine Works.
Proctor & Percy.
Van Duzen Gasoline Engine Co.

Expansion Bolts.
Church, Isaac.
Steward & Romaine Mfg. Co.

Fencing.
Barnum, E. T.
Ludlow-Saylor Wire Co.
Mast, Foos & Co.

Files and Rasps.
Barnett, G. & H. Co.
Nicholson File Co.

Fire Places.
Philadelphia & Boston Face Brick Co.

Furnaces & Heaters.
Howard Furnace Co.
Kelsey Furnace Co.
Sheppard, I. A. & Co.

Gas and Electric Fixtures.
Frink, I. P.

Gauges.
Leavitt Mch. Co.

Glass, Ornamental.
Keystone Stained Glass Works.
Wallis, A. H.

Grates. (See Mantels, &c.)

Heaters. *Steam and Hot Water.*
Howard Furnace Co.
Nason Mfg. Co.
N. Y. Central Iron Works.

House Plans.
Comstock, Wm. T.
Hicks, I. P.
Payne, Geo. W. & Son.

Incubators.
Von Culin Incubator Co.

Iron House Fronts.
Mesker & Bro.

Iron Shutters.
Garry Iron & Steel Roofing Co.

Iron Work.
Barnum, E. T.
Ludlow-Saylor Wire Co.
Mast, Foos & Co.
Phœnix Iron Co.

Levels.
Akron Level Works.
Richardson, C. F. & Son.

Machine Knives.
Fox Machine Co.

Mantels and Grates.
Jackson, W. & Son.
Philadelphia & Boston Face Brick Co.

Mantels, Wood.
Ironton Wood Mantel Co.
Requarth, F. A. & Co.

Mineral Wool.
American Mineral Wool Co.

Mortar Colors.
French, Sam'l H. & Co.

Painters' Materials.
Devoe, F. W. & Co.

Patent Solicitors.
Wedderburn, J. & Co.

Pencils.
Dixon, Jos., Crucible Co.

Planes.
Gage Tool Co.
Siegley, Jacob.
Smith, Otis A.

Plaster Ornaments.
French, Samuel H. & Co.

Printing.
The Williams Printing Co.

Ranges.
Mt. Penn Stove Works.
Sheppard, I. A. & Co.

Reflectors.
Frink, I. P.

Roofing.
Berger Mfg. Co.
Burton, W. J. & Co.
Canton Steel Roofing Co.
Chattanooga Steel Roofing Co.
Eller, J. H. & Co.
Garry Iron & Steel Roofing Co.
Sykes Iron & Steel Roofing Co.
Warren Chemical & Mfg. Co.
Warren-Ehret Co.

Roofing Brackets.
Stanley Rule & Level Co.

Roofing Paint.
Devoe, F. W. & Co.
Dixon, Jos., Crucible Co.

Roofing Slate.
Auld & Conger.
Bangor Excelsior Slate Co.
Galt, John & Sons.
Johnson, E. J. & Co.
Lloyd, W. E. Slate Co.

Sash Balances.
Caldwell Mfg. Co.
Gardner Sash Balance Co.
Stearns, E. C. & Co.

Sash Chains.
Bridgeport Chain Co.
Morton, Thos.
Smith & Egge Mfg. Co.

Sash Fasteners.
Wooster, F. V.

Sash Fixtures.
Fitch, W. & E. T. Co.
Fox Machine Co.
Gardner Sash Balance Co.
Ives, H. B. & Co.
Palmer Hardware Mfg. Co.

Sash Weights.
Raymond Lead Co.

Saws.
Disston, H. & Sons, Inc.
National Saw Co.

Saw Filers.
Wilkinson, A. J. & Co.

Saw Filing Guides.
Disston, Henry & Sons, Inc.

Saw Sets.
Disston, Henry & Sons, Inc.
Taintor Mfg. Co.

Schools.
Academy of Architecture and Building.

Shingles and Tiles, Metallic.
Berger Mfg. Co.
Burton, W. J. & Co.
Cortright Metal Roofing Co.
Garry Iron & Steel Roofing Co.
Montross Metal Shingle Co.
Thorn Shingle & Ornament Co.

Shingle Stains.
Cabot, Samuel.
Dexter Bros.

Shutters. (See Blinds.)

Skylights.
Van Noorden, E. & Co.

Snow Guard.
Folsom Snow Guard Co.

Speaking Tubes.
W. R. Ostrander & Co.

Spring Hinges.
Bardsley, J.
Bommer Bros.
Van Wagoner & Williams Hardware Co.

Stable Fittings.
Broad Gauge Iron Stall Works.
J. L. Mott Iron Works.
Ludlow-Saylor Wire Co.

Stained Glass Windows.
Keystone Stained Glass Works.
Wallis, A. H.

Stair Builders.
Smith, S. E. & Bro.

Steel Figures and Letters.
Sackman, F. A.

Tiling.
Star Encaustic Tile Co.

Tools.
Deane, E. L.
Gage Tool Co.
Hammacher, Schlemmer & Co.
Leavitt Mch. Co.
Millers Falls Co.
Siegley, Jacob.
Smith, Otis A.
Stanley Rule & Level Co.
Tatum, S. C. Co.
Walter's Sons, Wm. P.
Wilkinson A. J. & Co.

Turn'd, Mold'd, Carv'd Wk.
Dickey, A. & Co.
Requarth, F. A. & Co.
Standard Wood Turning Co.

Varnish.
Devoe, F. W. & Co.

Ventilators.
Doerge, H.

Wax, Floor.
Butcher Polish Co.

Weather Strips.
Burcaw, F. P.
Church, E. I. & Co.

Weather Vanes.
Jones, Thos. W.
Mott, J. L. Iron Works.

Window Fasteners.
Stanley Works.

Wire Work.
Barnum, E. T.

Wood Filler.
Bridgeport Wood Finishing Co.

Wood Working Machinery.
Barnes Tool Co.
Barnes, W. F. & John.
Clement, F. H.
Cordesman, Meyer & Co.
Fay, J. A. & Co.
Fox Machine Co.
Little, C. E.
Marston, J. M. & Co.
Park, L. F.
Place, Geo.
Pownall, F. H.
Rogers, C. B. & Co.
Rowley & Hermance Co.
Seneca Falls Mfg. Co.
Seymour & Whitlock.
Witherby, Rugg & Richardson.
Yerkes & Finan Woodworking Mch. Co.

Woods, Ornamental.
Albro, E. D. & Co.

Alphabetical Index to Advertisers.

H Trask

Carpentry and Building

WITH WHICH IS INCORPORATED

The Builders' Exchange

VOL. XVIII. No. 12. NEW YORK, DECEMBER, 1896. Ten Cents a Copy. One Dollar a Year.

Classified List of Advertisers.

Annunciators.
Ostrander, W. R. & Co.

Architectural Ornaments.
McCune, Alex.

Auger Bits.
Adams, A. L.

Barrel Swing.
Leavitt Machine Co.

Bevels.
Hill Bevel Co.

Blinds.
Burlington Venetian Blind Co.
Flexible Door & Shutter Co.
Hartman Sliding Blind Co.
Morstatt & Son.
Phœnix Sliding Blind Co.
Willer Mfg. Co.

Brackets.
Atlas Mfg. Co.

Books, &c.
Comstock, Wm. T.
Hicks, I. P.

Boring Machines.
Millers Falls Co.

Builders' Hardware.
Hammacher, Schlemmer & Co.
Russell & Erwin Mfg. Co.
Shannon, J. B. & Sons.
Stanley Works.

Building Paper and Felt.
Cabot, Samuel.
Warren-Ehret Co.

Butts and Hinges.
Stanley Works.

Ceiling, Iron and Steel.
Canton Steel Roofing Co.
Eller, J. H. & Co.

Cements.
Fisher, E. W.

Clamps.
Tatum, S. C. Co.

Clothes Dryer.
Hill Dryer Co.

Conductor Pipe.
Canton Steel Roofing Co.

Cornices, Sheet Metal.
Berger Mfg. Co.
Eller, J. H. & Co.
Lee, Thos.
Mesker & Bro.

Cresting.
Barnum, E. T.
Mast, Foos & Co.
Springfield Architectural Iron Works.
Van Dorn Iron Works Co.

Designs and Details. (See House Plans.)

Door Hangers.
Lane Bros.
McCabe Mfg. Co.
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Stearns, E. C. & Co.
Van Wagoner & Williams Hdw. Co.
Wilcox Mfg. Co.

Door Knobs.
Bardsley, J.

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Russell & Erwin Mfg. Co.

Drawing Inks.
Higgins, C. M. & Co.

Drawing Instruction.
Academy of Architecture and Building.
International Correspondence Schools.

Drawing Instruments.
Abbott, A. H. & Co.
Comstock, Wm. T.

Dumb Waiter Fixtures.
Hammacher Schlemmer & Co.

Eave Troughs.
Eller, J. H. & Co.

Elevators and Dumb Waiters.
Curran, J. H.
Hutchinson, F. S. Co.
Kimball Bros.
Maynard, J. Q.
Morse, Williams & Co.
Sedgwick Mch. Wks.
Warner Elevator Mfg. Co.

Elevator Fronts, &c.
Ludlow-Saylor Wire Co.

Engines, Gas.
Otto Gas Engine Works.
Proctor & Percy.
Van Duzen Gasoline Engine Co.

Expansion Bolts.
Church, Isaac.
Steward & Romaine Mfg. Co.

Fencing.
Barnum, E. T.
Ludlow-Saylor Wire Co.
Mast, Foos & Co.
Van Dorn Iron Works Co.

Files and Rasps.
Barnett, G. & H. Co.
Nicholson File Co.

Fire Places.
Philadelphia & Boston Face Brick Co.

Furnaces & Heaters.
Howard Furnace Co.
Kelsey Furnace Co.
Sheppard, I. A. & Co.

Gas and Electric Fixtures.
Frink, I. P.

Gauges.
Leavitt Mch. Co.

Glass, Ornamental.
Keystone Stained Glass Works.
Wallis, A. H.

Grates. (See Mantels, &c.)

Heaters. *Steam and Hot Water.*
Howard Furnace Co.
Nason Mfg. Co.
N. Y. Central Iron Works.

House Plans.
Comstock, Wm. T.
Hicks, I. P.
Payne, Geo. W. & Son.

Incubators.
Von Culin Incubator Co.

Iron House Fronts.
Mesker & Bro.

Iron Shutters.
Garry Iron & Steel Roofing Co.

Iron Work.
Barnum, E. T.
Ludlow-Saylor Wire Co.
Mast, Foos & Co.
Phœnix Iron Co.
Van Dorn Iron Works Co.

Levels.
Akron Level Works.
Richardson, C. F. & Son.

Machine Knives.
Fox Machine Co.

Mantels and Grates.
Jackson, W. & Son.
Philadelphia & Boston Face Brick Co.

Mantels, Wood.
Ironton Wood Mantel Co.
Requarth, F. A. & Co.

Mineral Wool.
American Mineral Wool Co.

Mortar Colors.
French, Sam'l H. & Co.

Painters' Materials.
Devoe, F. W. & Co.

Patent Solicitors.
Wedderburn, J. & Co.

Pencils.
Dixon, Jos., Crucible Co.

Planes.
Gage Tool Co.
Siegley, Jacob.
Smith, Otis A.

Plaster Ornaments.
French, Samuel H. & Co.

Printing.
The Williams Printing Co.

Pumping Motors.
Schnebles, Martin Sons Co.

Ranges.
Sheppard, I. A. & Co.

Reflectors.
Frink, I. P.

Roofing.
Berger Mfg. Co.
Burton, W. J. & Co.
Canton Steel Roofing Co.
Chattanooga Steel Roofing Co.
Eller, J. H. & Co.
Garry Iron & Steel Roofing Co.
Sykes Iron & Steel Roofing Co.
Warren Chemical & Mfg. Co.
Warren-Ehret Co.

Roofing Brackets.
Stanley Rule & Level Co.

Roofing Cement.
Connors, William.

Roofing Paint.
Devoe, F. W. & Co.
Dixon, Jos., Crucible Co.
Connors, William.

Roofing Slate.
Auld & Conger.
Bangor Excelsior Slate Co.
Galt, John & Sons.
Johnson, E. J. & Co.
Lloyd, W. E. Slate Co.

Sash Balances.
Caldwell Mfg. Co.
Gardner Sash Balance Co.
Stearns, E. C. & Co.

Sash Chains.
Bridgeport Chain Co.
Morton, Thos.
Smith & Egge Mfg. Co.

Sash Fasteners.
Wooster, F. V.

Sash Fixtures.
Fox Machine Co.
Gardner Sash Balance Co.
Ives, H. B. & Co.
Palmer Hardware Mfg. Co.

Sash Weights.
Raymond Lead Co.

Saws.
Disston, H. & Sons, Inc.
National Saw Co.

Saw Filers.
Wilkinson, A. J. & Co.

Saw Filing Guides.
Disston, Henry & Sons, Inc.

Saw Sets.
Disston, Henry & Sons, Inc.
Taintor Mfg. Co.

Schools.
Academy of Architecture and Building.

Shingles and Tiles, Metallic.
Berger Mfg. Co.
Burton, W. J. & Co.
Cortright Metal Roofing Co.
Garry Iron & Steel Roofing Co.
Montross Metal Shingle Co.
Thorn Shingle & Ornament Co.

Shingle Stains.
Cabot, Samuel.
Dexter Bros.

Shutters. (See Blinds.)

Skylights.
Van Noorden, E. & Co.

Snow Guard.
Folsom Snow Guard Co.

Speaking Tubes.
W. R. Ostrander & Co.

Spring Hinges.
Bardsley, J.
Bommer Bros.
Van Wagoner & Williams Hardware Co.

Stable Fittings.
Broad Gauge Iron Stall Works.
J. L. Mott Iron Works.
Ludlow-Saylor Wire Co.

Stained Glass Windows.
Keystone Stained Glass Works.
Wallis, A. H.

Stair Builders.
Smith, S. E. & Bro.

Steel Figures and Letters.
Sackman, F. A.

Tiling.
Star Encaustic Tile Co.

Tools.
Deane, E. L.
Fox, P. L. & Co.
Gage Tool Co.
Hammacher, Schlemmer & Co.
Leavitt Mch. Co.
Millers Falls Co.
Siegley, Jacob.
Smith, Otis A.
Stanley Rule & Level Co.
Tatum, S. C. Co.
Walter's Sons, Wm. P.
Wilkinson A. J. & Co.

Turn'd, Mold'd, Carv'd Wk.
Dickey, A. & Co.
Requarth, F. A. & Co.
Standard Wood Turning Co.

Varnish.
Devoe, F. W. & Co.

Ventilators.
Doerge, H.

Wax, Floor.
Butcher Polish Co.

Weather Strips.
Burcaw, F. P.
Church, E. I. & Co.

Weather Vanes.
Jones, Thos. W.
Mott, J. L. Iron Works.

Wire Work.
Barnum, E. T.

Wood Filler.
Bridgeport Wood Finishing Co.

Wood Working Machinery.
Barnes Tool Co.
Barnes, W. F. & John.
Clement, F. H.
Cordesman, Meyer & Co.
Egan Co.
Fox Machine Co.
Little, C. E.
Marston, J. M. & Co.
Park, L. F.
Place, Geo.
Pownall, F. H.
Prybil, P.
Rogers, C. B. & Co.
Rowley & Hermance Co.
Seneca Falls Mfg. Co.
Shimer, Samuel J. & Sons.
Seymour & Whitlock.
Witherby, Rugg & Richardson.
Yerkes & Finan Woodworking Mch. Co.

Woods, Ornamental.
Albro, E. D. & Co.

Alphabetical Index to Advertisers.

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WITH WHICH IS INCORPORATED

The Builders' Exchange

VOL. XVIII. NO. 11. NEW YORK, NOVEMBER, 1896. Ten Cents a Copy. One Dollar a Year.

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Annunciators.
Ostrander, W. R. & Co.

Architectural Ornaments.
McCune, Alex.

Auger Bits.
Adams, A. L.
Ford Bit Co.

Barrel Swing.
Leavitt Machine Co.

Bevels.
Hill Bevel Co.

Blinds.
Burlington Venetian Blind Co.
Flexible Door & Shutter Co.
Hartman Sliding Blind Co.
Morstatt & Son.
Willer Mfg. Co.

Books, &c.
Comstock, Wm. T.
Hicks, I. P.
Palliser, Palliser & Co.

Boring Machines.
Millers Falls Co.

Builders' Hardware.
Hammacher, Schlemmer & Co.
Russell & Erwin Mfg. Co.
Shannon, J. B. & Sons.
Stanley Works.

Building Paper and Felt.
Cabot, Samuel.
Warren-Ehret Co.

Butts and Hinges.
Stanley Works.

Ceiling, Iron and Steel.
Canton Steel Roofing Co.
Eller, J. H. & Co.

Cements.
Fisher, E. W.

Clamps.
Tatum, S. C. Co.

Clothes Dryer.
Hill Dryer Co.

Conductor Pipe.
Canton Steel Roofing Co.

Cornices, Sheet Metal.
Berger Mfg. Co.
Eller, J. H. & Co.
Lee, Thos.
Mesker & Bro.

Cresting.
Barnum, E. T.
Mast, Foos & Co.
Springfield Architectural Iron Works.

Designs and Details. (See House Plans.)

Door Hangers.
Lane Bros.
McCabe Mfg. Co.
Prescott Hdw. Mfg. Co.
Stearns, E. C. & Co.
Van Wagoner & Williams Hdw. Co.
Wilcox Mfg. Co.

Door Knobs.
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Sheppard, I. A. & Co.

Gas and Electric Fixtures.
Frink, I. P.

Gauges.
Leavitt Mch. Co.

Glass, Ornamental.
Keystone Stained Glass Works.
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Grates. (See Mantels, &c.)

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Howard Furnace Co.
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Phœnix Iron Co.

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Akron Level Works.
Richardson, C. F. & Son.

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Fox Machine Co.

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Painters' Materials.
Devoe, F. W. & Co.

Patent Solicitors.
Wedderburn, J. & Co.

Pencils.
Dixon, Jos., Crucible Co.

Planes.
Gage Tool Co.
Siegley, Jacob.
Smith, Otis A.

Plaster Ornaments.
French, Samuel H. & Co.

Printing.
The Williams Printing Co.

Ranges.
Mt. Penn Stove Works.
Sheppard, I. A. & Co.

Reflectors.
Frink, I. P.

Roofing.
Berger Mfg. Co.
Burton, W. J. & Co.
Canton Steel Roofing Co.
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Sash Balances.
Caldwell Mfg. Co.
Gardner Sash Balance Co.
Stearns, E. C. & Co.

Sash Chains.
Bridgeport Chain Co.
Morton, Thos.
Smith & Egge Mfg. Co.

Sash Fasteners.
Wooster, F. V.

Sash Fixtures.
Fitch, W. & E. T. Co.
Fox Machine Co.
Gardner Sash Balance Co.
Ives, H. B. & Co.
Palmer Hardware Mfg. Co.

Sash Weights.
Raymond Lead Co.

Saws.
Disston, H. & Sons, Inc.
National Saw Co.

Saw Filers.
Wilkinson, A. J. & Co.

Saw Filing Guides.
Disston, Henry & Sons, Inc.

Saw Sets.
Disston, Henry & Sons, Inc.
Taintor Mfg. Co.

Schools.
Academy of Architecture and Building.

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Shingle Stains.
Cabot, Samuel.
Dexter Bros.

Shutters. (See Blinds.)

Skylights.
Van Noorden, E. & Co.

Snow Guard.
Folsom Snow Guard Co.

Speaking Tubes.
W. R. Ostrander & Co.

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Bardsley, J.
Bommer Bros.
Van Wagoner & Williams Hardware Co.

Stable Fittings.
Broad Gauge Iron Stall Works.
J. L. Mott Iron Works.
Ludlow-Saylor Wire Co.

Stained Glass Windows.
Keystone Stained Glass Works.
Wallis, A. H.

Stair Builders.
Smith, S. E. & Bro.

Steel Figures and Letters.
Sackman, F. A.

Tiling.
Star Encaustic Tile Co.

Tools.
Deane, E. L.
Gage Tool Co.
Hammacher, Schlemmer & Co.
Leavitt Mch. Co.
Millers Falls Co.
Siegley, Jacob.
Smith, Otis A.
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Tatum, S. C. Co.
Walter's Sons, Wm. P.
Wilkinson A. J. & Co.

Turn'd, Mold'd, Carv'd Wk.
Dickey, A. & Co.
Requarth, F. A. & Co.
Standard Wood Turning Co.

Varnish.
Devoe, F. W. & Co.

Ventilators.
Doerge, H.

Wax, Floor.
Butcher Polish Co.

Weather Strips.
Burcaw, F. P.
Church, E. I. & Co.

Weather Vanes.
Jones, Thos. W.
Mott, J. L. Iron Works.

Window Fasteners.
Stanley Works.

Wire Work.
Barnum, E. T.

Wood Filler.
Bridgeport Wood Finishing Co.

Wood Working Machinery.
Barnes Tool Co.
Barnes, W. F. & John.
Clement, F. H.
Cordesman, Meyer & Co.
Egan Co.
Fox Machine Co.
Little, C. E.
Marston, J. M. & Co.
Park, L. F.
Place, Geo.
Pownall, F. H.
Rogers, C. B. & Co.
Rowley & Hermance Co.
Seneca Falls Mfg. Co.
Seymour & Whitlock.
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Alphabetical Index to Advertisers.

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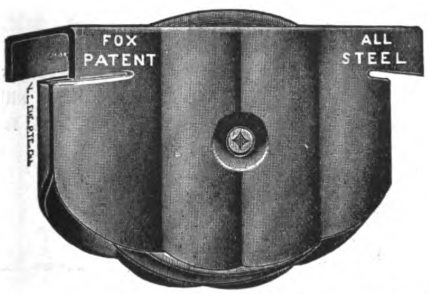

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FOX ALL-STEEL SASH PULLEY.

We also send a descriptive booklet giving all the information to be desired. Let us tell you about this sash pulley, and let us send you a sample.

MACOMB, ILL., Nov. 9, 1896.

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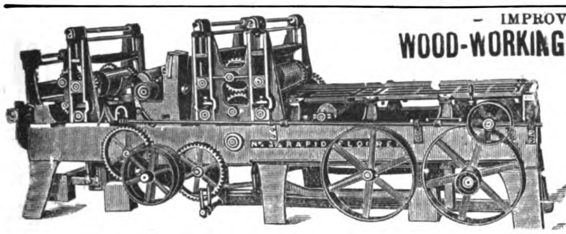

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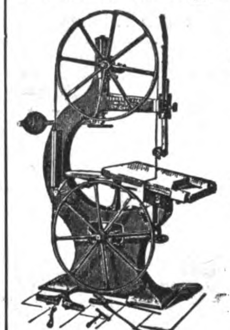

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SASH DOVE-TAILING MACHINE.

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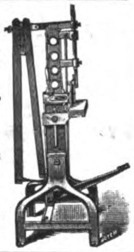
Foot Power Saw Tables, Mortising Machines, Miters, Wirers, Brad Punches, Stile Borers and Whitlock's Upright Engines.

Send for 1889 Descriptive Catalogue and prices before purchasing elsewhere.



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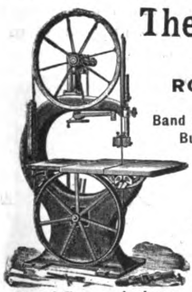

Band Saws,
Buzz Planers,
Pony Planers,
Automatic Lathes,
Hand Lathes,
Scroll Saws,
Boring Machines,
Dowel Machines,
Shapers,
Swing Saws, &c., &c.

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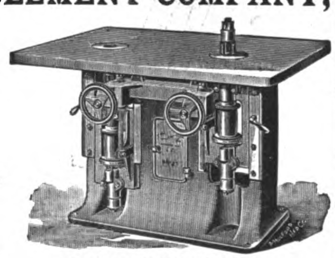

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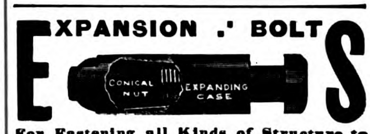

For Fastening all Kinds of Structure to Brick and Stone Work.

Patentee and M'f'r **ISAAC CHURCH,**

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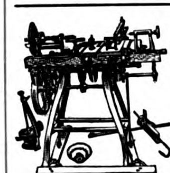

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Cold Rolled Steel and Iron Shafting, Patent Compression Couplings, Adjustable Self Oiling Hangers and Solid Split Pulleys.

— ONE LONG HONEYMOON.—She: "It seems rather hard, dear, that you can't afford to take me on a wedding trip."

"But darling, you will never know the difference. In the little flat I have engaged it will be just like living in a Pullman car."—*Life.*

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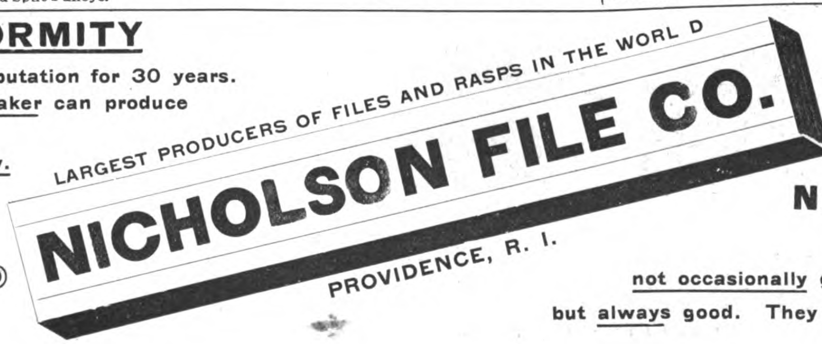
Any maker can produce good files occasionally.



Nicholson Files

not occasionally good, but always good. They are uniform.

— Financial Tip.—"You see, Mrs. Golightly, the new silver dollar will be called a dollar, but it will really be worth only half a dollar."

"Well, then, why don't they call it two dollars, so it will be worth a dollar?"—*Detroit Free Press.*

— Waiter: "What will you eat this morning, sir?"

Customer: "I don't know. Give me hash."—*Detroit Free Press.*

— And He Got Left.—"Did you get a nice change and rest at the resort, Bulkey?"

"No; my daughter got most of my change and my wife got the rest."—*Detroit Free Press.*

— SMITHSON: "Hello, Dobson, you are getting stout, aren't you?"
Dobson: "Well, I was getting stout, but since I bought my wheel I have been falling off considerably."—*Pittsburgh Chronicle Telegraph.*

— LIMITED CHOICE.—In a department store. "I want something nice in oil for a dining room."
"Yes, madam. A landscape or a box of sardines?"—*Woonsocket Reporter.*

— PREPARED FOR THE BEST.—Guest: "Am I the unlucky thirteener?"
Host: "No; you're the lucky fourteener. We invited you to fill the gap."
Guest: "All right. I've brought it with me."—*Detroit Free Press.*

— AUNTIE: "Do you like Uncle Harry to ride you on his back?"
Tommy 'Oh, right well, but I had a ride on a real donkey yesterday."—*Detroit Free Press.*

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CINCINNATI, OHIO.

FINEST GRADES OF LATEST IMPROVED

WOOD-WORKING MACHINERY

For Planing Mills, Furniture and Chair Factories, Carriage, Wagon and Agricultural Works. Circulars and prices. Correspondence solicited.

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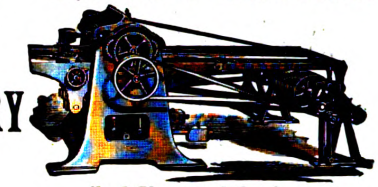

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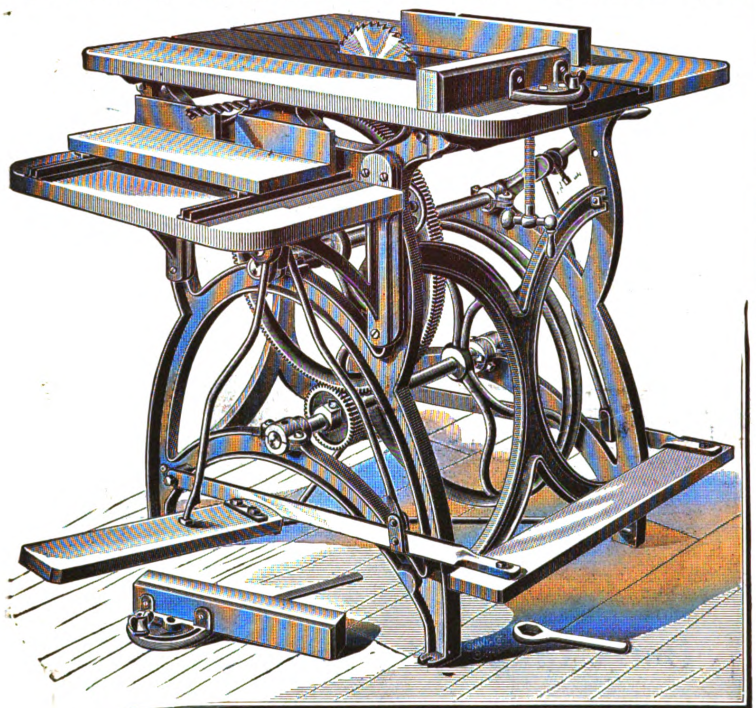
Marston's Hand and Foot Power Circular Saw.



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.

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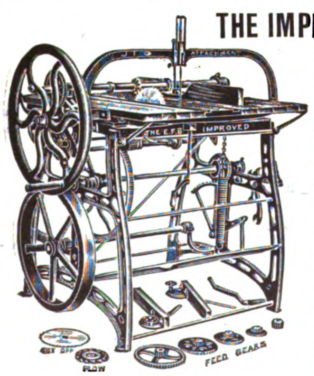

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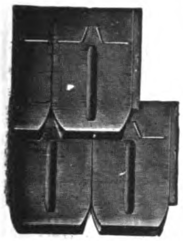

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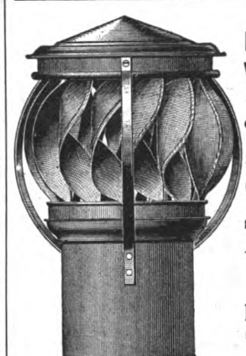

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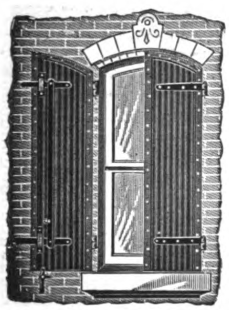

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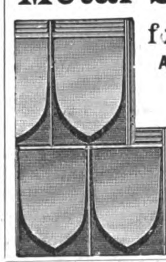

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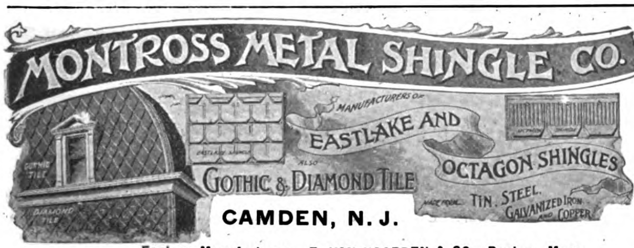

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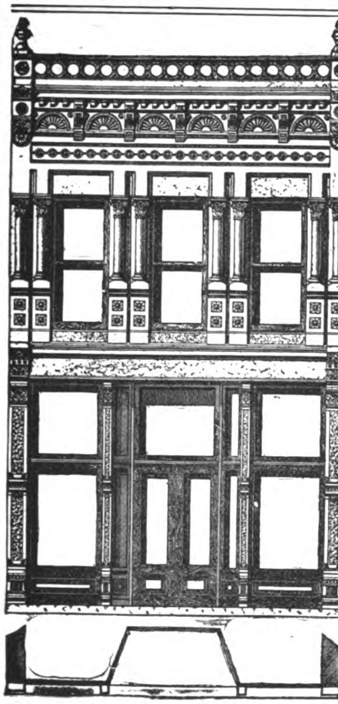

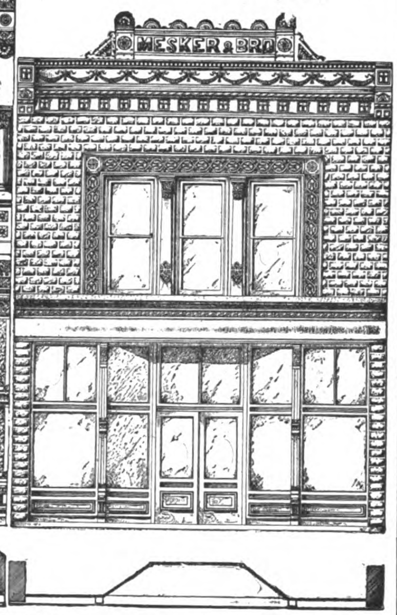

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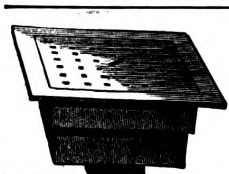

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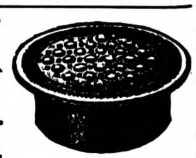

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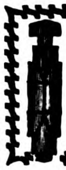

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