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AMERICAN CARPENTER AND BUILDER

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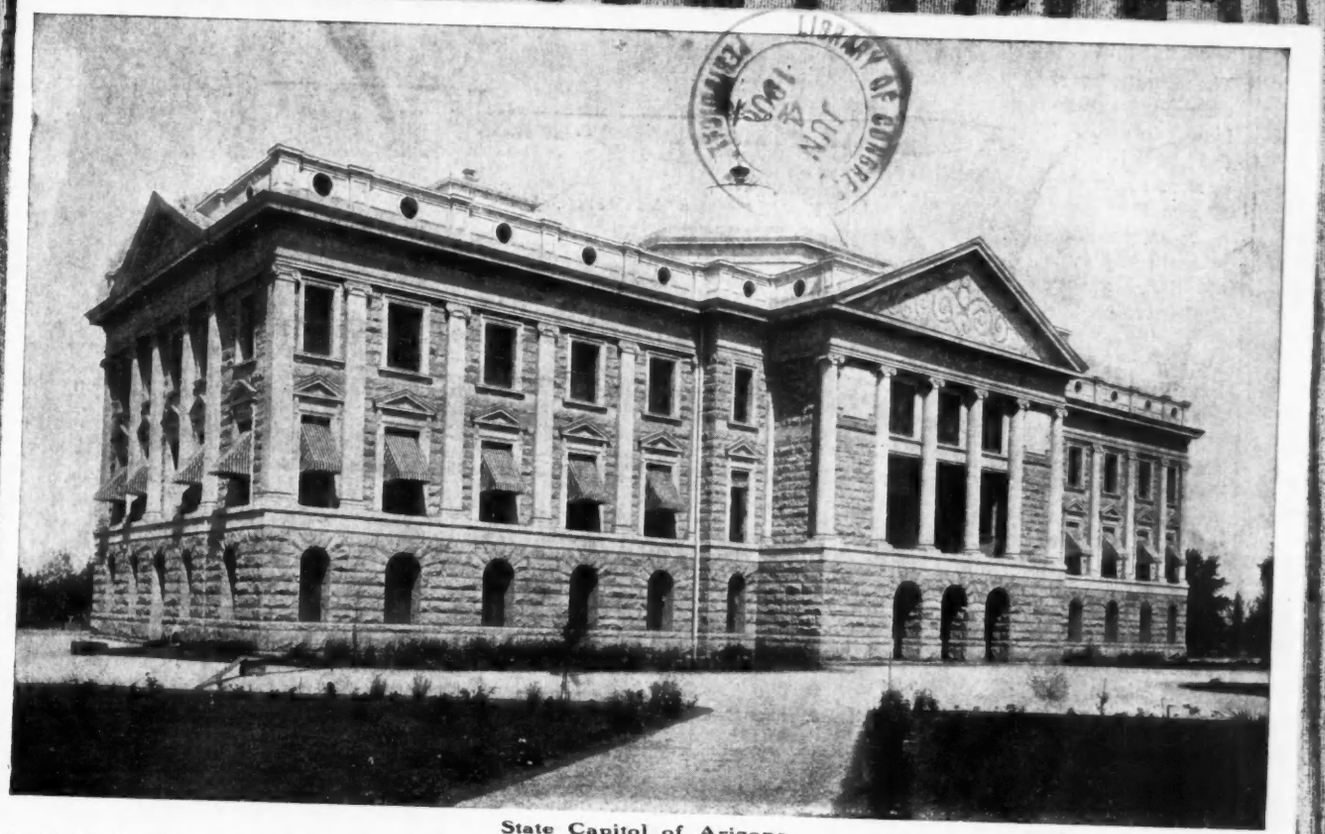
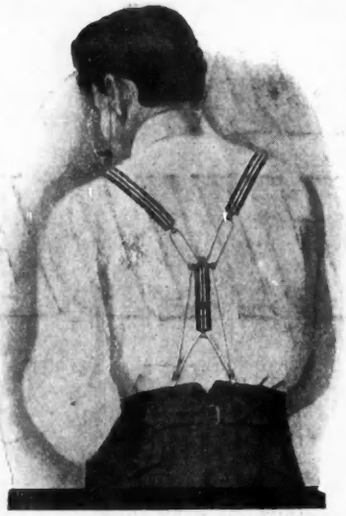


State Capitol of Arizona

President Suspenders



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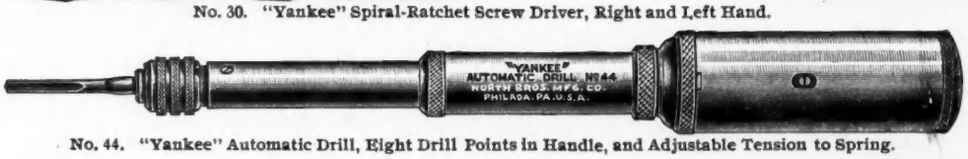

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American Carpenter and Builder

Entered as second-class matter July 1, 1905, at the postoffice at Chicago, Ill. under the Act of Congress of March 3, 1879.

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GENIUS without getup is like a plow without a horse—it doesn't turn up much ground.

✣

Labor Situation in San Francisco

THE architects and draftsmen of California are sending out the complaint that architects and draftsmen from all over the country are flocking to California, when there are plenty of them in the state to take care of all the work at hand. While the circumstances causing this sudden inflow of architects are unusual, still it would be wise for all those contemplating going there to first have definite assurance that there will be work to do. Too many workmen of all kinds are rushing in a haphazard way to the scene of the recent disaster with the hopes that there will be plenty to do. While this may be the case for a short time, things will soon resume their normal proportions, and those who rushed out there, cutting all bridges behind them, will become so much surplus population and prove a hindrance rather than a benefit. There may be a selfish motive prompting the complaint, but it nevertheless would be wise for those expecting to locate there to first thoroughly investigate the situation.

✣

Establishing Confidence

WITHIN the last six or eight months a very great contrast has been observed in the tone of trade journals relating to hollow concrete block construction. It is very noticeable that the most prominent ones with a reputation to sustain have vigorously attacked the numerous cheap-john machines, the dishonest manufacturer, and some of the prevalent fakirs. That this is a step in the right direction no one can deny and the only regret is that it was not started long before, however, no very great harm has resulted, especially to those most closely connected to the industry, yet it will require years to eradicate that distrust in the minds of many which false theories and chaotic discussions have placed there. The psychological moment is indeed at hand for such a movement, and much credit is due each and every one whose foresight has prompted them to sound the note of warning with an honest view of placing the infant industry properly before the people and if possible separate the bad from the genuine which time and experience has demonstrated and proven does actually exist.

It is a sign of breaking day when editors will come to the rescue by advocating that those with some natural qualifications or those who have learned their trades only should be employed, or in other words as

one stated, "Don't employ an experimenter and don't begrudge your builder a fair price. If you are a failure in your present business don't imagine that success awaits you in this. It may look easy but it isn't; so does playing a fiddle or riding a bicycle. If you want to get into the business go to work with some successful man and learn before you offer your services."

H. S. PALMER.

♣

The New San Francisco

AMID the horror of the catastrophe, one could not but admire the lofty courage of the afflicted people, who, before the last of the fires had smoldered out, were making plans for the building of a new and more beautiful San Francisco. Architects, engineers and builders from all parts of the country have gone to California in response to the call of the people for assistance in replacing the ruins with modern buildings, designed to resist earthquakes and fire. Nowhere is the effect of the disaster more marked than in the building world.

From a study of the structures still standing, valuable lessons will be learned, and in the rebuilding many improvements in construction will be made, in an effort to avert future disasters from earthquakes.

The effect of the terrestrial disturbances on the various classes of buildings, and the spread of the conflagration are the important points to be carefully investigated. From the reports we have it appears that the buildings of steel skeleton construction have made the best resistance. This, however, is not surprising when we consider the great elasticity of steel structures, their deeply rooted foundations and the fact that the principal component parts are so securely riveted and bolted together. With this class of buildings the weak point seems to have been the brick curtain walls and the terra cotta floor arches, which in some cases were shaken out.

In the case of the brick buildings, where the rupture or fall of a wall would almost inevitably precipitate an entire collapse, considerable damage would naturally be expected.

The greatest destruction, however, was done to, and caused by, the frame buildings, which not only offered a poor resistance to the shocks, but were the fuel that caused the rapid spread of the conflagration which destroyed many of the more substantially constructed buildings that withstood the earthquake.

From these conditions it would seem that the new structures of the larger kind, should be of the steel skeleton type, fireproof throughout, and with enclosure walls and floors of a material less likely to be shaken out. In this last connection, reinforced concrete immediately suggests itself as most desirable. The openings between the vertical and horizontal members of the steel framework could be covered with a network of the iron reinforcing bars which, when imbedded in the concrete, would prevent the shaking out of the walls and floors, even though the concrete was badly ruptured by the convulsions.

For the smaller buildings that have heretofore been built of wood there is needed a material that is at once substantially indestructible by fire and sufficiently inexpensive. Again, reinforced concrete suggests itself as being almost indestructible by fire, but the question of cost still remains. On the Pacific Coast lumber is cheaper than in any other part of the country, while iron and cement are expensive. If the cost of these materials can be reduced by suspending the tariff on building materials, particularly on steel from Great Britain and Germany, we predict that reinforced concrete will be employed to a great extent in the reconstruction of the city.

If the frame buildings cannot be replaced with fireproof buildings at a feasible cost then such frame buildings as will be erected should be carefully restricted, so as to prevent a repetition of the conflagration which followed the earthquake.

J. A. F. CARDIFF.

♣

IT LOOKS as if the carpenter will have to add a glue room to his shop and a glue pot to his tool kit, so general and widespread is becoming the use of veneer.

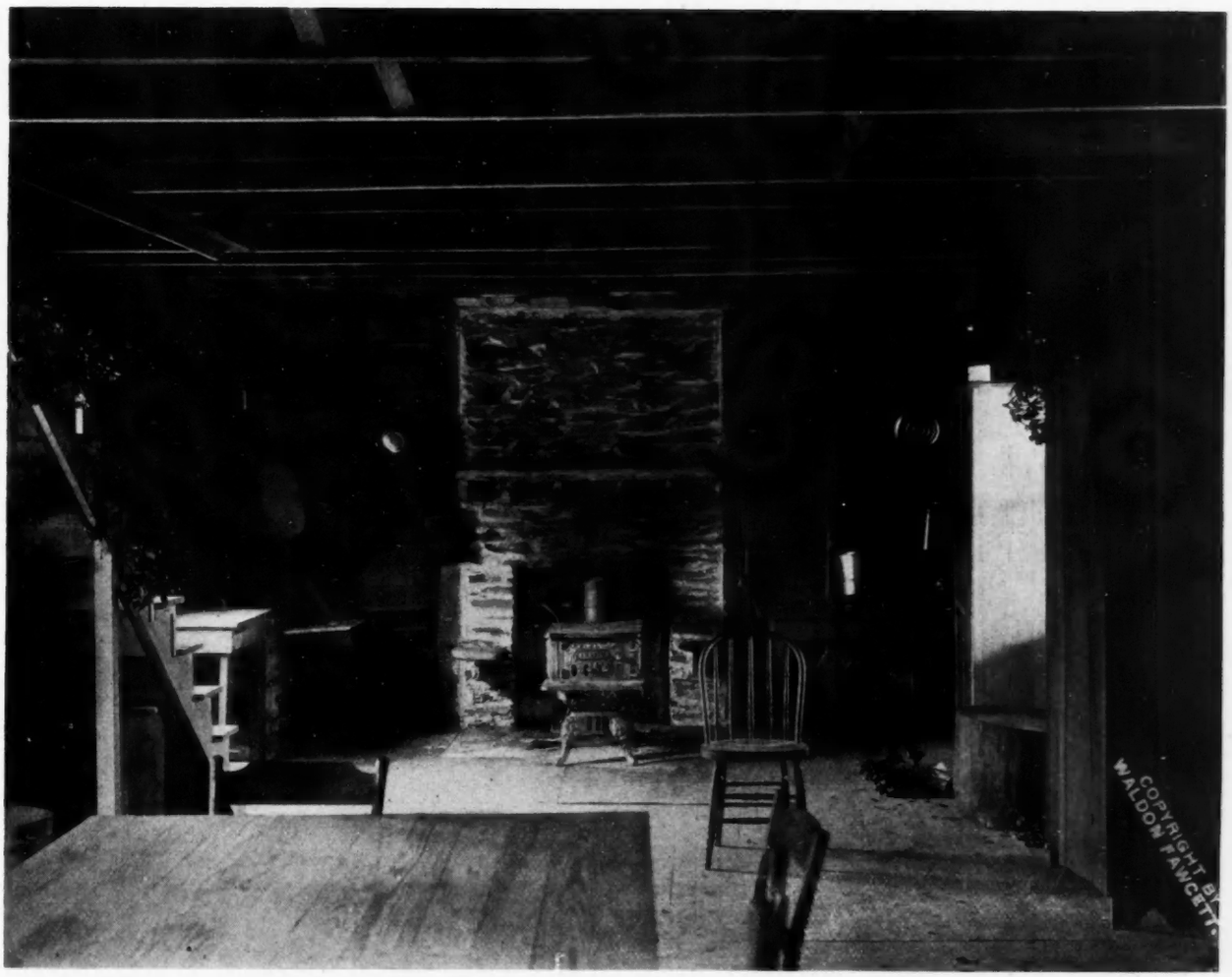
President Roosevelt's Vacation Retreat

BY WALDON FAWCETT

PRESIDENT ROOSEVELT's new vacation retreat in the mountains of Virginia is a refuge which could scarcely be expected to appeal to a man unless his love of nature were deep and genuine. Pine Knob is located in an isolated section of the Old Dominion, not readily accessible from either steam railroad or trolley line and all such luxuries as telephones and electric lights are utterly unknown. Moreover, the quaint cottage, closely hemmed in on all sides by the forest, is probably quite the most unpretentious habitation ever owned by a President of the United States.

The little wilderness estate where President Roosevelt and his family lead the simple life in real earnest is located in the broken and picturesque Piedmont region of central Virginia in the same environment which little more than a century ago encompassed the homes of Presidents Thomas Jefferson, Madison and Monroe. The idea of securing this retreat on "the highlands of Albemarle" where the family might enjoy short vacations from time to time originated with Mrs. Roosevelt, but now that he has had a taste of the delights of unconventional life in the mountains the President is quite as enthusiastic as is his wife over his lodge in Dixie.

The Roosevelt estate comprises fifteen acres of land and was purchased about a year ago from William N. Wilmer, a New York banker and old personal friend of the Roosevelts, who has a large plantation adjoining. The lodge, a modest little two-story dwelling, set deep in the heart of the woods, was altered and improved to some extent in conformity with the wishes of Mrs. Roosevelt, but as is apparent from the accompanying illustration it remains a decidedly modest shelter. In color the house is ochre with brown trimmings and green blinds. A porch, supported by the trunks of young trees with the bark on, extends across the front of the house and the cottage is well shaded by overhanging trees on all sides.



Mrs. Roosevelt's Kitchen

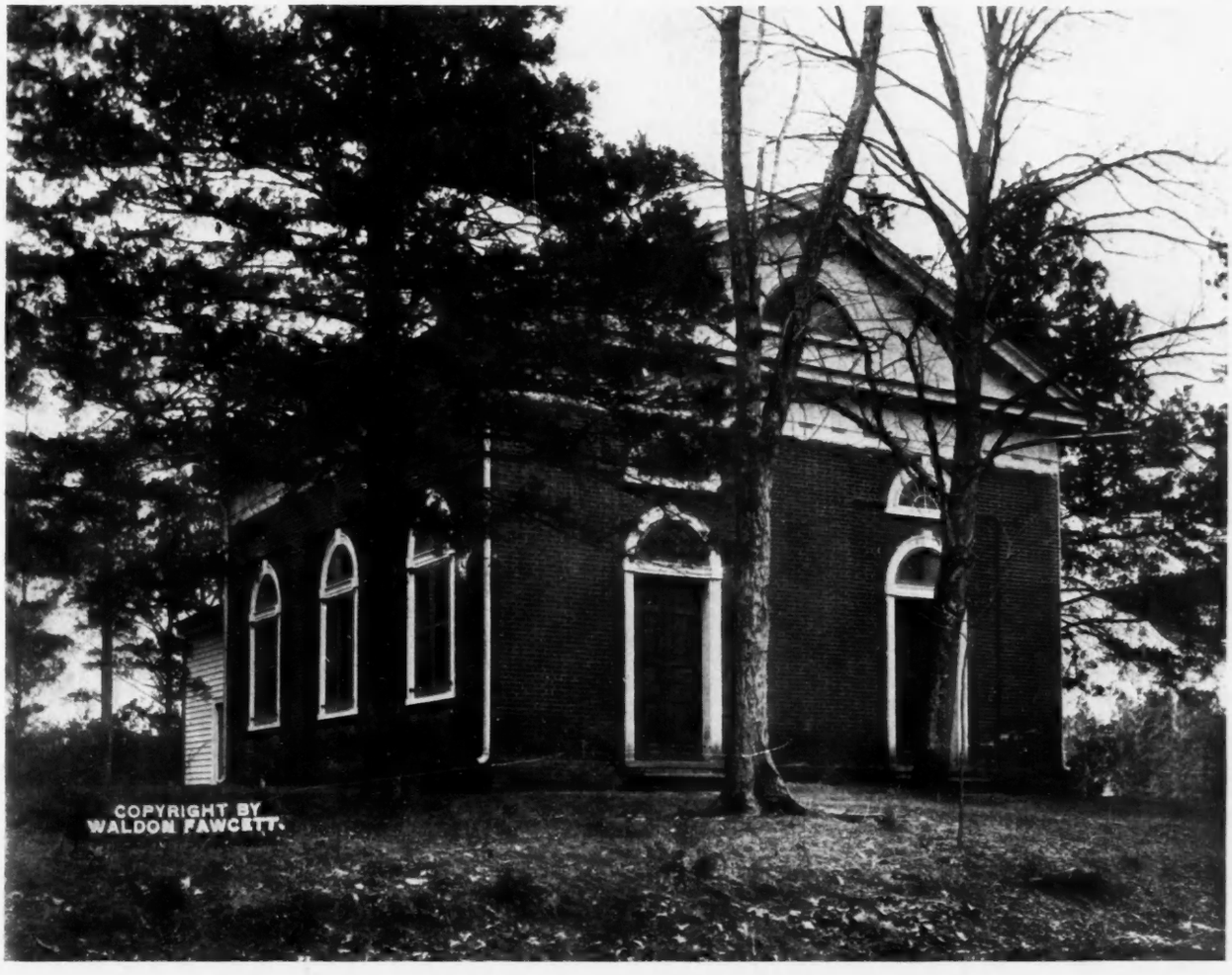
The interior of the little frame structure which the mountaineers have dubbed "Roosevelt's Rest," is quite in keeping with the simplicity of the exterior. There

Front View of Cottage

are less than half a dozen rooms all told and the furniture is primitive enough in character to suggest to the President his ranching days in the Northwest. A massive, old-fashioned outside chimney leans against either end of the house and the house boasts a couple of quaint, old-time open fireplaces of goodly proportions in which log fires blaze when the Roosevelts are at Pine Knob.

The Roosevelt Servants at Pine Knob

In particularly marked contrast to the conveniences of the average city house is the equipment of "Mrs. Roosevelt's kitchen" at Pine Knob, aptly so named because the First Lady of the Land on most of her visits to the retreat has taken a hand in preparing the meals. On one occasion two cooks from the White House accompanied the presidential party, but at other times the preparation of the meals for the Chief Executive and his sons, when long tramps over the hills have whetted their appetites, has been in the hands of Mrs. Roosevelt, assisted by "Aunt" Lina Coleman, a colored "mammy" eighty-six years of age, who knows how to prepare all the proverbial Southern delicacies and who incidentally "waits on table" for the Pine Knob household.



Christ Church Near Pine Knob

There is only one room under the roof at Pine Knob in which to tuck away servants and so most of the colored help about the place have quarters outside or over at Wilmers. The nearest approach to a servants' hall is the cabin of "Uncle" Dick, a strapping big fellow who acts as the President's guide and body servant and who incidentally has charge of the hunting dogs and the horse Virginia Chief which the President rides when at Pine Knob. It is Dick who opens the house and gets the fires going when word comes from Washington that a party from the White House is en route for a sojourn at the lodge under the shadow of Green Mountain.

President Roosevelt and his family have lost none of their loyalty to their summer home at Oyster Bay, Long Island, and will continue to spend the heated term of each year there, but Pine Knob is likely to be the scene of most of their other and briefer vacations. The family went to the Virginia mountain retreat for their Thanksgiving vacation and also for the Christmas holidays and had all plans made to spend Easter there this year but an unexpected engagement kept the President in Washington on the last mentioned occasion.

As may be imagined from what has been said of its location, Pine Knob is not reached with sufficient ease to cause the President to fear an invasion of his solitude. Passengers for Pine Knob leave the Southern railway trains at North Garden, which is situated eleven miles from the city of Charlottesville, Virginia, the seat of the University of Virginia. A drive of twelve miles brings them to the mountain cottage. Sometimes the Roosevelts make the trip to or from Pine Knob in two-seated drags and wagons, but more often there is utilized for the journey a stage coach drawn by four powerful bays.

The President goes to Pine Knob to enjoy long

(*Continued on page* 314.)

STEEL SQUARE

Alfred W. Woods

How to Use the Steel Square

SHOWING THE RELATION OF THE HIP RAFTER TO A COMMON RAFTER—HOW TO PLACE THE STEEL SQUARE TO OBTAIN THE CUTS AND BEVELS FOR THE ROOF TIMBERS

IT IS quite clear that a common rafter becomes a hip for a building of less span, as will be seen by referring to Fig. 64. Here the common rafter for a 12-inch run becomes a hip for an 8½-inch run. A hip for a 12-inch run becomes a common rafter for a

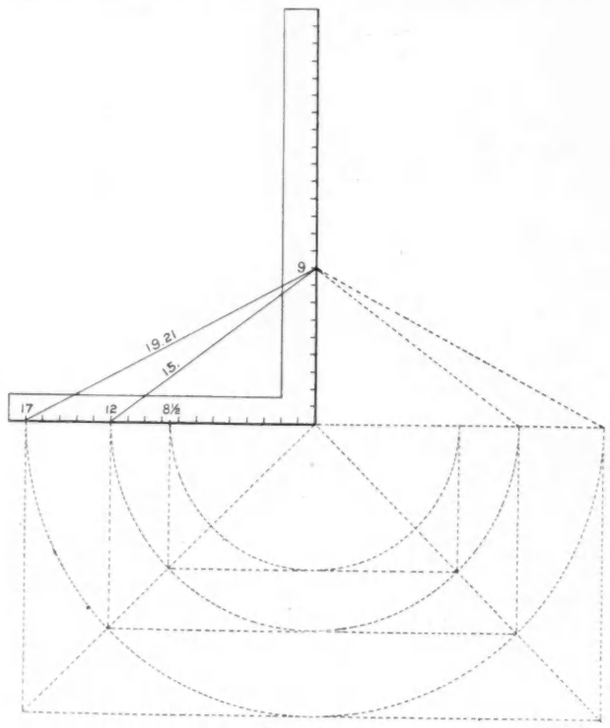


FIG. 64.

17-inch run. Therefore, the same rule must apply to both, that is, the tangent (commonly called run) and rise, taken to scale on the square will give the seat and plumb cuts. The tangent and the length of the rafter taken to scale on the steel square will give the side cut for the hip to rest against the ridge tree. Cut on length. The same applies for the common rafter which gives the side cut of the jack to rest against the hip or valley. Taking the full scale for the hip as compared with the common rafter, it is practically 17 on the tongue and the length of the hip for a one-foot run of the gable taken on the blade, and the latter will give the cut. If 12 is used on the tongue for a foot run of the hip, its rise would necessarily be less than for the same run of the common rafter as will be seen on Fig. 65. In this is shown the corresponding difference for the ⅜ pitch. The diagonal line from 12 to 12 represents the length of the run of the hip, and this taken on a continued line of the run of the common rafter, as at "A," and erect the rise equal to that of the common rafter, as at "B," and it will be seen a line from this to 12 on the tongue passes at 6 6-17 inches on the blade; because the common rafter having a rise of 9 inches to one foot, for one inch, it would only have 9-12 of an inch, while the hip would only have 9-17 of an inch to one inch. Then for 12 inches it would be 12 times 9-17, equals 108-17, or 6 6-17 inches. There-

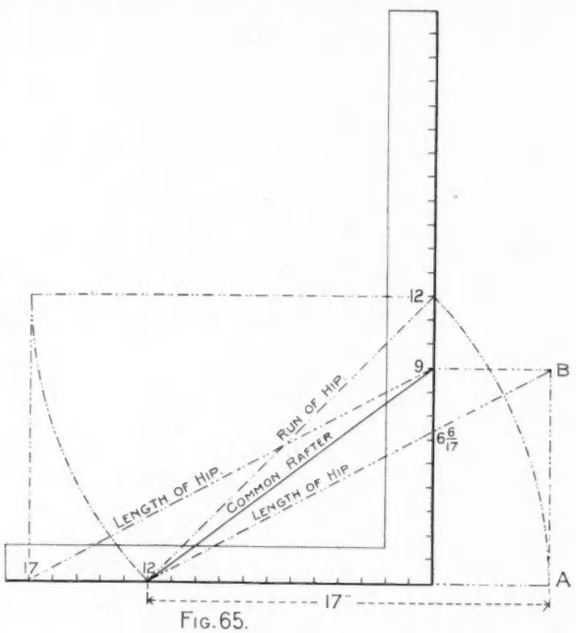


FIG. 65.

fore, 12 on the tongue and 6 6-17 on the blade will give the same result as 17 on the tongue and 9 on the blade, but as the former method necessitates a calculation that ends in fractions—fractions not given on the

square—it is better to use the latter method because it obviates the fractions. In this illustration is also shown why 17 is used on the tongue, which is simply

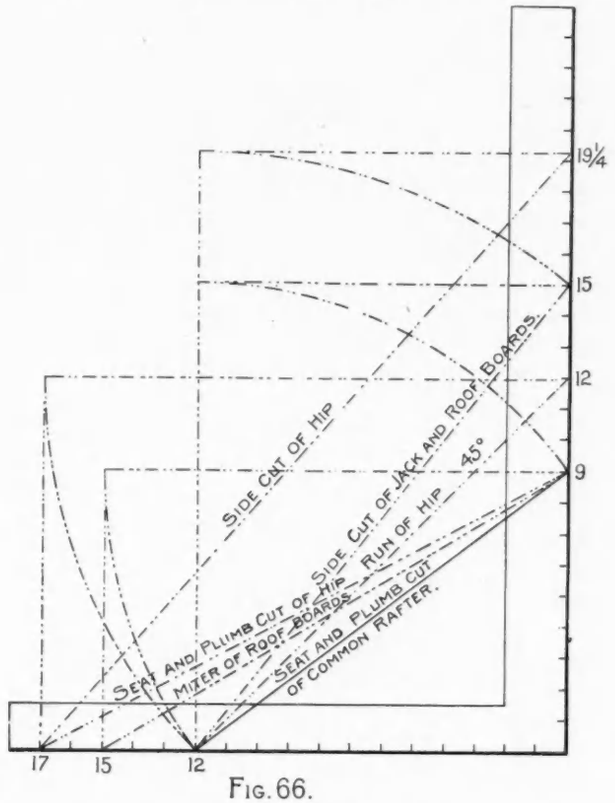


FIG. 66.

taking the length of the run of the hip on that member, as shown by the course of the dotted lines. A line from this point (17) to the rise of the common rafter, represents the length of the hip or valley for a one-foot run to correspond with that for the common rafter and is parallel with the line from 12 to "B," as in the former method. Thus 17 is a standard number on the tongue for the hip or valley, just the same as 12 is used for the

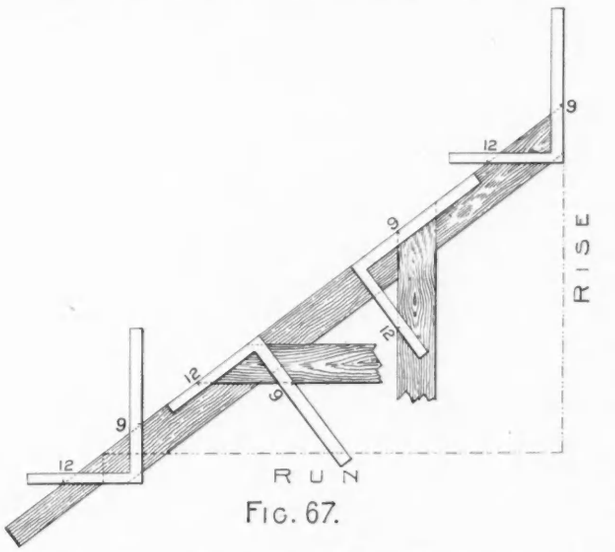


FIG. 67.

common rafter, the rise remaining the same avoids computations and greatly simplifies the work. While 17 is used on the tongue to obtain the cuts, the actual measurement is a little less than 1-32 of an inch of being 17 inches. This, however, is too small to consider, but the lengths of the rafters for accuracy should be reckoned from 16.97 inches as described in the February article, and right here, while we are at this point, we wish to correct a slight error that occurred in that article. In describing the length of the hip as commonly reckoned the over-run diminishes from .03 of an inch for the one inch rise to .017 for the 24th inch rise to the foot. The lengths as given with the said article are correct up to the 13th inch rise, but from that point on there is a shortage instead of a gain. The shortage at the 24th inch rise being practically the same as the overrun in the first inch rise. This, however, is small, and while it would probably never be detected in actual practice, the fact remains that it is not, strictly speaking, correct. We do not mean to be considered critical on this point, but speaking of correctness none of the lengths for the hip according to trigonometry are what could be called absolutely correct.

Rafter Cuts

In the foregoing, we have tried to lead up more to the cause and effect and have in a general way touched on the different cuts about the roof, showing at the same time why they give correct results.

We will now take up the subject showing the various cuts in one diagram as shown in Fig. 66. Here

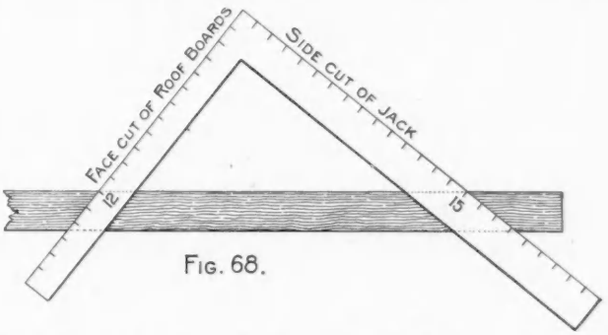


FIG. 68.

are shown the measurements on the steel square and afterwards illustrating each cut separately.

For example we will take the ⅜ pitch. Take 9 on the blade. Why? Because, the run being 12 inches, the span must be two times 12, which equals 24, and since the pitch is reckoned by the span, we find that ⅜ of 24 is 9, and therefore represents the rise to the foot run. Then 12 and 9 gives the seat and plumb cut of the common rafter. They also give the cuts for the gable boards resting either horizontally or perpendicular as shown in Fig. 67. Take the length of the common rafter (15) on the blade and the tangent (12) on the tongue, and the blade will give the side cut of the jack as shown in Fig. 68. These figures will also give the side cut across the face of the roof boards to fit in the valley or over the hip. The tongue giving the cut. These figures will also give the side cut of the hip if the same has been previously backed and the square applied to the backing plane. The blade giving the cut. They also give the cut across the top of the

purlin when it is set to the plane of the common rafter. The tongue giving the cut. Thus, all of the above cuts are obtained from the one set of figures, on the steel square. There are also other cuts about the cornice

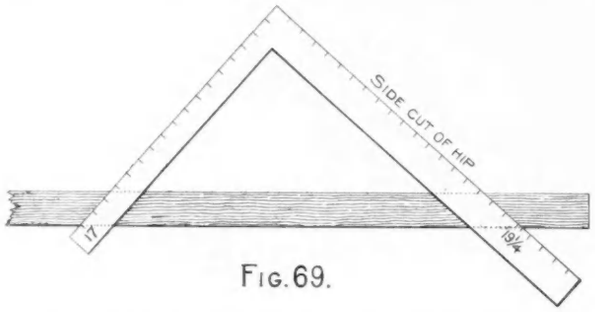


FIG. 69.

work to which these figures apply, such as the face cut across the plancier of a gable finish to member with that of a raking cornice, because they rest in the same position with the hip as that of the jack and the roof boards.

The length of the diagonal line from 12 to 15 is also

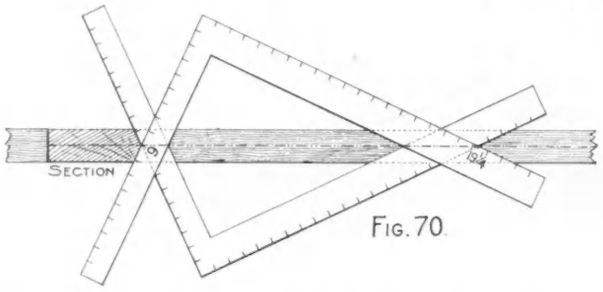


FIG. 70.

the length of the corresponding hip and this length taken on the blade, as at 19¼ and the length of the run of the hip taken on the tongue as at 17 gives the side cut of the unbacked hip. The blade giving the cut as shown in Fig. 69. 9 on the tongue and 19¼ on the blade will give the bevel for the backing of the hip as shown in Fig. 70. Take the length of the common rafter (15) on the tongue and the rise (9) on the blade,

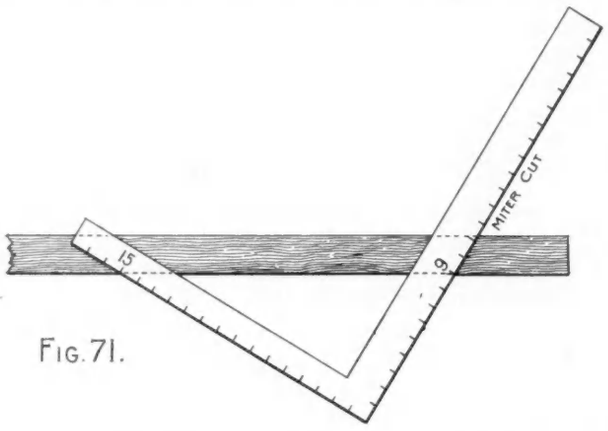


FIG. 71.

the latter will give the miter or edge cut of the roof boards to fit in the valley, or over the hip. The blade giving the cut as shown in Fig. 65. From this it will be seen that from the right angle triangle formed by the run, rise and pitch of the common rafter, all of the cuts and bevels can be had. However, there are many ways of illustrating these various cuts and bevels and we will in future numbers of this magazine give other illustrations showing how they may be reckoned on the steel square. The ambitious mechanic of to-day is not satisfied with the one way of doing things and for that reason it is our intention to show various ways of illustrating the same point, making the subject so clear that all who really care to master the principles involved in roof framing will understand and be able to use them in their work.

Hints on Oak Graining

When doing a job of oak graining on new wood, give the surface three good coats of color. The first coat is to be thinned with equal parts of raw linseed oil and turpentine and a little coach painter's japan. The japan should be stirred in before the lead is thinned and care must be taken not to make the lead too thin and watery. After the priming is dry, sandpaper and dust off, and then putty up well the nail holes, joints and uneven places. Whiting thinned with drying oil is used to make the putty. The drying oil is made by taking 10 gallons of raw linseed oil and putting it in an iron kettle. One pound of litharge should be tied up in a muslin sack and suspended in the kettle just so it will not touch the bottom. The oil is then boiled slowly for an hour and a half. It is a good plan to have a sheet iron cover for the kettle to prevent it from boiling over.

The first coat may be all lead or four parts lead and one part ocher. The second and third coats should be white lead tinted with a little chrome yellow and a few drops of red. In these last two coats of groundwork a little gold size japan and a little quick rubbing varnish should be stirred in while the paint is in the paste form. It should then be thinned down with turpentine, strained and applied with a white bristle, oval varnish brush.

After the last coat of groundwork is dry, sandpaper off and give a good dusting, when the surface is ready for the oak graining.

There is now in the market, both light and dark oak, ground very fine in oil. By adding a little coach painter's japan, a little raw oil and a good deal of turpentine, you are ready to rub on a thin coat on one panel. To do this you need a one-inch, a two-inch and a three-inch double thick white bristle varnish brush. Now, with some soft rags, a piece of rubber or potato, and a set of steel graining combs, wipe out and blend, imitating as near as you can some piece of natural oak wood. When the work is dry, overgrain with the same graining color, by combing with your rubber, and wiping with your rag in the opposite way and shading your knots. Some very pretty effects can be produced in this way. After the job is dry, give a good coat of finishing gear varnish. —*The Painters' Magazine.*

Short Talks With Our Subscribers.

YOU have probably noticed the panel on page 292 of this issue. We put the thought which we wished to express in that form and location so that it would attract your attention, and so that you would be impressed with the importance of our advertising pages.

Sometimes readers are inclined to complain that a magazine contains too much advertising. There are some important points about advertising pages which should not be overlooked—points which are decidedly to the advantage of the subscriber. It is generally believed that the advertising pages are simply a source of revenue to the publisher, and of no value to the reader or subscriber. This is a most mistaken idea, as there are several ways in which these pages are of immeasurable benefit to the reader.

Perhaps the most important of these is the bearing they have on the quality and quantity of the reading matter. While the AMERICAN CARPENTER AND BUILDER costs $2.00 a year, as compared with a few other publications at $1.00 a year, this small increase in price would not begin to pay for the greater expense of the many additional pages of reading matter, the extra fine quality of paper used, or the unusual number of very fine illustrations. Then, too, the cost of the articles in the AMERICAN CARPENTER AND BUILDER is much more than would be possible if the only revenue was the subscription price. The editors stop at nothing when it is possible to obtain particularly valuable and interesting matter for its readers. Thanks to the revenue from its advertising pages they do not have to stop and count the cost when some new and expensive feature is under consideration. The only question is, "Will it be helpful to our readers?" If it is decided that it will be, then it is secured.

As an example of what we have been able to arrange for through this means we might mention a particularly important feature which will be of unusual interest to our readers, and which has never appeared in a magazine of this character.

Two young men of unusual pluck, energy and ability are to make a tour of the world on bicycles. They will visit practically every country on the globe, and will be away at least two years—perhaps five years. They are to make a particular study of the architecture of each country visited, and will write interesting descriptions of how it differs from the architecture of this country, and why; they will tell of the conditions surrounding the trade, the tools which are used, and anything else which will be of value to our readers. These articles will be illustrated with actual photographs from abroad, taken by these men themselves while they are on the ground. This is a feature which will appear in no other magazine published in the interest of the carpenter and builder, the expense of which it would be impossible to bear if it were not for the revenue from the advertising pages.

But this is digressing a little from the subject—the value of the advertising pages.

A magazine carrying the advertisements of 228 individuals and firms, as the AMERICAN CARPENTER AND BUILDER does, is a veritable market place of the world for the requirements of the carpenter and builder. No matter what the carpenter or builder may need, he has but to turn to the pages of his magazine and he will find there described what he wants. He knows that the goods advertised in these pages are reliable or they would not be described there. By dealing with these concerns he not only gets fair and honest treatment, but he is at the same time indirectly helping himself. Advertisers are advertising to sell their goods. If they do not sell their goods through advertising in our magazine they will not continue to advertise. If they stop advertising, then the quality of the magazine must suffer, and it would eventually be no better than the others. We would not long be able to give you for $2.00 a year a magazine which is really much better than most of the architectural journals which command a price of $5.00 a year.

Fortunately for the readers of the AMERICAN CARPENTER AND BUILDER the advertisers are so well satisfied with the results they secure that every month one or more—sometimes a large number—will increase space. Every advertiser is looking for letters of inquiry, requests for catalogues, and sales of their goods. They are getting them. They have learned that our readers are interested, that they are students, that they are trying to learn all that they can and are keeping abreast of the times. When a new catalogue is advertised they send for one, and if the goods are what they want they are not slow to buy.

As one family of readers, subscribers, editors and publishers let us co-operate. Co-operate with the advertiser, with each other and with ourselves by answering advertisements, and by buying of the advertisers. But never forget to mention, in your correspondence with the advertisers, the AMERICAN CARPENTER AND BUILDER.

J.A.F. Cardiff.

Building a Home

A SERIES OF ILLUSTRATED ARTICLES COVERING CONSTRUCTION DETAILS IN THE ERECTION OF OUR AMERICAN HOMES—FROM THE LAYING OF THE FOUNDATION TO THE DELIVERY OF THE HOUSE TO THE PAINTER

THE use of inside blinds on double hung windows in masonry walls is considered in this number.

Plate XXIX is a double hung window frame in a thirteen-inch brick wall. A stone lintel is provided on the outside over the opening; in depth it should equal the height of four or five courses of brick; its thickness should be not less than the brick reveal, and it should have a bearing of about four inches on each brick jamb so as to take up with the brick joints. The opening is spanned on the inside with a timber lintel or center made up of three pieces of two-inch stuff, cut to the required curve, with cross strips across top called lags. On top of the wood center or lintel a row lock arch is turned. Row lock arches are usually made with one row lock for each eighteen inches or fraction thereof in the width of masonry opening. The rise is usually made one inch for every eighteen inches of width of opening.

The sill of the masonry opening is of stone, the thickness of two courses of brick, of a depth that will overhang the wall on the outside about one and one-half or two inches, and will extend under the wooden sill not less than two inches. The sill is cut with a wash and lugs and on the underside of projecting part has an undercut or water nose.

The wall is furred on the inside with two by four-inch stuff, placed sixteen inches on centers, so as to give the required extra width for blind boxes.

The calking of interstices at head sill and jambs of frame is shown of "scratch" mortar, but in the best grade of work is usually of oakum hand caulked, so as to make the construction absolutely wind proof.

Fig. 128 is a section showing the usual construction at the window head. The wide soffit may be paneled if desired. A moulded staff bead should always be used to cover the joint at the intersection of the frame with the masonry, on the outside. The lath, plaster and grounds are applied to the furring in the usual manner. The trim is mitred and tongued or doweled together at the head, a feature employed only where expense is not an all important consideration.

Fig. 129 is a section through the jamb and shows the construction of the blind box and the method of folding blinds. It will be observed that a special hinge is used on blinds, which prevents them from catching or sticking in the box. All the woodwork of box, which would be exposed to view when the blinds are closed, should be made of the same material as, and should conform to, the finish of the balance of the room. All the blind stiles should be rebated as shown.

The blinds are all shown with rolling slats, but frequently the blind fold, which is exposed to view when blinds are folded back in the pocket, is made paneled instead of with slats, so as to give the effect of a paneled window jamb.

The inside stop bead should be made at least one and three-fourth inches wide, or better two inches wide, so as to give plenty of space for shades between blinds and sashes.

The use of a strip dividing the weight box would be an improvement.

Fig. 130 is a section through the sill, which is finished on the inside with a moulded stool and panelback. Plastering should always be provided back of panelbacks, but the hard finish coat may be omitted.

A nailing strip for the furring is let into the brick work.

Fig. 131 is an elevation of the trim, which extends to floor; finishing on a base block or plinth, against which the base butts.

Plate XXX shows a similar window frame, but without a pocket or box for the blinds. The ordinary hinges are used in this case.

Fig. 132 is a section through the head. The plastering is applied directly to the sixteen-inch brick wall, after it has first been coated on the inside with damp-resisting paint.

Fig. 133 is a section through the jamb. The trim is made with a separate wall mould or back band.

Fig. 134 is a section through the sill. A moulded drip is let into the lower rail of sash, to prevent water from entering under same.

Fig. 135 is an elevation showing the interior trim which finishes on a moulded stool and apron; both having returned ends.

✣

Longest Bridge in the World.

The longest bridge in the world is the Lion bridge, near Saugong, China. It extends five and a quarter miles over an arm of the Yellow sea, and it is supported by 300 huge stone arches. The roadway is seven feet above the water, and is inclosed in an iron network.

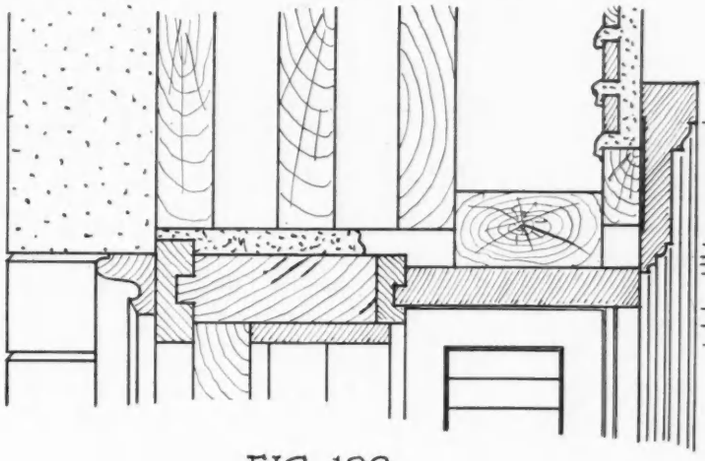


FIG. 128.

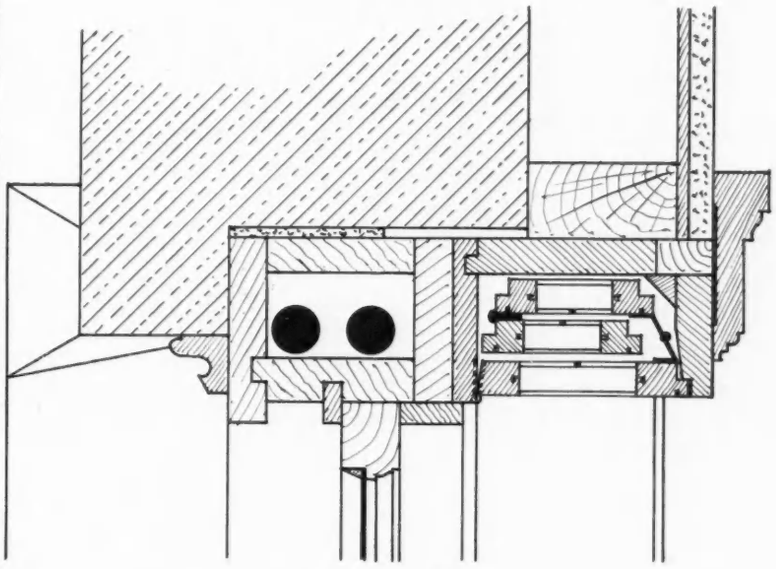


FIG. 129.

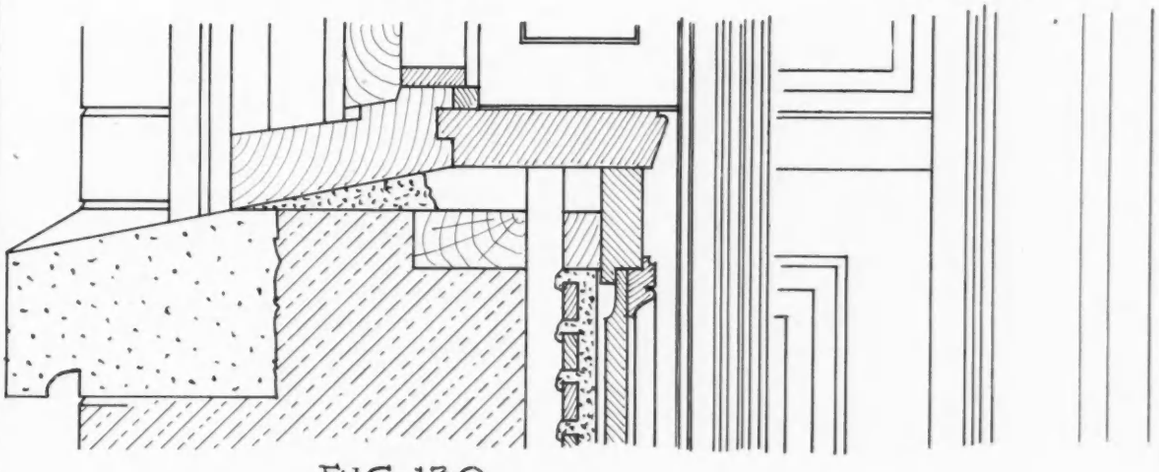


FIG. 130.

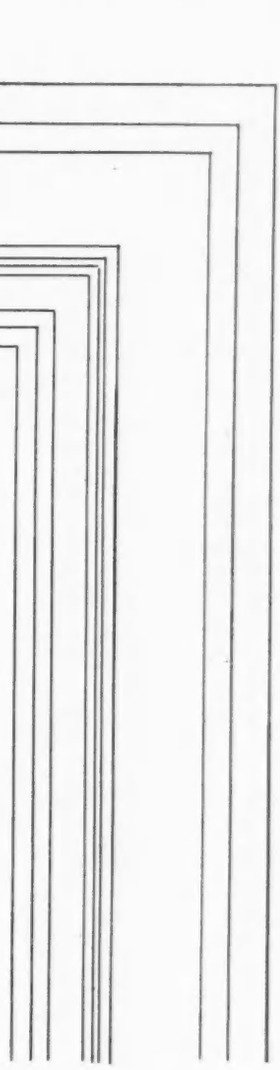


FIG. 131.

PLATE XXIX.

WINDOWS.

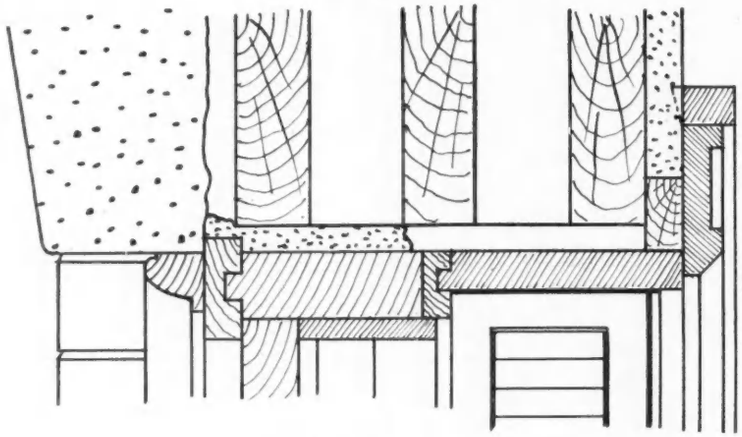


FIG. 132.

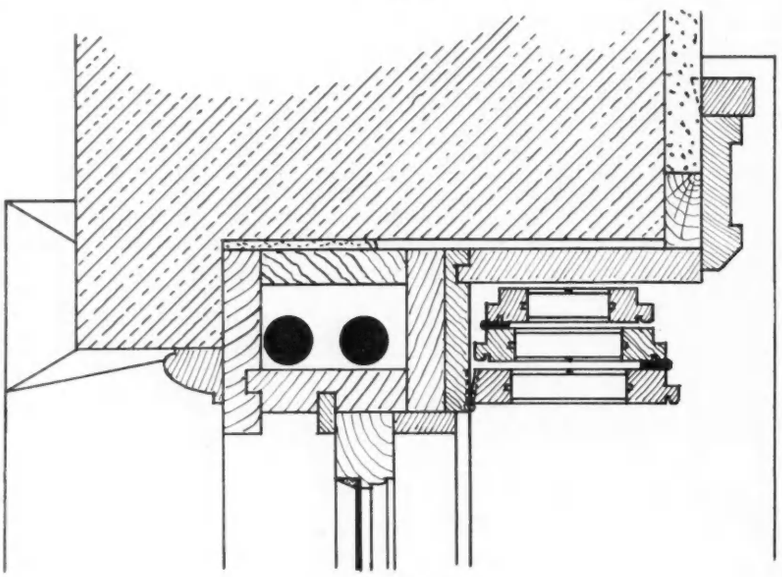


FIG. 133.

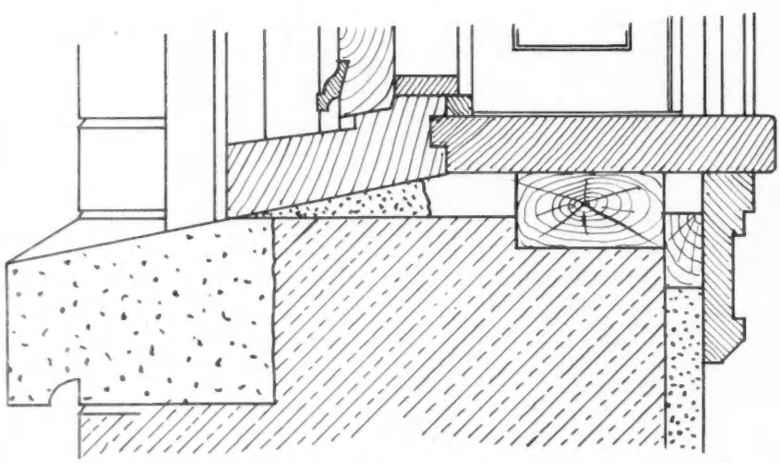


FIG. 134.

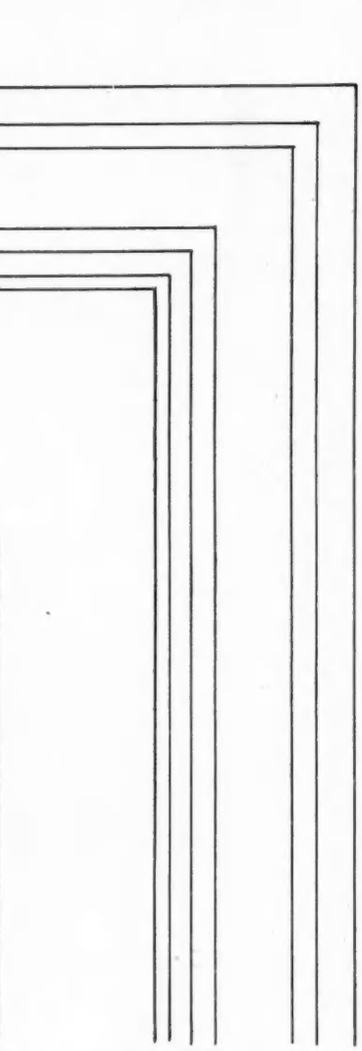


FIG. 135.

PLATE XXX.

WINDOWS.

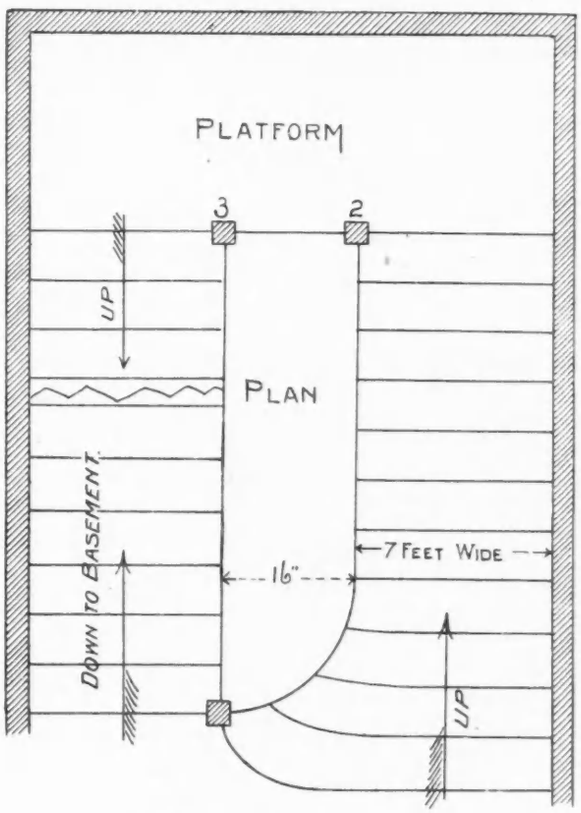
Geometrical Handrailing

A PLATFORM STAIRWAY CONTAINING A LARGE QUADRANT AT THE BOTTOM OF ONE FLIGHT, CONNECTING TO A NEWEL ADJOINING ANOTHER FLIGHT, ETC.

By Morris Williams

THE illustrations accompanying this article represent a stairway that was put up in a public building in Scranton, Pa., last winter.

Those carpenters who are pleased to be considered as first-class mechanics and really are so if viewed from the standpoint of general finishing work, owing to stairwork usually being made by professional stairbuilders, find themselves facing a problem beyond their



MAIN FLOOR.

capacity when it happens that they have to lay out the details of a stairway containing, as this one does, more than one flight, and especially if in addition it happens that the least curve in the string and rail is encountered.

For the benefit of such mechanics mainly (who to my knowledge are very numerous throughout the country) this article has been prepared.

The apparent difficulties in such construction as the one under consideration will be the laying out of the newels, rails, etc.

Most carpenters are up to the requirements of laying out the stringers and steps, but when it comes to laying out the easements, goosenecks, newels and wreaths, they find themselves "*stuck*."

Fig. 1 represents the plane where it is shown that from the first floor the main flight extends to a platform midway between the two floors; then, another flight from the platform to the second floor.

In the starting of the main flight is shown 4 "swell steps" and a quadrant curve of 16 inches radius; the curve connecting to a newel from where another flight is shown leading down to the basement floor.

In Fig. 2 is shown the elevation of few steps adjoining the platform, and also the two newels marked in Fig. 1 as *2* and *3*.

We commence to draw this figure by drawing a line to represent the platform floor as shown from *a* to *b*; the distance between *a* and *b* to equal the exact measurement from the center of one newel to the center of the other.

At *a* the first riser of the upper flight is drawn above the platform; and few other steps as shown; so as to obtain the pitch of the flight; and above this line is drawn the rail with its under side resting on the nosing line, and the easement formed to intersect the newel at right angles as shown.

From *b* a riser is placed below the platform floor and few steps in addition to represent the pitch of the bottom flight.

On the nosing line is placed the rail as shown; its under side resting on the nosing line.

It will be observed that where the easement on the upper rail intersects newel *3* it determines the height of the short piece of straight rail between the two newels and also of the upper end of the gooseneck for the bottom flight.

To draw the gooseneck, continue the line from *x* to *o*; and from *x* also, drop the line *x x* to the nosing

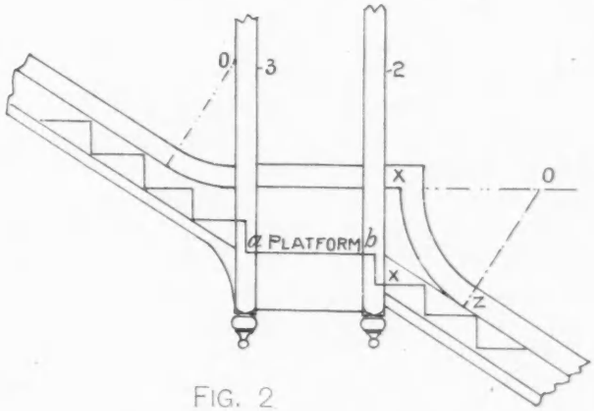


FIG. 2

line; make *x z* equal *x x* and draw a line square to the pitch from *z* to *o*. The point *o* will be the center to describe the curve for both the under and upper side.

It is now an easy matter to find the length of balusters and newels.

Assuming the short baluster to be 2 feet 2 inches long from the nosing to the bottom of the rail; the

baluster on the platform in that case will be 2 feet 2 inches and whatever distance is found from the platform floor to the platform rail; which in this case measures 14 inches, the height of two risers.

The length of the platform baluster, therefore, will be 40 inches or 3 feet 4 inches, which also will be the length of the newels from the platform to the bottom of the rail. By adding to this length the depth of the platform floor including joist, ceiling, etc., and also the

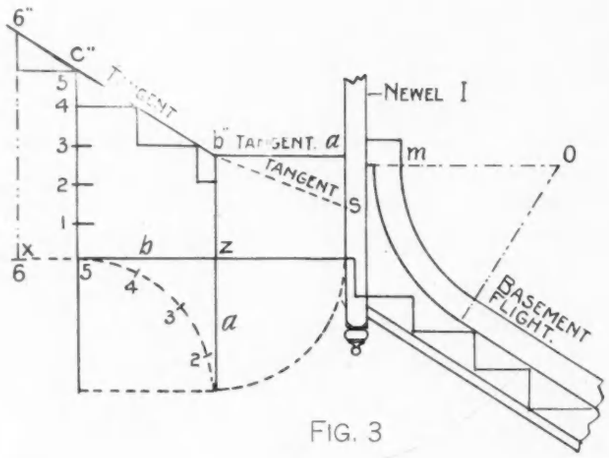


FIG. 3

thickness of the rail the full length of the newels is determined.

In Fig. 3 is shown how to treat the curve at the bottom of the main flight; and also to determine the height of the gooseneck at the top of the flight leading to the basement where, as shown in Fig. 1, it connects with newel *I*, to which also the curve at the bottom of the main flight is connected.

The difficulty to the uninitiated in the management of this portion of the stairway lies in the necessity of having both connections at the same height on the newel.

The method of procedure is to first determine the height of the curve portion of the main flight, then make the height of the gooseneck to correspond.

In Fig. 3 is shown how this is done. The center line of the plan, quadrant and tangents are reproduced from Fig. 1 and few steps drawn to obtain the pitch of one flight and tangents.

Tangent *a* is revolved to *x y*, as shown by the arc, and a perpendicular therefrom erected; so also is a perpendicular line erected on *z*; both lines reaching up to the pitch line of the tangents, as shown at *b"* and *a"* respectively.

It will be observed that point *a"* as thus established indicates the height of the rail from the floor line relatively to the nosing line of the steps. This height, therefore, will be the height required for the gooseneck which is shown at *m* to be the same height from the floor line as point *a"*.

The gooseneck may now be drawn as explained in Fig. 2 for those adjoining the platform. It is shown drawn in Fig. 3 over the portion of the basement flight adjoining newel *I* shown in Fig. 1 and to reach up to *m*, which as previously stated corresponds in height with point *a"*, thus showing that the curved rail of the main flight and the gooseneck over the basement flight will connect with newel *I* at the same height—the curve at *a"* and the gooseneck at *m*.

In this treatment it will be observed that we are dealing with a case of a bottom level tangent for the wreath as shown from *b"* to *a"*.

If it is desired to lower the wreath, as from *b"* to *s*, the gooseneck of the basement flight would connect with the newel at *s*, and the wreath in that case will have two unequal tangents.

As these two cases occur in practice we will now proceed to draw the face mold for the wreaths, first, when the upper tangent inclines and the bottom level, as shown in Fig. 3, from *c"* to *b"* and from *b"* to a"; second, when the two tangents incline, as shown from *c"* to *b"* and from *b"* to *s* in the same figure.

In Fig. 4 is shown the simplest method to draw the face mold for the first example, namely, the case of one inclined tangent and one level.

First draw the plan of the rail as from *b* to *c*; from *a* draw the plan tangent *a b*; draw also the plan tangent *a c*; and upon *b c* place the pitch-board and draw the pitch from *b"* to *a*. This last line represents the

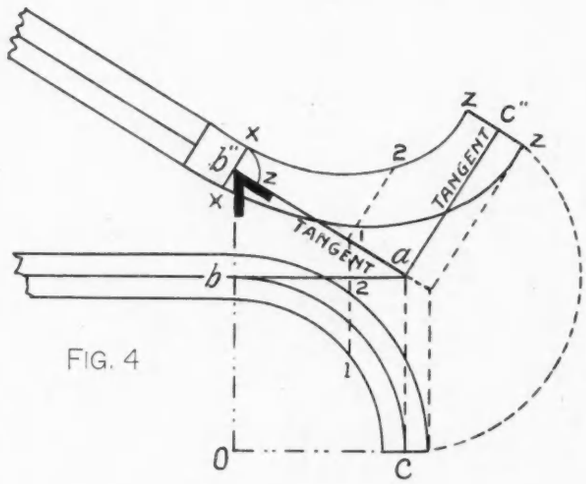


FIG. 4

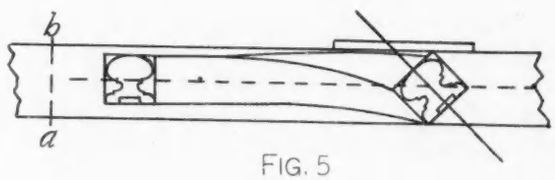


FIG. 5

pitch over and above the plan tangent *b a*, the same as is shown from *c"* to *b"* in Fig. 3.

From *a* and square to the pitch draw the line *a c"*. This line represents the bottom level tangent as it is required in the face mold relatively to its co-tangent *b" a* for the purpose of squaring the joints.

Having thus projected the tangents all that is re-

quired now to complete the mold is to draw the curve which in this example we will do by means of one ordinate.

Commence by drawing the line *1 2* across the plan rail parallel to the plan tangent *a c*, and from where it intersects the pitch line *b″ c″* draw another line *1 2*, as shown, parallel to the tangent *b a″* and make it equal to *1 2* in the plan. Thus we find two points *1* and *2* that will be contained in the curves of the mold.

We will now find the width of the mold at each end.

At the end *b″* it will be the exact width of the straight rail and that because point *b″* represents the location of the minor axis.

The width at *c″* is taken from the bevel; the distance *b″ z* there shown is placed on each side of *c″* as shown at *c″ z* and *c″ z*.

Now if we bend a lath to touch the points thus found

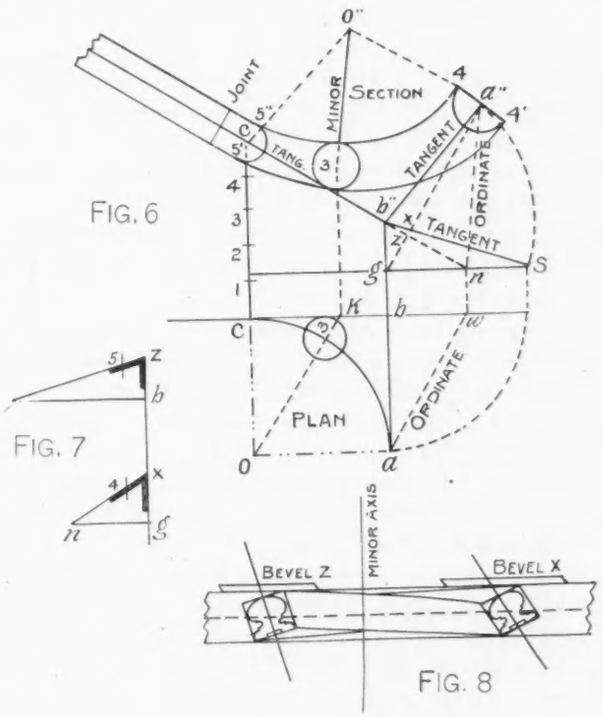


FIG. 6

FIG. 7

FIG. 8

the curve of the mold will be formed as shown for the inside through *z*, *2* and *x*, and for the outside through *z*, *1* and *x*.

Make the joint at *b″* square to the tangent *b″ a″* and at *c″* square to the tangent *b″ c″*, thus completing the face mold.

It will be observed that the only bevel required for this wreath is found at the upper angle of the pitch-board.

It is to be applied to the end *c″* of the wreath. No bevel will be required for the end *b″* owing to it being on the minor axis as previously stated.

In Fig. 5 is shown a view of this wreath after it is squared and the bevel applied to the end *c″*.

In Fig. 6 is shown how to draw the face mold when it is determined to lower the wreath to *1 s*, as shown in Fig. 3. In this case the two tangents will be inclined, as shown in Fig. 6, from *a″* to *b″* and from *b″* to *s*.

Commence by drawing from *o* the central line of the plan rail, as shown from *c* to *a*; place the compasses in *b*; extend to *a* and turn over, as shown, to *s*.

Now draw a line from *g*, square to the pitch of tangent *c″ b″* to *a″*; place one leg of the compasses in *b″*; extend the other to *s*, and turn over to cut the line previously drawn from *g* in *a″*; connect *a″* and *b″*.

This line will be the bottom tangent, as it is required in the face mold relatively to the upper tangent *c″ b″*; the angle between the two as thus fixed will give the correct direction to square the joints at each end of the wreath.

Now draw a line from *a″* parallel to the upper tangent *c″ b″* to *o″*; and from *o″* a line parallel to the bottom tangent *b″ a″* to *c″*; thus completing what is known as the section.

We will now need to find the minor axis on this section.

From *o* in the plan, the center wherefrom the plan rail is struck, draw the line *o k* parallel to the plan ordinate *a w*. On *k* erect a line to cut the tangent *c″ b″*, and therefrom a line to *o″*, which will be the minor axis. Make *o″ 3* equal to *o 3* in plan, and on *3* draw a circle having a radius equal to one-half the width of plan rail. The line *o″ 3* being the minor axis, the width of the wreath in all cases on this line will be the same as that of the straight rail. The circumference of the circle therefore defines its width at point *3*.

To determine the width at each end we will need to find the two bevels that are required for this wreath.

Make *a b* in Fig. 7 equal to the radius of the plan curve shown in Fig. 6, and make *b z* equal to *g z* in Fig. 6 join *z a*. The bevel at *z* is to be applied to the end *c″* of the wreath.

Again, make *g n* in Fig. 7 equal *g n* in Fig. 6 and *g x* equal to *g x* in the same figure. The bevel at *x* is to be applied to the end *a″* of the wreath.

Both bevels are shown applied in Fig. 8; bevel *z* is held parallel with the joint in the direction of the outside of the wreath, and bevel *x* similarly held in the direction of the inside, which is the case always when the plan tangents are at right angles to one another.

The distance *z 5* in Fig. 7 is to be applied on each side of *c″* in Fig. 6, and the distance *x 4* in Fig. 7 on each side of *a″* in Fig. 6 as shown; then by bending a lath to touch *4* the circumference of the circle on the minor, and *5*, the inside curve is drawn. Similarly the outside is drawn by touching *4*, the circle on the minor, and point *5*.

The point at *a″* is made square to the tangent *b″ a″* and at *c″* square to the tangent *c″ b″*, thus completing the form of the face mold.

A careful study of Fig. 6 will amply pay all students of handrailing, in that is exemplifies the method of either lowering or raising the wreath at the bottom of a stairway, which is a necessity that often happens in the course of practice.

Useful Machines for the Shop

THINGS TO BE CONSIDERED IN SELECTING MACHINES FOR VARIOUS WORK — KINDS OF MACHINES MOST NEEDED BY THE BEGINNER

RECENTLY a correspondent asked where he could get machinery for cutting out window frame pockets. It was a very simple question and easily answered in a way, as there are several manufacturers of machinery of this kind, but the question suggested something, and that is, that there is more to the problem of selecting machinery to do any given work than the mere finding of a machine designed for that purpose. It is not only that a machine will do a specified piece of work, but the problem of selecting a machine also involves a consideration of the amount of work the machine will ordinarily be called upon to do. In the machine wood-working world, while it is usually considered that the best and generally the most expensive machines are the cheapest in the end, it is also recognized that while this trade axiom holds good where machines are run to their full capacity, notice is not infrequently taken of the fact that it is just as foolish to buy a $5,000 machine to do the work of a $500 machine as it is to buy a $500 machine and try to make it do the work of a $5,000 machine. But, to bring the idea closer home to the carpenter shop, a machine that will soon pay for itself in a big planing mill or sash and door factory may become a "white elephant" on the hands of the carpenter who has only a limited amount of work for it to do. It may be a window frame machine, or a dozen and one other different machines, but this logic holds good just the same. Ordinarily a carpenter, unless he is going to make a specialty of window frames and hopes to control the window frame trade of the whole community, needs simple and comparatively inexpensive machinery for this work if he expects to make the machinery a paying investment. That was the thought that was suggested by the simple inquiry above, and the same thought applies to various machines, so many in fact, that the selecting of a machine best suited for the work in hand is frequently a more difficult undertaking than that of mastering the details of operating the machine for good results.

Kinds of Mortising Machines

Say we take mortising machines for an example, and there is quite a confusing list to select from, involving four distinct types as follows: Reciprocating, hollow chisel or bull dozer, chain saw, and oscillating, and of each type of machine there are several varieties and sizes made, all of which have features peculiar to themselves, and points of advantage for certain kinds of work. So that when their claims to favor are fully elaborated by enthusiastic salesmen it sometimes makes a man want to take to a tree to get out of the confusion and think clearly. If one would start in right, however, the job should be comparatively simple for the carpenter operating a little machine wood-working shop, because as a rule, when he comes to figure it up he finds that while he has mortising enough to make lots of tedious work by hand, it is really a very light task for even the simplest power driven mortising machine. Of course, there are special instances where one might want to turn the carpenter shop into a manufacturing institution and make large quantities of stock where every minute saved on the mortising machine is worth while, but as a rule in the average machine carpenter shop the mortiser that will be found to give the best results, all things considered, is the simple type of reciprocating machine, and this should be the least expensive of machines offered. It is hardly necessary to add further argument than that set forth above in support of this idea, but there is another argument that could be offered. The reciprocating machine is capable of the widest range of work as a rule, in size, length and depth of mortisers, and it shows up to special advantage where very light delicate work is to be done. This is no argument against the other mortising machines, because many of them have decided advantages over the simpler forms of reciprocating machines, but their advantage comes as a rule where quantity is an object and where economy in time makes it advisable to have a mortising machine that will clean out its own mortise and make them rapidly even without having to bore a hole to start the machine to work. With the average carpenter, however, the saving on these items is not so important as original cost, power and the wide range of work. In fact, what the average carpenter needs is something simpler and less expensive than the average type of reciprocating ma-

chines offered the machine wood-working fraternity, and to find this they should ordinarily turn, not so much to the manufacturers of heavy wood-working machines, as to those who make a specialty of machines for the carpenter and light jobbing shop.

Kinds of Machines Needed

By and by as the use of light machinery grows in favor among carpenters there will undoubtedly develop a lot of new machines designed especially for work of this kind, and then the problem of selecting will be simplified somewhat. Moreover, there is due a new era in machines of this kind, and the machinery men who recognize this fact first and get busy with designs and offerings will reap a harvest and benefit the carpenters who put in power appliances to lighten the burden of their work. Among the machines of simple type that are needed is something to make tenons. Next to the mortise the burden of the carpenter shop work is the making of tenons and their first cousins the gains.

A lot of this kind of work can be done on a rip saw table if you've got the right kind of table and know how to use it. If you've got a saw table and mandrel that will carry a dado head or something of the kind and have it belted below so that your top is clear you can rig up a sliding jack to carry your stock and cut both gains and tenons of various sizes and shapes. Moreover, it is worth remarking in this connection again that a good rip saw table when it can be adjusted up and down, with a mandrel that will carry either rip or cross cuts, gainer heads or dado saws can be converted to more different kinds of uses than most any one machine going. For a tenoning machine its perfection, of course, depends on stock being sized to exact dimensions, because to cut both shoulders of your tenon you must turn your stock over so that where there is any variation in thickness there is also some variation in your tenon. A little careful attention, however, will enable one to do fairly satisfactory work with a home made jack and a rip saw table in making tenons.

Another machine that will make tenons if properly handled is the band saw. For this machine, of course, you have to scribe your tenons on one edge at least. One edge is enough, though, if your machine is in nice shape and the table is properly squared up with the saw. The band saw also has its uses for cutting gains, especially wide ones. But for the narrower ones the rip saw table is the best place to make them. And, speaking of tenons takes one's thoughts back again to the mortiser with the suggestion that this machine might be provided with bits and made to cut the tenons as well as the mortise, in some classes of work. Some foot power machines I believe are furnished with tenon chisels for sash work, but the idea does not seem to have been extensively developed of making mortising machines that can, by a change of chisels, be converted into a tenoner. Moreover, the idea may not be worthy of any special development, but it might be investigated, and if any of the readers of the AMERICAN CARPENTER AND BUILDER have done any experimenting along this line it would be interesting to hear the results. Meantime, bear in mind the fact that it is just as important to keep before you in selecting machinery for your shop the quantity of work you have to do as it is the kind of work you are looking for a machine to relieve your hands.

✤

Washington's Largest Office Building

The largest building in Washington is to be erected this year by Thomas F. Walsh. It is to be erected on the northwest corner of New York avenue and Fourteenth street, a locality which, only a few years ago, was not regarded as a suitable section in which to erect either an office or retail business building. The new building, which will occupy a site more than half an acre in extent, will be the largest structure of its kind in Washington. It will be about two and one-half times the size of the Colorado Building, which contains 224 rooms.

It is to be ten stories in height on the New York avenue front and nine stories on the H street front, the difference being due to the change in the grade at two points. The wide frontages on New York avenue and on Fourteenth street, with ample extent on H street, will afford an opportunity for architectural effect which will not be neglected. The lease on the property does not expire until next August and the work cannot be commenced until early in the fall, but it will then be vigorously pushed. The plans are now being prepared. Further details are not obtainable at present.

✤

Shortage of Sand and Gravel

Reports coming from the sand and gravel-digging grounds on the Potomac state that the known beds of gravel on the river are about exhausted, and unless new deposits are located, it is only a question of a short time before the local sand and gravel companies will have to seek deposits on shore to meet the heavy demand for the material. The use of concrete largely in building work of all kinds has in the past two or three years greatly increased the demand for gravel, and the river beds have been worked day and night to meet the demand, and as a conesquence, the beds have become exhausted. For several months, it is stated, the local sand companies have had men out hunting on both sides of the river for available beds of material, but none have yet been found. This scarcity of gravel has caused a sharp advance in the price of the material, and it is still going up. It is stated that borings will shortly be made along the river below the Long bridge in the hope that gravel may be found there.

✤

Speaks for Itself

Your magazine speaks for itself good and loud.—R. N. Adams, Corvallis, Oregon.

Connections Between Closet and Soil Pipe

IMPROPER AND PROPER METHOD OF MAKING CONNECTIONS BETWEEN THE CLOSET AND WASTE PIPE—DANGER IN POOR CONSTRUCTION, AND HOW BEST TO OVERCOME IT

THE problem of making a proper connection between the closet and the waste pipe has been a serious one ever since earthenware closets were manufactured, and may be looked upon as the one weak spot in an otherwise almost perfect system

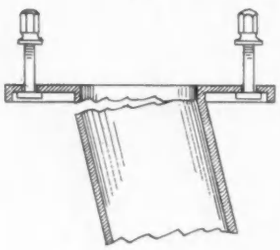


FIG. 1.

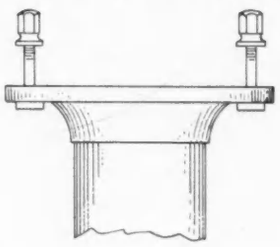


FIG. 2.

of house plumbing. The first earthenware closets were made with a flat base that is without a recess in the bottom. The method of connecting the closet to the waste pipe was to make a collar of lead, lay it on the floor and bring the lead pipe up through it and flange it out over the collar and solder them together. This flange was then covered with putty, plaster or cement and the closet was set over it and screwed to the floor. The floor would in time sag or become rotten, the screws would become loose and the joint broken, allowing gases to escape into the house.

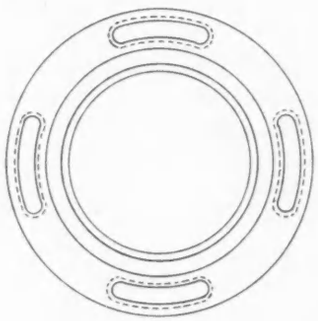


FIG. 3.

The next improvement of any consequence was the brass plate or ring perfectly flat with a slightly beveled inner edge on which the lead bend was soldered, a rubber gasket was then used between the closet base and the brass flange. The potteries, in order to allow for this projection above the floor, recessed the base so as to allow the closet to sit flat on the floor. The brass flange was drawn up into the recess with bolts, compressing the rubber gasket against the bottom of the closet in case the recess was too deep. The rubber was covered with putty. In fact, to-day a large percentage of the closets set are placed over a lead bend flanged over on the floor and a ring of putty laid over it and compressed into the recess of the closet by screwing it to the floor with common wood screws and let go at that as good enough.

Red lead putties, etc., are made plastic with oil. When the oil dries out of them they crumble, and then particles drop from place with every jar the closet receives. Rubber decays and has proven generally unsatisfactory as a gas-tight gasket between

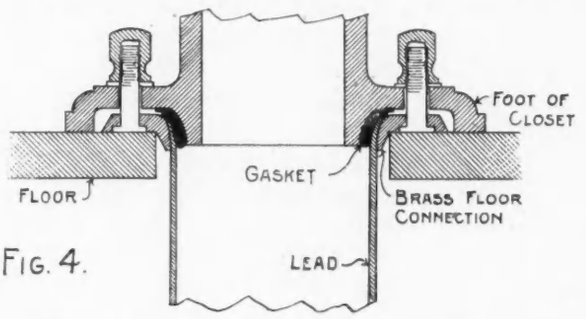


FIG. 4.

the closet base and the brass flange. The objections to the flat brass floor flange is better shown in Fig. 1 than explained. On account of insufficient holding surface for the lead the sharp edges of the flange will shear and cut the lead pipe or bend when the building settles or when the soil pipe stack settles.

The recent plumbing ordinances passed in Chicago, New York, Brooklyn and I believe by this time in Cleveland cover the point of closet connections very thoroughly and read in a general sense as follows: All earthenware and other closet traps shall have heavy brass floor plates, not less than one-fourth of an inch in thickness, soldered to the lead bend, or where brass or iron pipes are used, *screwed* to the same and bolted to the trap flange, and *joints between* the *flange* and *trap* shall be made *gas tight, without*

the use of *putty, plaster, cement, rubber or leather washers,* and the use of the putty, plaster, cement, rubber or leather washers in making such connections is hereby prohibited, and any person violating, neglecting or refusing to comply with any provisions of this article shall be fined, etc.

There are several closet flanges on the market that comply with the above mentioned ordinance, and the

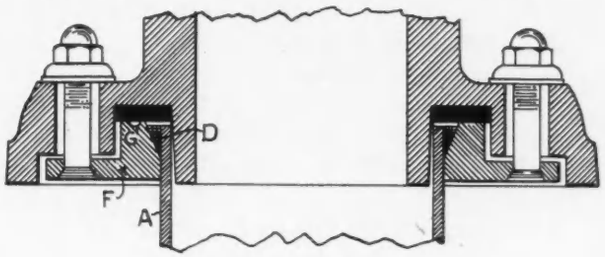


FIG. 5.

one shown in Fig. 2 is known as the Renton flange. This flange is provided with a clamping plate for attachment to the closet bowl and with a pipe holding part projecting from the clamping plate and having an inner converging wall. This inner wall or pipe holding part is sharply inclined at its upper part and converges uniformly below the sharply inclined part and is of sufficient depth so as to provide a long bearing for the lead pipe, while the sharply inclined part is adapted to receive solder for metallically uniting the floor flange and the lead pipe. The long, gripping surface of this flange is one of its best features. The gasket used is an especially prepared asbestos covered with canvas and treated with graphite. A sectional cut of this gasket showing shape is shown in Fig. 3. This gasket is soft and pliable, absolutely water proof, and will not harden or vulcanize, making it possible to compress it and take up any irregularity in the earthenware. Whenever it is necessary to take up

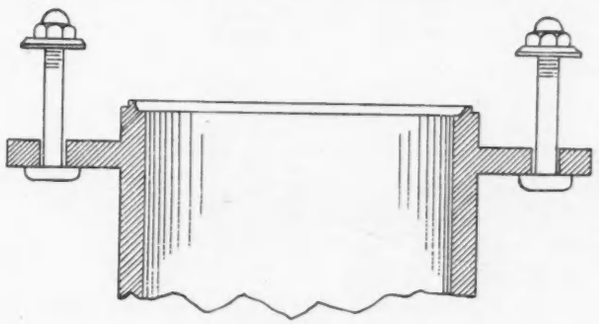


FIG. 6.

the closet to replace or for any other cause it does not need to be dug up. This gasket extends between the lead pipe soldered to the brass flange and the spud of the closet bowl, and *also* between the floor flange and the bottom of the recess in the bowl, and when tightly compressed between these parts not only makes a perfectly gas tight joint between the floor flange and the bowl, but also presses the lead pipe against the inclosing walls of the flange, thus reinforcing the lead along a considerable portion of its inner surface.

Fig. 4 shows the manner in which this connection is made. The particular advantage of the flange over and above its efficiency is that it will fit almost any closet made, and on account of its sloping sides it not only makes tight on top, but on all sides.

Figs. 5 and 6 is another type of improved closet flange connection and differs from the Renton flange in many points. This flange is soldered to the lead waste pipe in much the same manner as the Renton except that it does not slope or extend over the top. The brass flange is tapered to a point on top, forming a seat on which a flat asbestos gasket is laid between it and the closet base, and depends upon one point of compact for a tight joint, which is all right if the recess is perfectly level. The seat of this flange is grooved, the idea or intention being to sink a ridge of the asbestos gasket into the channel to reinforce the joint. Another type of closet connection is shown in Fig. 7

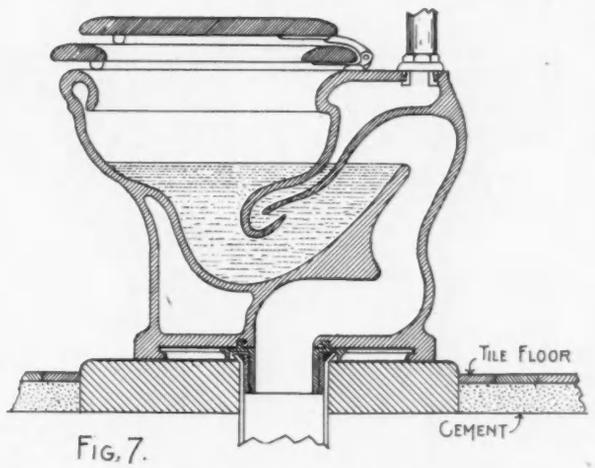


FIG. 7.

and is known to the trade as the Sanitary-Perfect Screw connection. This connection has been accepted by the different departments of health and sanitary boards wherever the use of putty, plaster, cement, rubber or leather gaskets have been prohibited and has proven gas tight under peppermint test, the only objection to it being that one type of closet must necessarily be used, and again it takes considerable more time and skill to properly install than either of the two mentioned above, but it is a great improvement over the rubber, putty, makeshift arrangement so commonly used to-day.

In using the Sanitary Perfect Screw connection it is much preferable to use a floor slab of either marble or porcelain ware on account of the desirability, in fact the almost necessity of having a level foundation. This closet connection is a heavy brass screw connection secured into the base of the closet, as shown in sectional view Fig. 7. The corresponding threaded brass coupling or socket is soldered in the end of the lead soil pipe. The sectional views Figs. 7 and 8 show the manner in which the connection is

made fast and tight into the base of the closet. The projecting arm of the flange acts as an anchor, which is cemented into a corresponding channel in the earthenware. Hard cement and lead make the brass con-

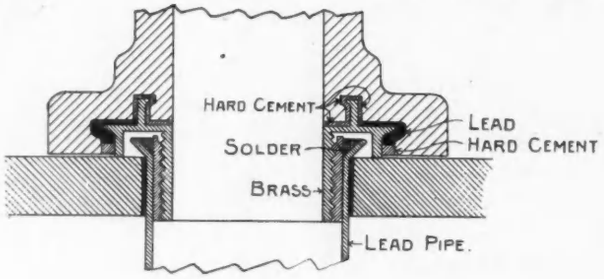


FIG. 8.

nection almost an integral part of the closet bowl. The brass receiving coupling is marked so that when installed it is placed in such a position that when the closet is screwed into it, it makes tight when the closet faces front or in proper position.

This closet connection proposition is a more serious one than is generally supposed, quantities of illuminating gas escape from mains, and enter the sewer pipes, and the so-called sewer gas often passes in the house through the bath room on account of the almost criminal manner in which some plumbers make their connection.

Constructing a Cesspool

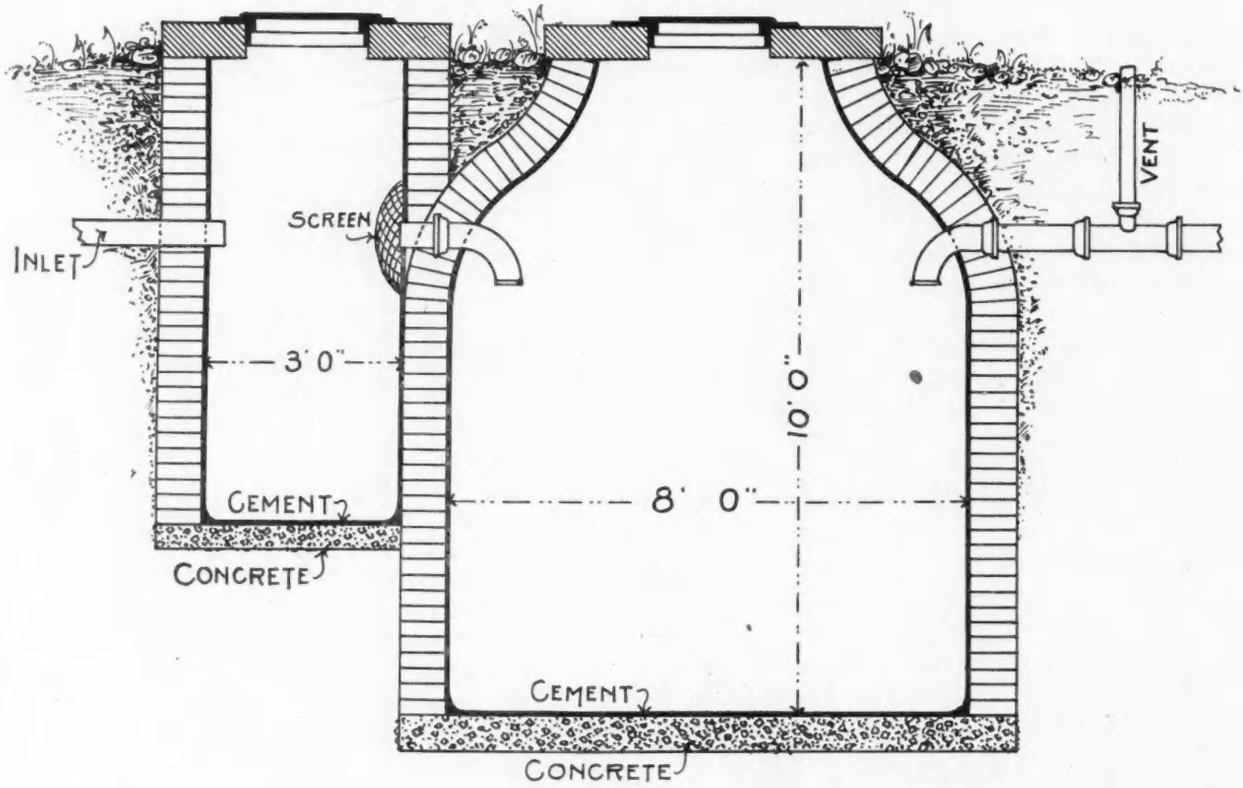
To the Editor: Arlington, Wash.

In a small town which has no system of sanitary sewerage, can a cesspool be so constructed as to be perfectly sanitary and satisfactory, or would it be safer to do away with the sanitary seat in the house and build a water-closet? In constructing a cesspool, how large should it be for the use of one family in an eight-room house? Should there be a covering of earth? What particular points should be observed in its construction? L. E. SMITH.

Answer: In reply to an inquiry from L. E. Smith, Arlington, Washington, we would say that a cesspool can be so constructed as to be perfectly sanitary and satisfactory, and it is to be much preferred to an outhouse proposition, as regards comfort and from a sanitary standpoint as well.

As regards construction: Of course it depends a great deal on the existing conditions, such as location, soil, etc., and the amount of money one can afford to spend.

A cesspool built as per sketch, about eight feet in diameter and ten feet deep, with an auxiliary basin built on the side thereof, about 3 by 3, we believe you have the most sanitary layout, for the amount of money it will cost, which it is possible to construct.



The small chamber is designed to receive and retain the solids, while the larger cesspool would take care of the liquid. The outlet could be connected to a porous drain tile laid about eighteen inches below the soil. A wire screen over the inlet to the liquid basin is desirable, as it would prevent a soil accumulation in the larger basin. The receiving chamber has a capacity sufficiently large, so that it will not have to be emptied more than once a year.

This arrangement is eminently more satisfactory than the seeping cesspool proposition.

Building Forms for Concrete Piers

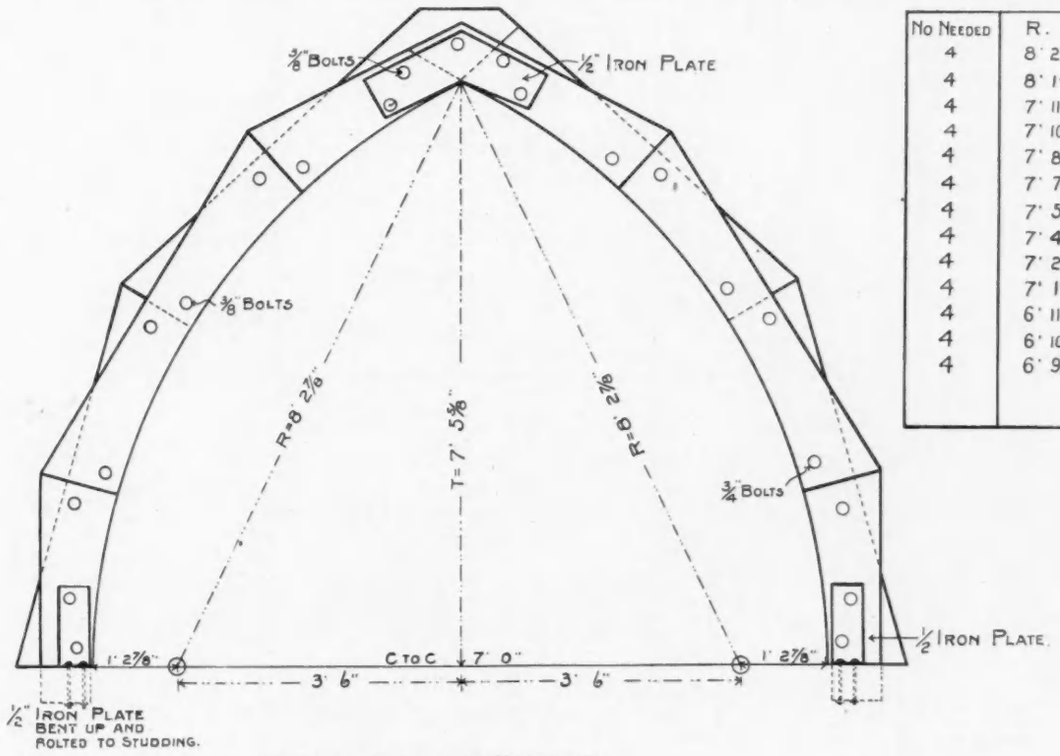
HOW TO CONSTRUCT FORMS FOR CONCRETE PIERS FOR BRIDGEWORK—KINDS OF TIMBER TO USE AND THE METHOD OF PROCEDURE

By Thomas P. Ellis

AS THE first thing to be considered in pier construction is the coffer dam, and as conditions are never alike we will leave that part with the engineer in charge. But since the pier form commences at the top of footing which is below the top of dam it is well enough to look out for whaling braces and place them so as not to conflict with the studding, otherwise troubles will result in taking them out. If conditions are such that footing forms can be placed in sections with a derrick it is best to build them that way, as men can build them at odd times, but if not, it is best to build them in place. As soon as footing has set sufficiently start form for shaft by laying plate 2 by 8 or 2 by 10 on top of footing. Cut all studding with proper batter on bottom end and set in place, turning the crown in, as by drawing them in with rods as work progresses they will bind the form against the stone that has already set, while if shoved out they will spring it away. Set corner studding exactly on spring line, being careful to select the straightest ones as the ribs for nose form connect with them; the rest then can be set in place.

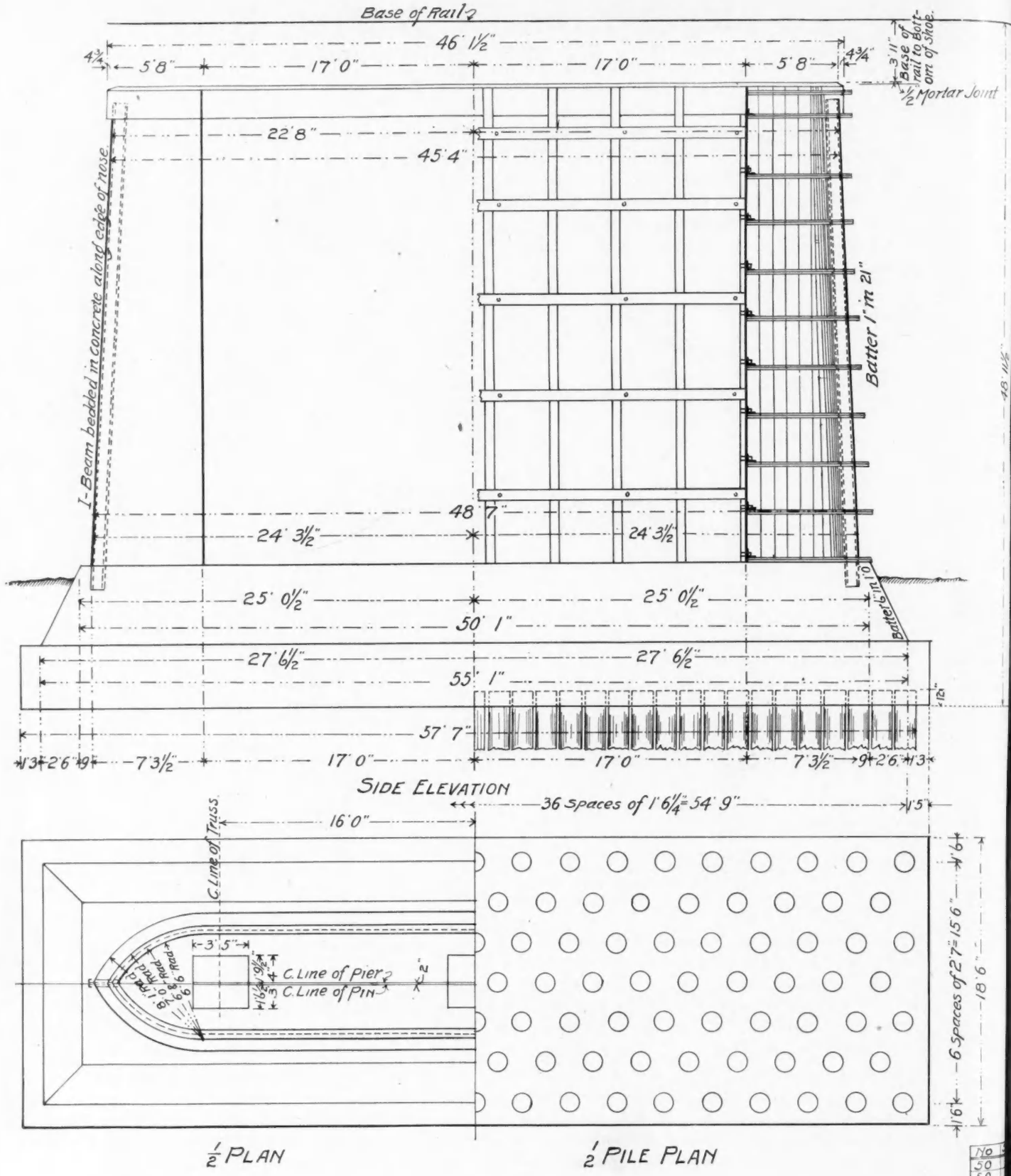
As we have established a center line on top of footing we go up any given number of feet on studding and strike line along each side (or if plate is straight enough they can be marked on the ground), and nail a tie beam across each pair of such length as will give the right batter having center line on same. Then drop plumb-bob at each end and rack studding till plumb-bob comes over point where spring and center lines cross, and brace them securely. By stretching chalk line through center the remaining ones can be more easily and quickly lined up than if each side was taken separately. Now we come to the siding, which is usually 1¾ by 8 or 10, and for a standard double-track pier should be 16 and 18 feet long, which will place the two center studding 2 feet apart, and alternate joints cut one 15 feet 11 inches and the other 17 feet 11 inches, which will leave one inch of studding on each end to catch staves (which form the end) and make a flush joint.

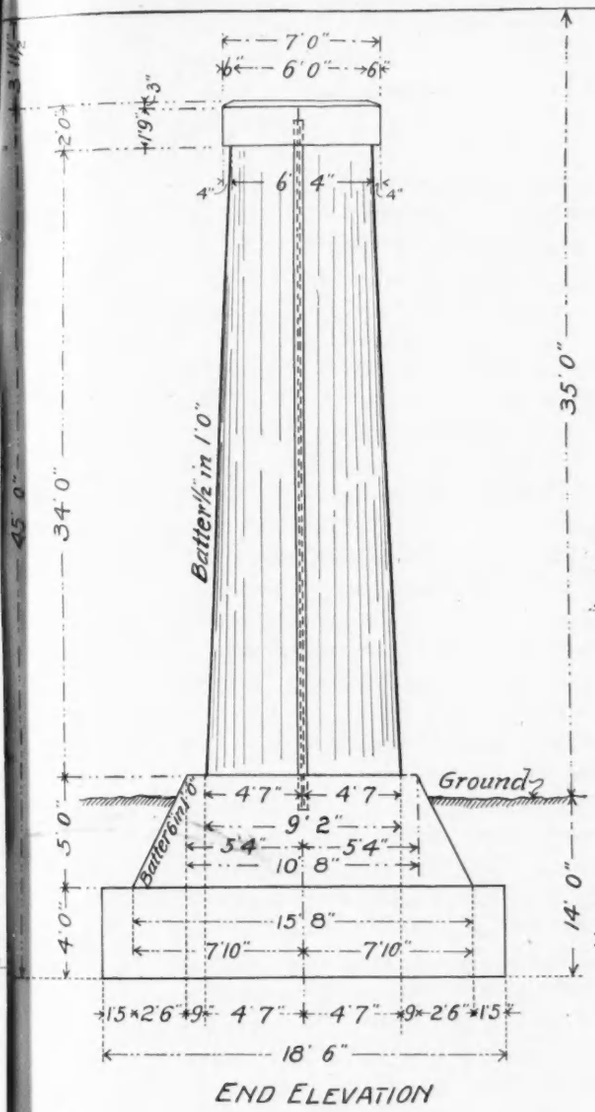
The siding can now be nailed on up to the top of the first section of staves leaving each end open until this is done. Some put whaling timbers and tie rods in as they go up, but I prefer to leave them out until I start putting up nose forms and then send a man back over it as I don't have them in the way. The ribs can now be put in place for the nose, placing first one on top of footing and the next ones 3 feet C to C, as we have a batter of ½ to 1 foot. Each one will be 3 feet smaller



No Needed	R.	T.	C to G.
4	8' 2⅞"	7' 5⅝"	7' 0"
4	8' 1⅜"	7' 3 5/16"	7' 0"
4	7' 11⅞"	7' 2 5/16"	7' 0"
4	7' 10⅜"	7' 0½"	7' 0"
4	7' 8⅞"	6' 10¾"	7' 0"
4	7' 7⅜"	6' 9 1/16"	7' 0"
4	7' 5⅞"	6' 7 1/16"	7' 0"
4	7' 4⅜"	6' 5⅝"	7' 0"
4	7' 2⅞"	6' 3⅞"	7' 0"
4	7' 1⅜"	6' 2 5/16"	7' 0"
4	6' 11⅞"	6' 0 7/16"	7' 0"
4	6' 10⅜"	5' 10¾"	7' 0"
4	6' 9⅞"	5' 10 5/16"	7' 0"

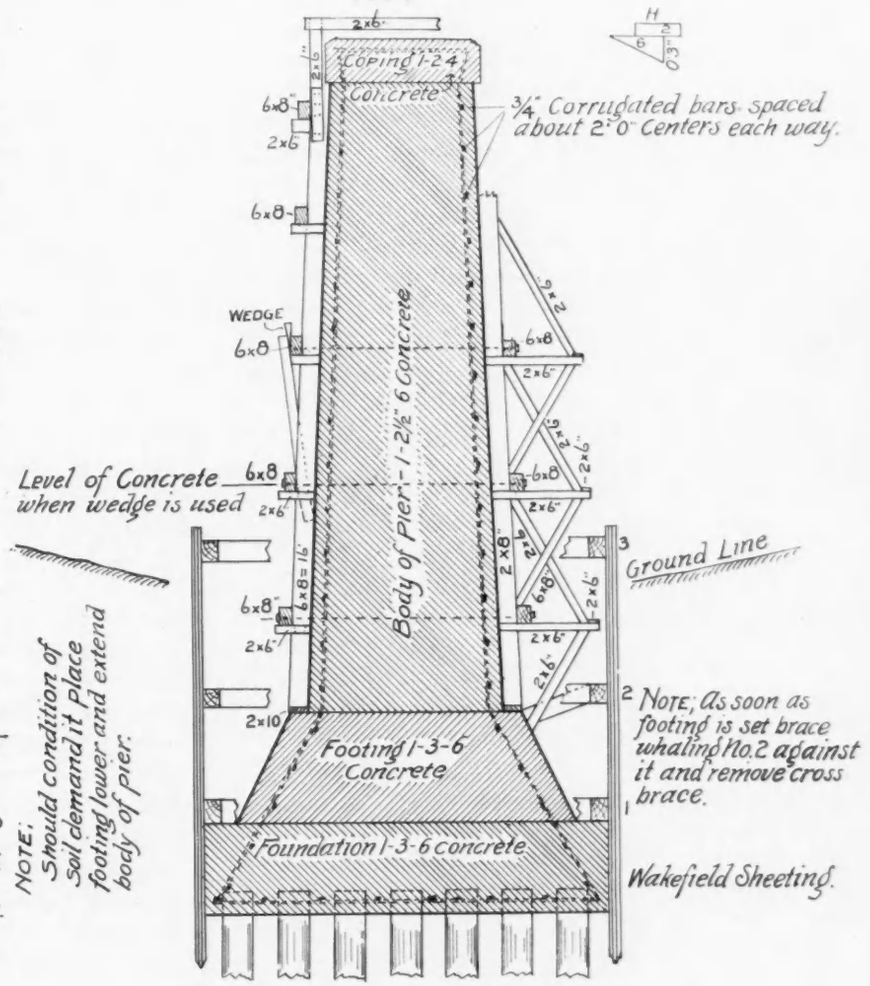
SKETCH OF FORMS FOR NOSES OF PIERS AT MAYFIELD CREEK. MAKE OUT OF 2 x 12" LUMBER IN TWO PLY SEGMENTS NOT LESS THAN ABOUT 7" AT CENTRE.


Base of Rail
46' 1½"
4¾"
5'8"
17'0"
17'0"
5'8"
4¾"
3'11" Base of rail to bottom of shoe.
½ Mortar Joint
22'8"
45'4"
I-Beam bedded in concrete along edge of nose
Batter 1" in 21"
48'7"
24'3½"
24'3½"
25'0½"
25'0½"
50'1"
Batter 1" in 10"
27'6½"
27'6½"
55'1"
12"
57'7"
1'3" 2'6" 9" 7'3½" 17'0" 17'0" 7'3½" 9" 2'6" 1'3"
SIDE ELEVATION
36 Spaces of 1'6¼" = 54'9"
1'5"
16'0"
C. Line of Truss
3'5"
C. Line of Pier
C. Line of Pin
2"
6 Spaces of 2'7" = 15'6"
1'6"
18'6"
½ PLAN
½ PILE PLAN

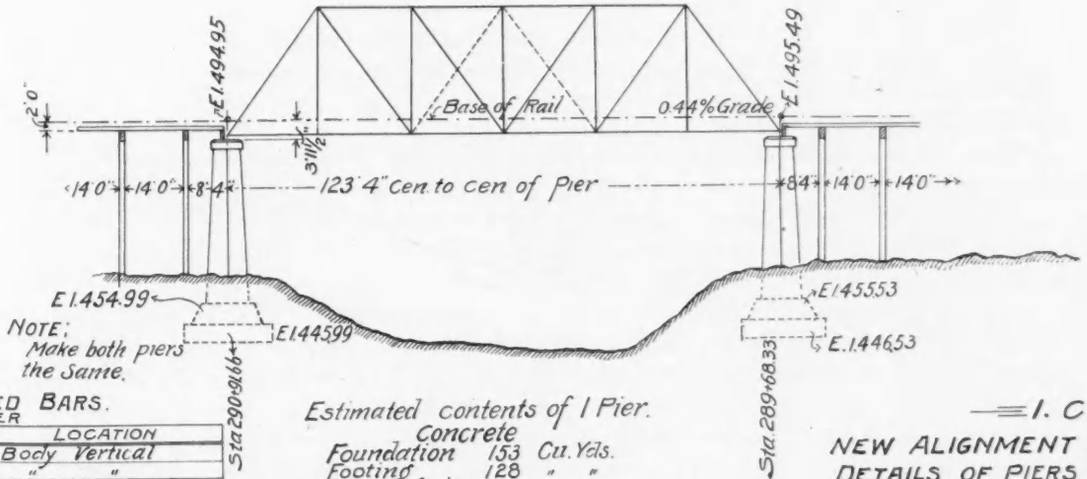


END ELEVATION

FIG 1



SECTION



RUGATED BARS.
OR 1 PIER

No	LENGTH	LOCATION
50	30' 0"	Body Vertical
50	15' 0"	" "
88	15' 0"	" horizontal
68	30' 0"	" "
3	60' 0"	Coping-Longitudinal
3	15' 0"	" "
20	16' 0"	" Transverse
29	18' 0"	Foundation "

Estimated contents of 1 Pier.

Concrete

Foundation	153	Cu. Yds.
Footing	128	" "
Body of pier	421	" "
Coping	22	" "
Total	724	" "

CORRUGATED BARS

Total weight of Bars 10.470#

PILES.

130 Piles 17'-0" long

I. C. R. R.

NEW ALIGNMENT NEAR WICKLIFFE, KY.

DETAILS OF PIERS AT MAYFIELD CR.

at spring line which will shorten the radius 1½ inches.

After the first section of staves are nailed up the shores can be knocked out from between ribs and binding rods put in as shown in illustration. Care should be taken not to draw them too tight, as they are apt to draw the staves away from the ribs. I usually have a man tighten them just as the concrete comes to their level. Having put our whaling timbers on and our tie rods in, which are either cut to depth of thread with pipe cutter or connected with turn buckles two inches inside the form, it is then ready for concrete. And I will say that if there is nothing solid to brace form against that too much care cannot be taken to get same started straight, as the coffer dam will sometimes move and carry the form with it. However after one or two lifts of concrete have been set the bottom of form is secure, and the only thing to look out for is to keep it straight or plumb. I prefer to use heavy timbers always for studding and whaling, for even if the pier is built under traffic it is not safe to brace to pile or trestle work owing to the jar.

If good strong timbers are used the concrete that has set or hardened below will hold form in line far enough to give a day's run or till next whaling is reached, which in turn will harden and hold form for next day. If the form should swing out of line, all that is necessary to bring it back is to put a piece of timber in behind whaling, as shown in Fig. 1, and put wedge or jack-screw between it and form.

As the nose forms will take care of themselves we will only say that all that is necessary is to taper staves according to batter, so as to keep joints perpendicular. When bottom of coping is reached studding should be cut off 3 feet ½ inch below stone point in order to get a short block 1¾ inches under the overhang which can be driven out when form is taken down to give clearance for studding. Strike a line on top of studding 4 inches from inside edge (if plain coping) and nail 2 by 6 on the side for coping, which should extend 10 inches vertically above top of coping to allow a 2 by 6 to be nailed across for a tie high enough for a trowel handle to pass under. These will serve as a scaffold to finish from and also to spread tarpaulin in case of rain, while if wires are used and top left open the work of finishing will be greatly hindered. A float and straight edge is all that is needed now and are shown at A, Fig. 1. Strike several times with straight edge and use float as soon as concrete will hold form. I would add for the benefit of the finisher, trowel as soon as dry enough, but do not dry surface with cement or keep alive too long or you will cause hair cracks. But as the carpenter is seldom called upon to do finishing I will conclude by saying don't be afraid to use heavy timbers, as it is better to rig up to handle them than to use light stuff and turn out a bum job, besides the time saved in bracing. In our next article we will show other forms in the construction of arches.

President Roosevelt's Vacation Retreat

(*Continued from page 295.*)

horseback rides with Mrs. Roosevelt on the fine roads of Albemarle county and to tramp through the woods with his sons under the guidance of "Dick" rather than to indulge in hunting; but for all that he does not entirely ignore the game that abounds in the vicinity and on one recent expedition upon which he set out without waiting for breakfast and from which he did not return until 1:30 o'clock in the afternoon the game bagged included a splendid wild turkey, half a dozen quail, two rabbits and several snow birds.

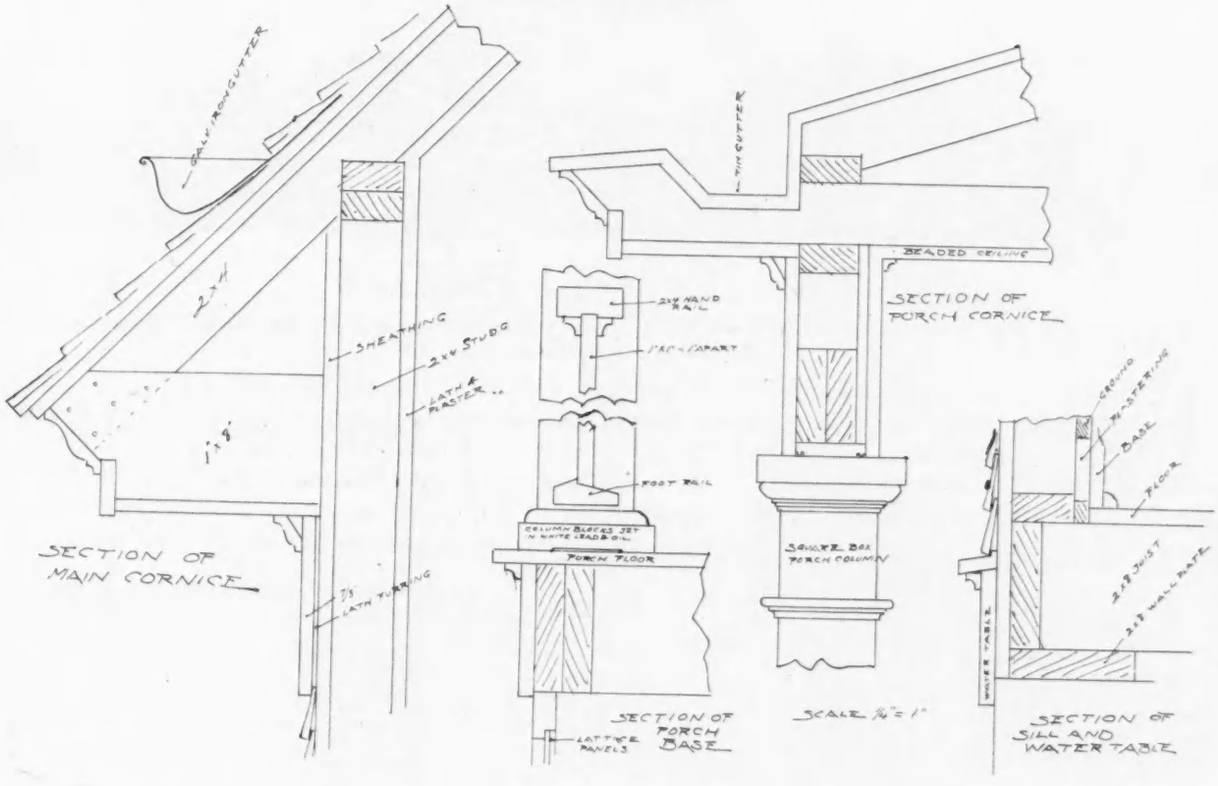
When at their mountain home the Roosevelts attend divine services at Christ church, St. Ann's parish, which is located but a short distance from the lodge at Pine Knob. This church, which is of the Episcopal denomination, is one of the oldest in that section of the State and many prominent Virginia families have worshiped within its walls. Here William Cabell Rives, one time U. S. Minister to France, worshiped along with the Carters and Coles, and the congregation is to this day one of the most aristocratic and wealthy in the Old Dominion, among the regular attendants being Mrs. Martin, wife of Senator Martin.

President and Mrs. Roosevelt, when they go to Pine Knob for an outing, bring most of their groceries and other supplies from Washington, for the shopping facilities in the neighborhood of Pine Knob, as may be imagined, are scarcely up to the requirements of so ambitious a housewife as Mrs. Roosevelt. The nearest mercantile establishment is a half hour's ride on horseback and the stock in trade at this cross roads store is rather limited in both quantity and quality, consisting chiefly of canned goods and crackers. Keene post-office is located only about a mile and a half east of Pine Knob, but urgent official letters and telegrams for the President are sent via North Garden where the President's personal stenographer and a Secret Service officer remain on duty whenever the President is in the mountains in order that they may respond with reasonable promptitude to any summons.

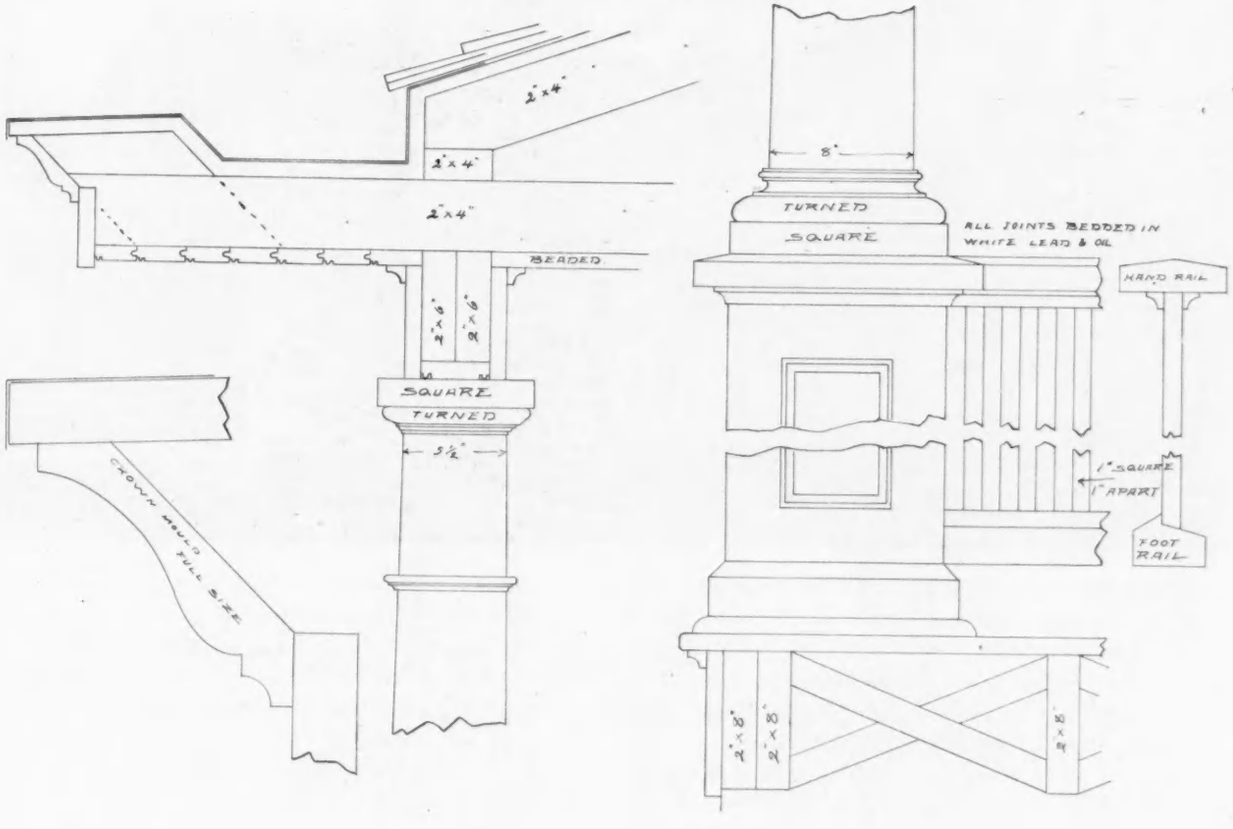
Concrete Blocks Withstood Shock

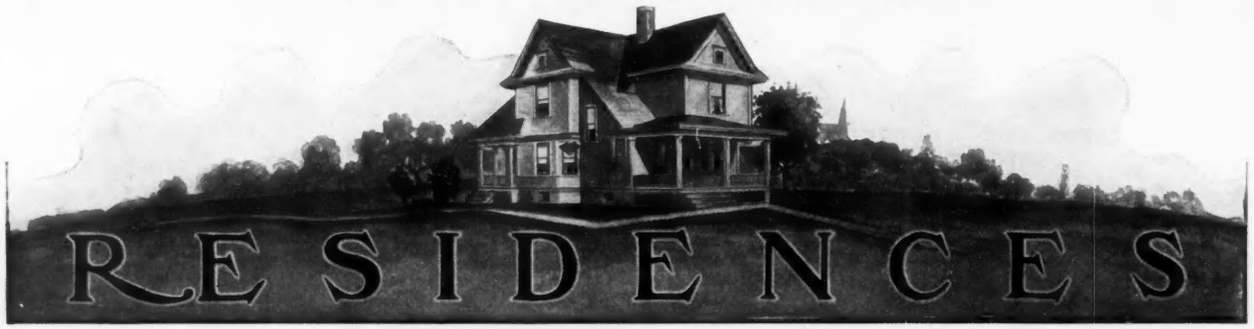
"A remarkable fact," says the Oakland Industrial News, "in connection with one of the more recent methods of construction—that of using hollow artificial building blocks—is that the largest building of this character in Alameda county was absolutely uninjured by the earthquake. We refer to the four-story paper-box factory of Wempe Bros., at Fifth and Adeline streets. This structure has probably a larger percentage of window openings than any building of its class in the state, being designed especially with a view to affording ample light to all parts of the building. There is a church on Waller street, San Francisco, near Golden Gate Park, built of building blocks, which also stood without any apparent damage."

Detail of Cornice



Detail of Porch

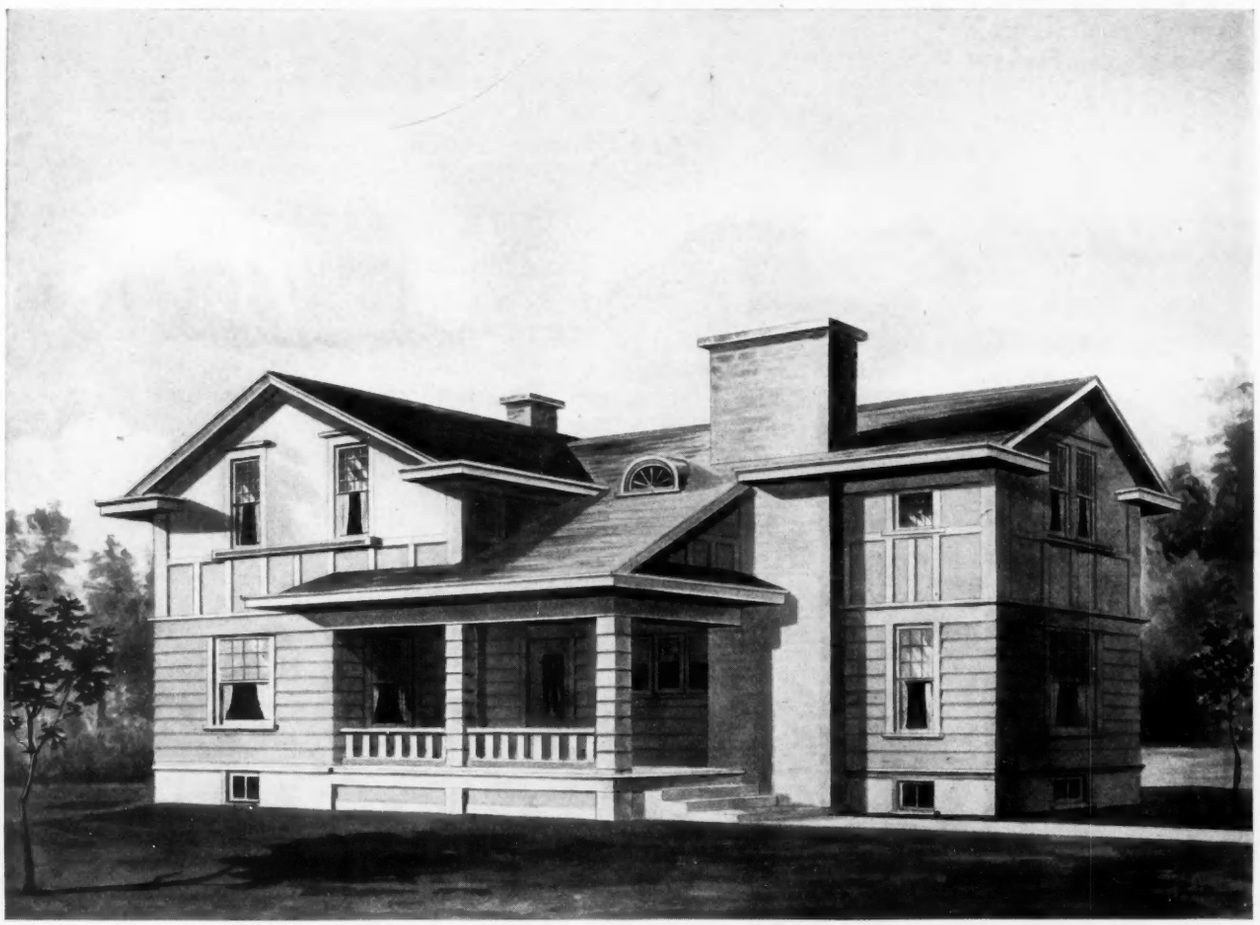




Two Typical Houses

PERSPECTIVES AND FLOOR PLANS OF HOUSES LOCATED IN ENTIRELY DIFFERENT SECTIONS OF THE COUNTRY—DESIRABLE FEATURES OF EACH

THE house shown on this page is half frame and half plaster. The large exposed chimney gives it a very pleasing effect which adds to the general appearance. The largest room in the house is the living room which is 16 by 26 and also has a nook at one side which is also 7 by 13. The living room should be the largest and pleasantest room in the house as it is the place where the family spend most of their time. It will be noticed that there is no parlor in this house. Parlors are gradually going out of date. Their principal use has been for weddings and funerals and the way some of them are furnished leaves a funeral flavor at all times. The conventional parlor is the most uncomfortable room in the house. The children are usually excluded and the men folks are afraid of disarranging the tidy or getting the chairs an inch or two out of their place. The chairs are usually stiff backed and uncomfortable and too nice for the children. Their only use seems to be for state occasions. Houses are getting to be built more for general comfort than for appearance, and it is a great improvement over the old way of building.

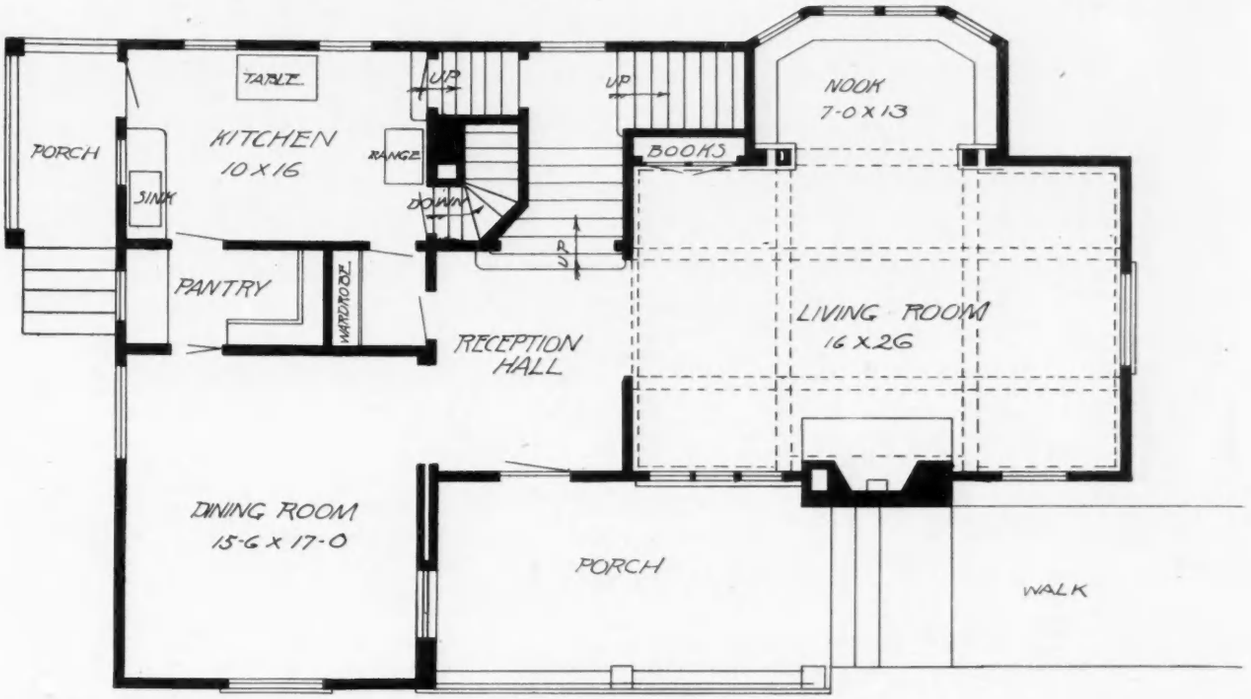


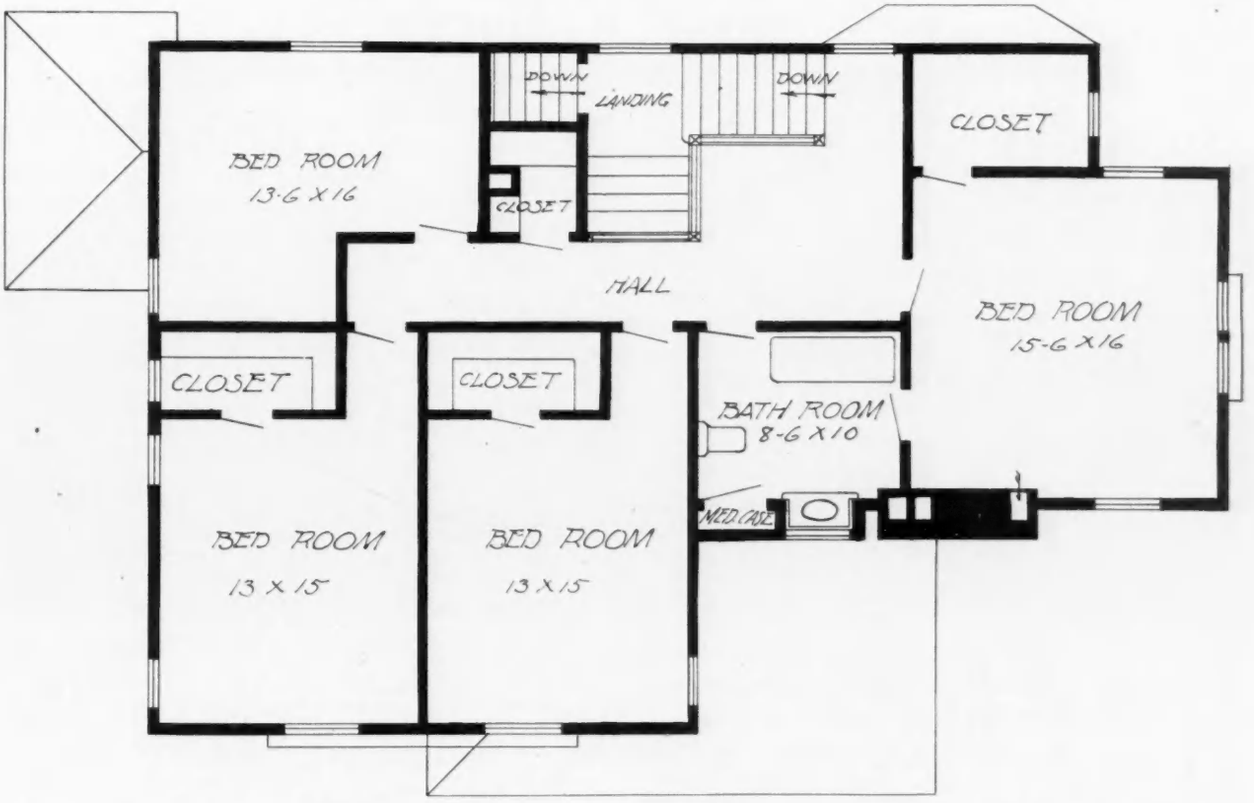
There are four bedrooms on the second floor and one of these can be used for a boy's room. Every boy enjoys having a room of his own no matter how small which he can decorate with pictures, tennis rackets, ball clubs and other things of interest to him. A boy with such a room, if encouraged by his parents and

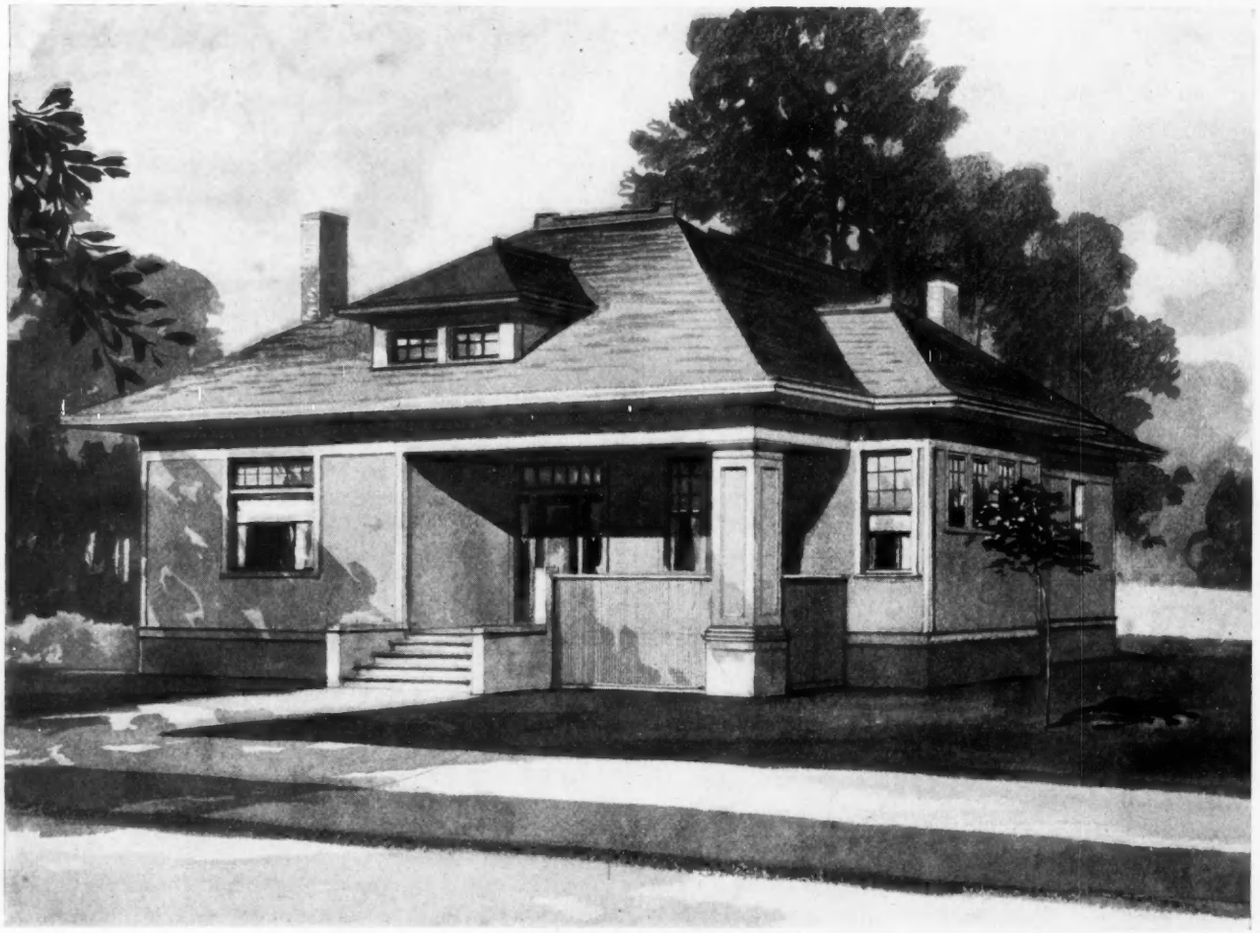
treated right in other ways, never has an inclination to leave home. In a room of this kind they can make plenty of noise without being continually hushed up.

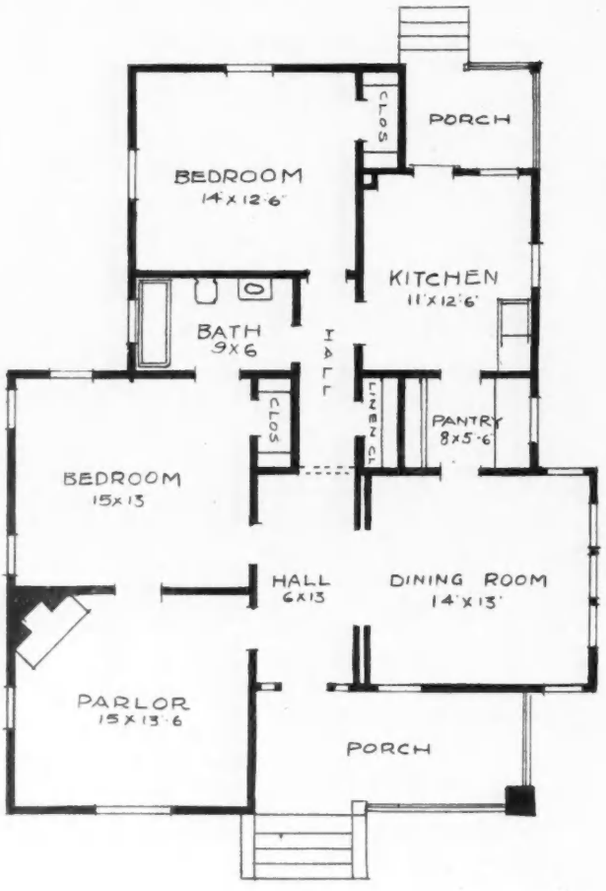
A Southern Home

The house shown on page 318 was designed by C. P. Rawson of Fort Worth, Texas and is an illustration of a typical southern home. The rooms are all on one floor and are very conveniently arranged. All the rooms open directly into the hallway which extends almost through the entire house. The fire-place in the parlor is placed in the corner and offers some advantages over the ordinary fire place arrangement. It not only makes an attractive furnishing for this part of the room, but when the fire is lighted it throws its light and heat into every nook and corner. All through the southwestern country where pinion wood is used for open fires, small fire-places are found. The southerners build smaller fire-places than we do for









they believe in making a small fire and getting close to it. Beach and maple and some other kinds of hard wood will burn in a fire-place without snapping out, and it is a good plan to let oak and chestnut alone.

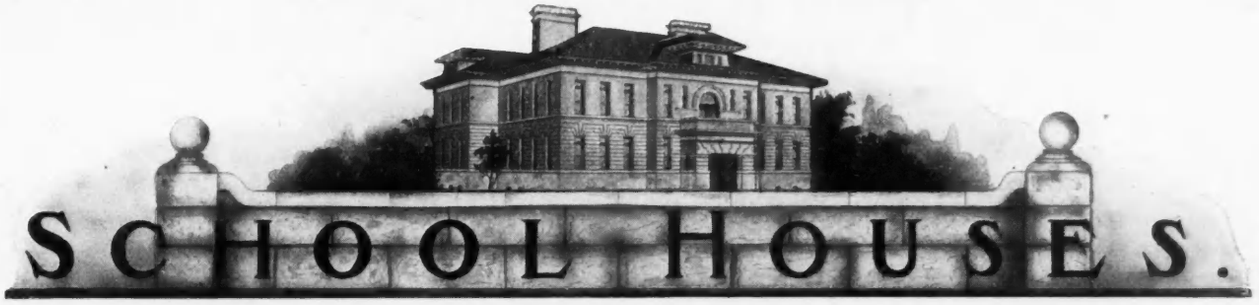
In a great many homes, fire-places are valued as an ornament only, as some people have the idea that more dust and sweeping is necessary when they have an open fire. If a fire-place is properly constructed and rightly used, it makes very little extra work and there is nothing else in a house that adds so much to the comfort of the family unless it be the bath room. If the fire-place is to be on one side of the room the heat and light from the fire is lost to that side and two corners, whereas the fire in a corner fire-place may be seen and enjoyed from any part of the room.

The dining room is 13 by 14 and is well lighted. The three windows on one side being high, small windows. The pantry is located between the dining room and the kitchen and will save many steps. There is a linen closet in the hall which is a great convenience, especially in a house of this kind where there is only one floor. There is no cellar under the house, as it is almost impossible to keep anything for any length of time in this warm climate.

✤

Most Valuable Magazine

Your journal is the most valuable trade magazine I have ever received.—E. A. Kirkland, Homestead, Pa.



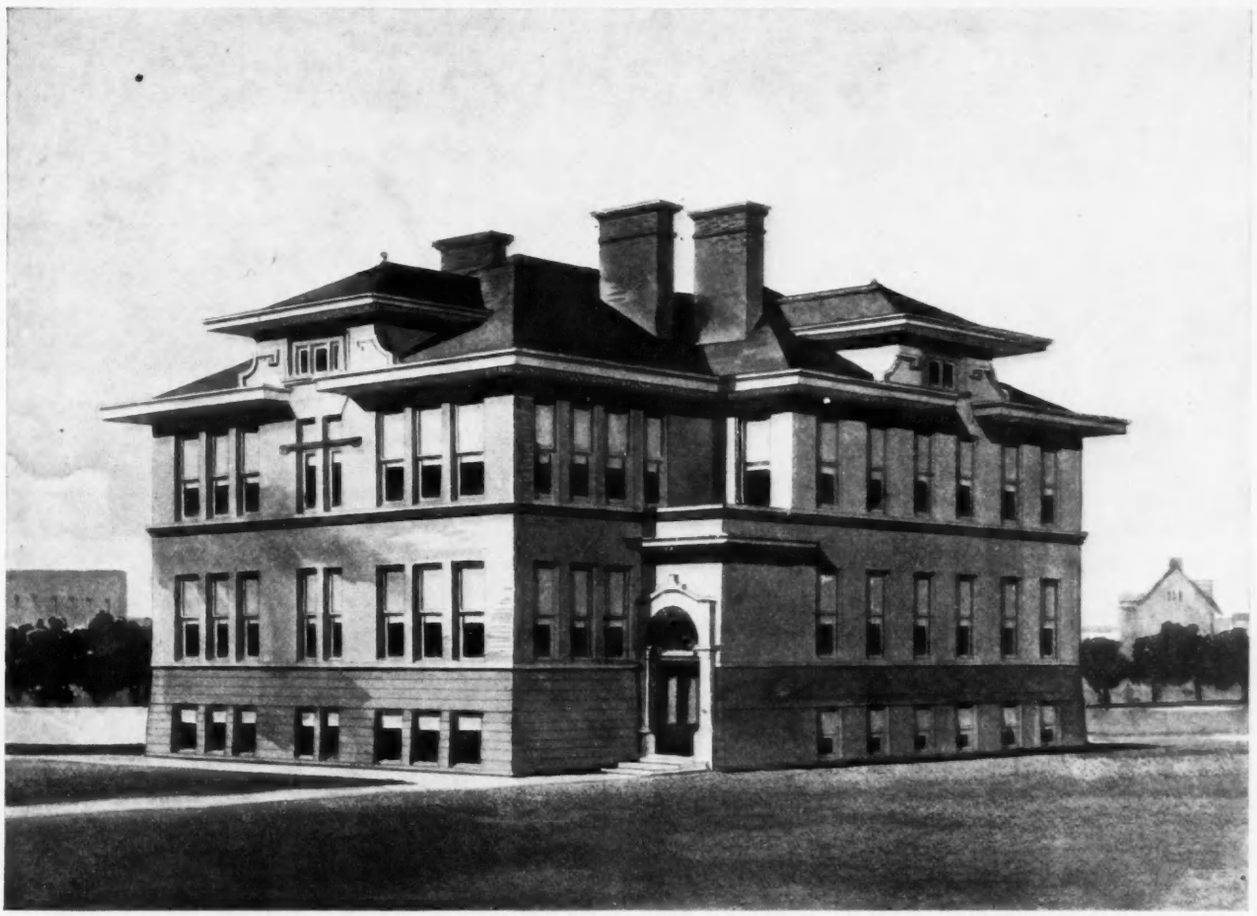
SCHOOL HOUSES.

Two Well Planned High Schools

SHOWING THE ELEVATIONS AND FLOOR PLANS OF EACH—DESIRABLE FEATURES WHICH ARE OF INTEREST TO THE BUILDERS

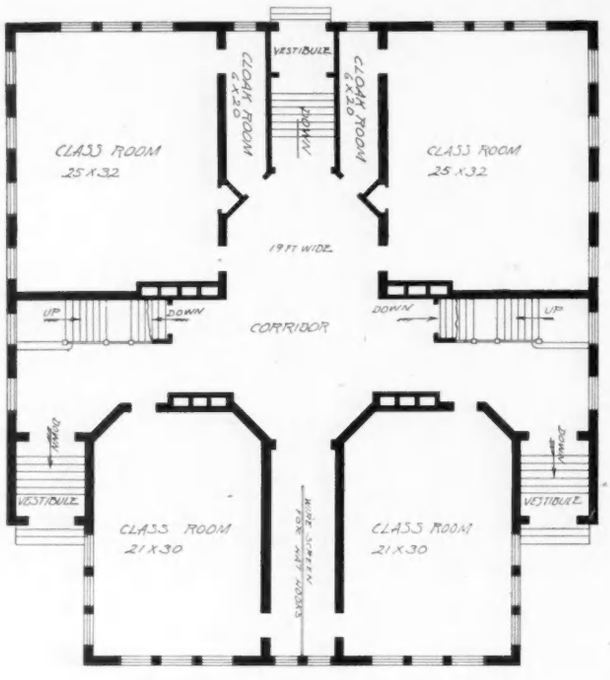
THIS month we are illustrating two high schools which were designed by G. W. Ashby, Architect. The one shown on this page can be used for a grade school and a high school. The first floor being devoted to the grades while the second floor is devoted entirely to the high school. This is done very largely in smaller towns where it would not pay to have two buildings and where one floor is plenty large enough to accommodate all the high school students. The arrangements are such that from two to three grades are in charge of one teacher in one room with the exception of the three highest grades where it is usually necessary to have two teachers. With a little planning on the part of the principal with regard to the classes, this can be easily done without any confusion resulting. A splendid feature of this plan is the two entrances, one on each side of the building and also two stair-ways leading to the second floor. This does away with a great deal of confusion which usually results when all the students are dismissed at one time.

The second floor of this school is divided into a large assembly hall, two class rooms, a laboratory, teacher's office and library. Should the lower floor be devoted to the grades, the library room can be used by the high school students for a cloak room and the teacher's room can be used for a library. No high school should be without some kind of a library as it trains the students to do outside reading and it is this outside reading which often is of more benefit to them



than their regular school work. It will be noticed that there is no space in the assembly room for blackboards and this is a splendid feature, for the assembly room is not a work room and should not be filled with chalk dust as the class rooms usually are. Whatever wall space there is, should be used for hanging pictures, especially such as are appropriate in the school work. Those most commonly used in our schools are pictures of great men of our country and they add greatly to the appearance of the room.

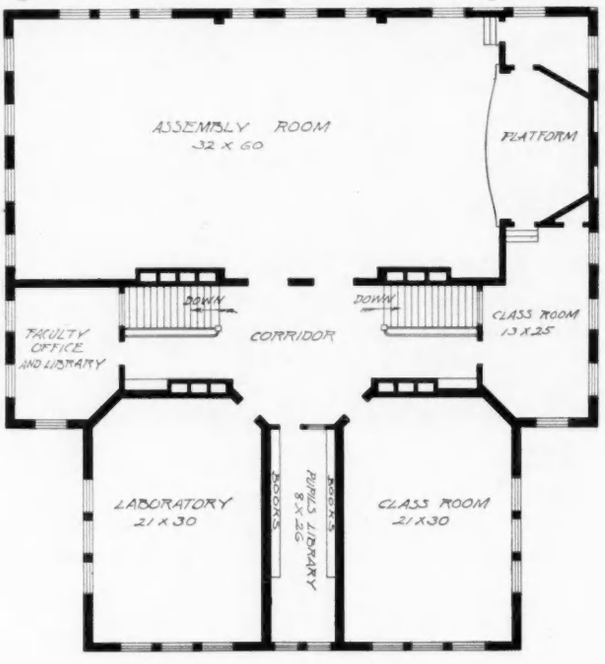
FRONT ELEVATION OF HIGH SCHOOL



FIRST FLOOR PLAN OF HIGH SCHOOL

Ten-Room High School

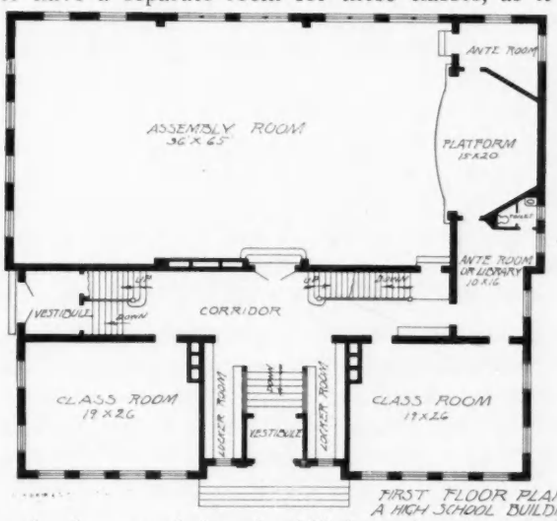
The school shown on page 321 is a large ten-room high school and is one which is suited for a good sized



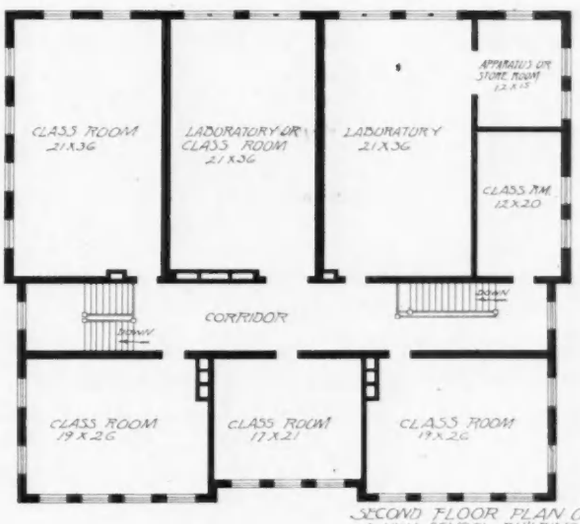
SECOND FLOOR PLAN OF HIGH SCHOOL

town. The entire building is devoted to high school work and the various rooms make it possible to take up quite a variety of work. As foreign languages are

being taught in our high schools at the present time, such as Latin and German, it is absolutely necessary to have a separate room for these classes, as it disturbs the rest of the school if these classes are held in the large assembly room. The assembly room is exceptionally large with a good sized platform. This gives a splendid opportunity for holding exercises on Friday afternoons for an hour. This is getting to be more customary in our schools as the value of public speaking by the students is being more appreciated. The good feature of these exercises is to have debates on some of the leading questions of the day as it not only makes the high school students acquainted with public affairs, but it also trains them to think upon their feet. The fact that so few people are able to get up in a public meeting and talk consecutively and intelligently for five minutes on the subject which is before the assembly, is due to this lack of early training.



FIRST FLOOR PLAN OF A HIGH SCHOOL BUILDING



SECOND FLOOR PLAN OF A HIGH SCHOOL BUILDING

Edward Hurst Brown.

Painting the New House

PROPERTIES OF EXTERIOR AND INTERIOR VARNISH—NUMBER OF COATS TO USE AND TREATMENT OF EACH—HOW AND WHERE TO USE SHELLAC VARNISH

SO FAR, we have considered the materials used for hardwood finishing and the preparation of the surface for the varnish coats. We will now take up the application of the varnish. It has before been stated that every varnish maker lists in his catalogue varnishes which are prepared for special purposes, and that varnish should always be selected which is best adapted for the work in hand. Here a certain experience and judgment are required, because there is no uniform standard of varnish naming, neither do all varnish makers apply the same names to the same grade of varnish. It has even been charged that some varnish manufacturers use the same labels for different grades of varnish, according to the price that is paid, but this accusation would be very difficult to prove. The determination of the quality of a varnish by means of chemical analysis is difficult even for the experienced chemist, and it is practically impossible for the ordinary consumer, so that the purchaser must depend very largely upon the reputation of the manufacturer.

Exterior Varnishes

Varnishes for exterior use, as for example on outside doors, window sash, porch columns and the like, are variously named as exterior or spar varnishes, finishes or coatings, or as exterior coach varnishes. In general the latter term is applied to a somewhat inferior grade and does not indicate the high-class varnish that is sold to the carriage trade under the name of coach body varnish. A good exterior varnish will cost the consumer anywhere from $3.50 to $5.00 per gallon, depending on the paleness of the varnish, although exterior varnishes are sometimes offered below these figures. However, it is economy to pay a good price for a first-class varnish, for the very best are comparatively short lived, when exposed to the trying conditions that must be met by any exterior architectural varnish. A carriage is taken care of, kept under cover when not in use, washed down carefully and wiped with a chamois, and even then, the varnish surface in a few years, begins to show checks and cracks. The varnished exterior of a railway coach is not expected to remain in good condition more than a year or eighteen months without shopping for revarnishing. Now it must be remembered that these are varnished under cover, and are kept protected until the varnish has hardened, while the doors and window sash of a house may be exposed to wind, dust and rain within a few hours after the varnish has been applied. Hence a quicker drying varnish must be used for a building than for either a car or carriage, and it is an unvarying rule that the addition of enough driers to make a varnish dry free from injury by dust within a few hours, shortens the life of the varnish by just so much. Varnishes dry by the oxidation of the oil contained in them, but they also perish by oxidation, hence anything which hastens the drying leaves in the varnish an element that ultimately hastens the perishing. Except, where an exterior varnish is protected from the direct action of the weather, as for example on the ceiling of a piazza, it can scarcely be expected to last in good condition over eighteen months to two years. This is a fact that most property owners are unaware of, and frequently blame the painter because the varnish looks badly after this time, claiming that he has used poor materials, while in reality, the varnish may have done all that could reasonably be expected of it.

As shellac is affected by moisture, no shellac should be used as a first coat on any exposed exterior woodwork, nor anywhere where the presence of moisture might give trouble. Dampness coming through the back of the boards, traceable to a leaky roof, has often ruined a varnished porch roof or a church ceiling, where shellac or a so-called liquid filler has been used as a first coater. Open grained wood, like oak, of course, requires to be filled with paste filler, and should then receive at least four coats of a first-class exterior varnish, wherever the work is exposed to the weather. Some manufacturers make a special varnish for the undercoats, at a slightly lower price, reserving the use of the more expensive material for the last coat. This is the only economy that may be practiced safely. The last coat, on which the resistance to the weather chiefly depends, should always be a varnish made from specially selected hard gums, and must be so proportioned that it has great elasticity. Of course on porch ceilings and similar sheltered locations, it is possible for the sake of economy to do with three coats of varnish.

Where varnish is to be exposed to the weather, it

should always be left bright, or in its natural condition. Rubbing a varnished surface to deaden it or to give it a so-called egg-shell gloss, cuts through the outer surface of the varnish film and exposes any slight porousness that there might be in this film to the direct action of the elements. The rubbed surface may look better for a short time, but it perishes very much quicker than a varnished surface that is left bright. Exposure to the weather soon dims the best varnish, and the effect of a dull finish is obtained soon enough by natural causes. It is best, however, to slightly rub each coat of varnish, except the last one, with curled hair or fine steel wool, in order to remove any roughnesses or inequalities, before the next coat is applied. Ample time for drying must be allowed between coats.

A good exterior varnish should be full bodied, that is, should be of good consistency and not too thin, should flow freely under the brush and level out well when left to itself, should have good brilliancy and be free from specks or motes, and should dry so as to avoid injury from dust in from ten to twelve hours, although at least four to five days should be allowed between coats.

Interior Varnishes

Interior varnishes are sold under all sorts of names, according to the fancy of the manufacturer. The cheaper grades are generally called furniture varnishes, and are composed largely or altogether of rosin in place of the harder gums. Such varnishes are cheap and practically worthless. A good quality of varnish will cost from $2.00 to $3.00 per gallon, if of the ordinary color, such as would be used on the darker woods, and will run from twenty to thirty per cent higher in price if made of specially selected pale gum for use on white woods or over white enamel work. "Hard oil finish" is a name that was originally applied by a well-known firm of varnish manufacturers in Detroit, to a good quality of varnish which they offered for interior architectural work, and as the name was not protected by copyright, it was adopted by other manufacturers who offered inferior grades of goods under the same name, until now it has ceased to indicate quality and is frequently applied to the very cheapest varnishes that are made. The manufacturers of the original "hard oil finish," in order to protect themselves against this form of unfair competition, have abandoned the name for their own product and now offer it under a special trademark brand. The term "hard oil finish," therefore, should not be used in a specification where good work is intended, as the very cheapest rosin varnish could be used and still carry out the letter of the specification.

The demand for a rubbed finish for the better class of dwelling house work has become so great that almost all the first-class architectural interior finishes are made with the idea that they may be rubbed, if so desired. There are some varnishes, however, and varnishes of good quality, too, which are not intended to be rubbed, and would roll up under the rubbing felt. Therefore, if a particular brand of varnish is to be specified, care must be taken to see that it is a varnish which is made to be rubbed before specifying that it must be. It may be well, in this connection, to again emphasize what was said last month, that it is better not to specify any particular brand of varnish, but to allow the finisher to use the make which he is accustomed to use and whose peculiarities he knows thoroughly, since even the best mechanics are liable to make a poor job with a varnish that they are not familiar with. However, there should be some method of specifying the quality of the varnish to be used, and the writer, who has had many conversations on this subject with painters from all sections of the country, believes that until some standard system of naming various grades of varnish shall be adopted and followed strictly by the manufacturers (and this is hardly to be hoped for, however advantageous it may be) the only thing left for the builder or architect is to specify that the varnish shall not cost less than so much per gallon, and that it shall be a copal varnish and free from rosin or benzine.

It is very difficult to give a satisfactory practical test for a varnish, but it may be said that when the can is opened, it should have the smell of pure turpentine, with a slightly sweet smell of the gum, without the slightest trace of the odor of benzine. If some of the varnish is poured into a test tube, it must appear perfectly clear, without any cloudiness. This does not refer to the color of the varnish, as some of the best varnishes are dark in color, and although a pale varnish is more expensive than a dark varnish, it is not necessarily more durable. When a small quantity of varnish is poured upon a perfectly clean sheet of glass, and tipped slightly, if it is a good varnish it will run smoothly, with no tendency to pull. Lay the glass flat, and the varnish should level perfectly and set, or surface dry, so as to be free from injury from dust, in a few hours, but should not harden thoroughly for two or three days. A longer time will be required for a varnish to harden on glass than on wood.

Where a priming coat of shellac or liquid filler is used, from two to three additional coats of varnish are required, according to the quality of the work desired. Where no priming coat has been used, an additional coat of varnish will be needed. For the sake of economy, on cheap work, a coat of glue size is often substituted for the priming coat of shellac or liquid filler, and although this will hold out the finish well and make a good showing—until after the painter has received his pay, at any rate—it has nothing to recommend it, for any dampness coming through from the back of the wood, or penetrating the crevices between the panels and the mouldings, will have a tendency to soften up the glue and ruin the whole work.

In using varnish the can should be left in the room where it is to be used for not less than twenty-four

hours before it is opened, in order to let the varnish become of the same temperature as the room, which should not be less than 60 degrees, and preferably should be from 70 to 80 degrees Fahrenheit. The can should not be shaken, in order to avoid disturbing any sediment which may have settled at the bottom of the can, and only just enough to last for not more than two hours should be carefully poured from the can into the varnish cup or pot, and the can should then be tightly stoppered until more varnish is required. Under no circumstances should any of the varnish remaining in the pot be poured back into the original can after the work is done. Varnish should be used just as it comes from the can and should not be thinned with oil or turpentine to make it flow easier, as by so doing the quality of the varnish will almost invariably be injured. Nor should two different brands or qualities of varnish be mixed together, as this will almost invariably cause trouble.

In varnishing, all panels and other sunk portions of the work should be varnished first, and the raised portions, such as the stiles, rails, mouldings, etc., should be done afterwards. The work should always be begun at the top and be carried downward, the baseboards being done last. Wherever it is possible to do so, all doors, inside blinds, etc., should be taken from their hinges and laid flat on a pair of trestles to varnish them. At least forty-eight hours should be allowed between coats, and each coat should be given a slight sandpapering with very fine sandpaper or be slightly rubbed with fine steel wool before the next succeeding coat is applied. Before the final coat is applied, the surface should be rubbed with curled hair, to avoid scratching. The finishing coat should be laid on with a good body and leveled by brushing lightly over the surface with the tip of the brush before it has had time to set, using no pressure, in order to remove all brush marks and produce an even, glossy surface. If a dead surface is desired, it is obtained by rubbing the varnish, after it has become bone dry, with powdered pumice stone and water, on a piece of rubbing felt, until the desired result is produced. A highly polished and perfectly smooth surface may be obtained by a further rubbing with dry rotten stone on the palm of the hand. This rotten stone must afterward be thoroughly washed from the surface. Some wood finishers advocate the use of kerosene, instead of water, for rubbing, arguing that it obviates any danger that might occur by reason of the water finding its way back of the varnished surface, through any cracks that may have been left between the mouldings and the stiling of doors and wainscots. Practically, there seems to be no difference in the results obtained by the two methods, so if the painter prefers the use of kerosene or crude oil for rubbing, there is no reason for objecting to it.

The rubbing process is necessarily quite expensive, and many people demand something cheaper. To meet this demand, a class of varnishes have been put on the market that dry semi-flat with a dull luster, if such a term is permissible. The exact composition of these varnishes, of course, is kept a secret, but the dulling is probably done by the introduction of wax into the varnish during the cooking process. These dull drying varnishes are intended to be used as the last varnish coat, and although it is claimed that they produce the effect of rubbing without the labor cost of doing this work, this is scarcely true, because these dull varnishes do not dry with the smooth, even surface that is produced by rubbing, and which constitutes one of the greatest beauties of rubbed work. But in spite of the inequalities of surface, the dull effect makes these varnishes very desirable where expense is an item to be reckoned.

Shellac Finish

Shellac varnish has not received the attention it deserves from the wood finishers of this country, due chiefly to the practically prohibitive price of grain alcohol, which should be used to dissolve the gum shellac, in order to produce a free working shellac varnish that will brush out well without showing laps. If the bill now pending in the United States Senate providing for the removal of the tax from alcohol which has been denaturized and rendered unfit for drinking, becomes a law, it will afford the painters of the country the same opportunity to produce some of the finest effects of wood finishing that are now enjoyed by the painters of Europe. Shellac has the advantage of drying very quickly, since it dries by the evaporation of the solvent alcohol, and is especially useful for hurried work. As it does not level up, like an oil varnish, it must be brushed on quickly, using long, even strokes, and no spots must be omitted, since they cannot be touched. No crossing can be done with shellac. Sandpapering or smoothing with steel wool between coats is necessary to insure smoothness. Shellac should not be used in any place that is subject to dampness, on account of the danger of turning white or chipping off, and any moisture on the surface to be shellacked will surely prove disastrous.

French polishing is a form of shellac varnishing, in which the finish is produced by gradually filling up the surface of the wood with successive thin coats of an alcoholic solution of shellac, or shellac varnish, and bringing the surface to a high polish by means of continual rubbing. This is accomplished by means of a circular pad, made by rolling up strips of woolen cloth into a circular form, and to a size which can conveniently be held in the hand. Another form of pad is made of cotton batting covered with a piece of soft linen or cotton rag. The pad is charged with enough shellac solution to dampen it, by means of a bottle with a goose quill through the cork. The shellac is then applied to the wood by rubbing the pad with a circular motion over the face of the piece to be polished. Occasionally a very few drops of raw linseed oil are applied to the face of the pad, to prevent sticking. Just the least possible portion

of oil must be used to accomplish this result, as it must be removed before the polish will appear. The pad must be kept constantly in motion and never allowed to rest for a moment on the surface of the work, and when necessary to remove it, this must be done with a sort of sliding lift. The operation just described must be repeated again and again, taking care each time to use the shellac very sparingly. This should be continued until a thin film of shellac remains on the surface of the wood without sinking into it or disappearing. If too much linseed oil has been used, the shellac will soften and the surface remain pitchy in feeling. When sufficient shellac has been applied, the surface must be allowed to stand for at least twenty-four hours to harden. The next process is called spiriting off, and is accomplished by adding alcohol to the shellac in ever increasing quantities, repeating the previous operations until finally only pure alcohol is used, taking care at this stage to employ a clean rubber. The last rubbing must always be done with the grain of the wood.

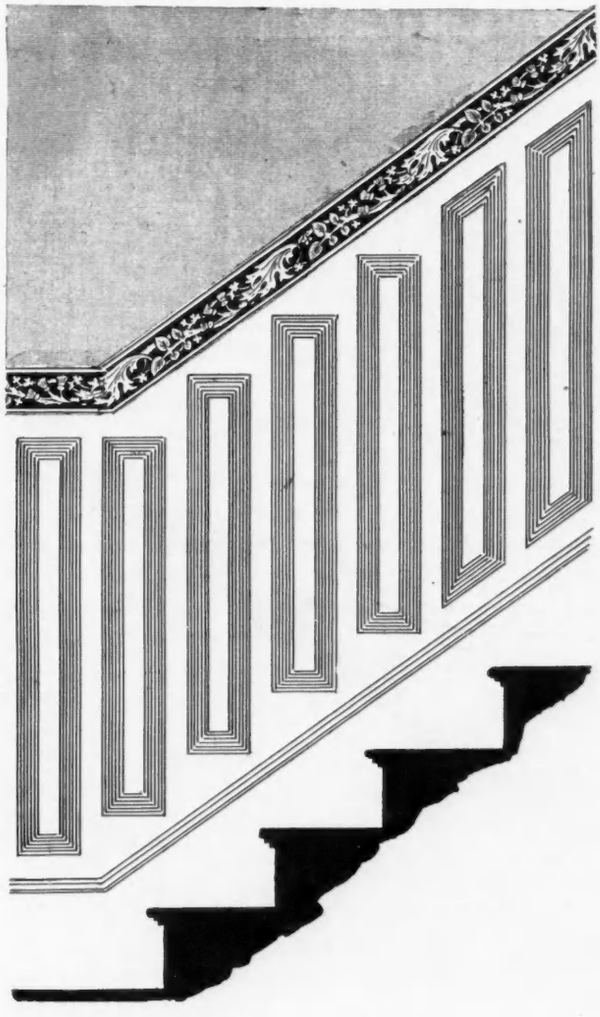
Although French polishing produces a beautiful and durable finish, it is too slow and costly a process to suit modern American ideas, and it is not likely to gain much favor in this country. But the use of thin coats of shellac varnish, rubbed to a smooth surface between the coats with curled hair or fine steel wool, produced such satisfactory results that it is to be hoped that the opportunity will arise when this method of finishing will again come into use.

Decoration of the Stair Hall

HOW TO OVERCOME THE PROBLEM PRESENTED BY THE RAKE OF THE STAIRS—VARIOUS TREATMENTS SUGGESTED WITH APPROPRIATE COLOR EFFECTS

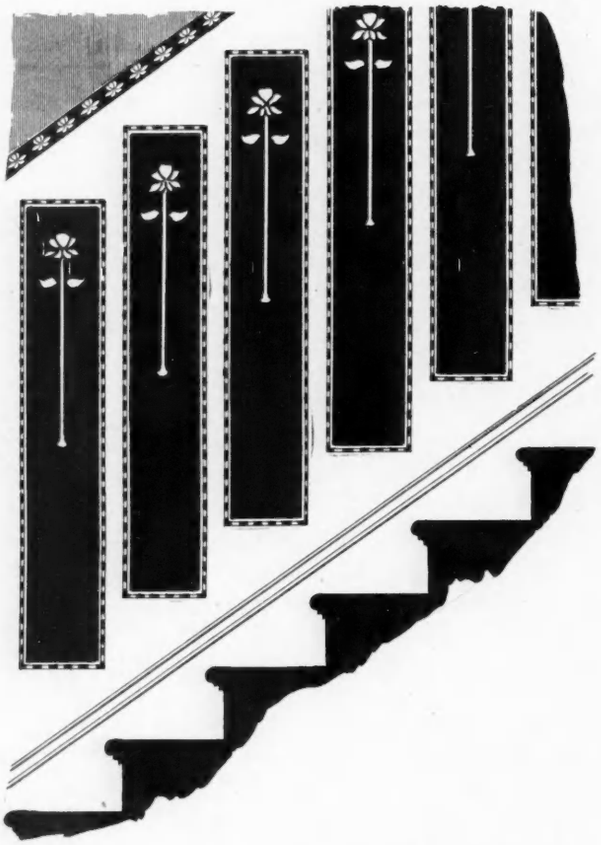
By Sidney Phillips

EVERY house that is built presents as a puzzling and preplexing problem to the decorator the treatment of the wall along the rake of the stairs. The difficulty does not lie alone with the fact that the lines are angular, because the space included in a gable presents no such perplexing problem, on account of its being symmetrical. A triangular space is not necessarily difficult to treat, because a special form of ornament can always be designed to fill it, but the staircase wall adds to the sloping line the fact that any decoration which is to be employed on this wall must at the same time be carried along the level walls of the halls in each story and across the level spaces at the landings. Where posts are introduced by the architect, they form a natural break, which the decorator may take advantage of, but, unfortunately, such posts are seldom used on the flat wall surface, hence the decorator is compelled to meet the problem of carrying up the rake of the stairs, without a break, the same ornament which is used on the hall walls, or else he must stop it abruptly, without any apparent reason for doing so. To add to the difficulty, in many houses the ceiling line makes a sudden break over the start of the stair where the well begins, and the side wall, which is only nine feet high, suddenly become a blank wall space of eighteen or nineteen feet in height. In such a case there seems no alternative to stopping the frieze at the break, even though such stoppage may be difficult on account of the design being a continuous one, without any good method of terminating it. This is almost always the case with the ordinary wall paper or stenciled border, unless it happens to be such a pattern that a panel or other natural break recurs at regular intervals. To overcome this difficulty, the paper hanger should lay out his work from this break in the level, selecting the best point for cutting the border, and run away from the stairs, instead of beginning at the door and running toward the stairs, letting the border stop as it will.



Where a picture moulding is used, another difficult problem is presented. If the moulding follows the rake of the stairs, it serves no practical purpose, but

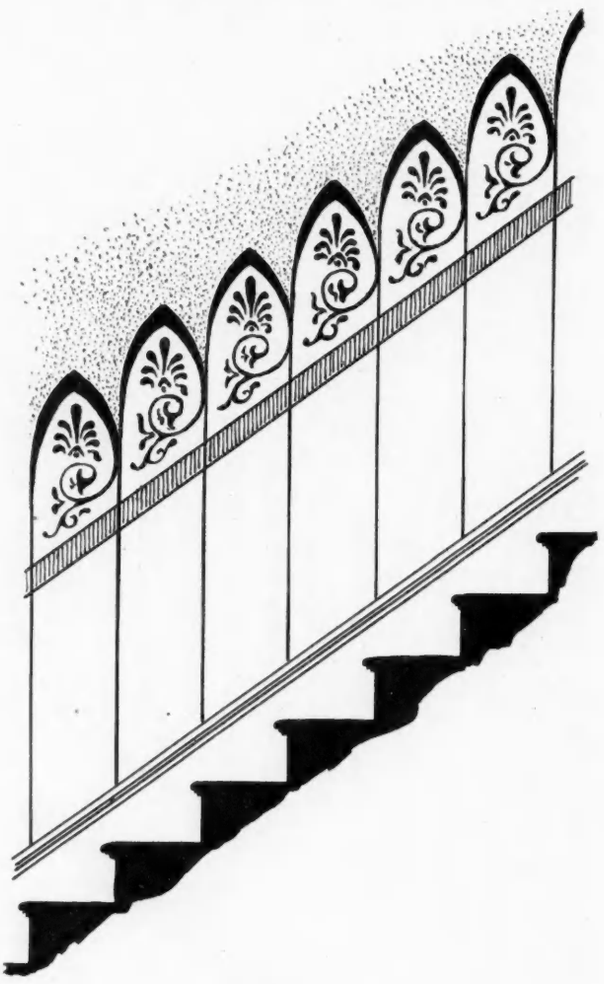
is merely ornamental; yet if, on the contrary, it is carried along the level, so that pictures may be suspended from it at any point, it will run out against the baseboard, if continued far enough. In general,



it is wiser to carry the picture moulding along the slope, and let it serve merely as a divider between the frieze and wall or a break of the ceiling angle. Where an upper third treatment is used, this problem of the picture moulding becomes of great importance, and what to do with the side wall at the point where the stair well begins is very difficult to determine. It is almost impossible to lay down any general rule for the treatment at this point, but the decorator must be governed by common sense and take the special conditions into account. Sometimes the division may be made along a series of right angled breaks, like large steps.

Many very attractive frieze and border designs are not adapted for carrying up the rake of the stairs, because they require to be vertical in order to view them properly. A pictorial or a swag frieze looks absurd when it is hung upon a sloping line, and so would a design that introduces the Empire torch or a basket of flowers suspended by a ribbon. Such a design, when following the slope, gives one the feeling of being on a ship at sea that has been tossed on a wave and is held in the grip of a frozen storm, which prevents it from ever regaining its equilibrium. Better by far to stop a border of this character at the end of the level stretch and let the sloping wall go undecorated. Where an upper third treatment is used, the pattern can, of course, always be hung vertical, and this difficulty is not met with.

A paneled dado also presents many difficulties. For example, let us consider the dado shown in Fig. 1, which is formed by using a two-toned stripe wall paper, cutting it at the top and base in miters, to give a paneled effect. If the panels are made like the two shown on the right of the sketch, although this presents the fewest mechanical difficulties for the paper hanger, the appearance is given of a series of panels that seem to be constantly sliding down hill. This fault is often met with in wood paneling, but perhaps does not impress one so much in wood, on account of the rigidity of the material, as it does when wall paper decorations are employed. It is much better to arrange the panels to form a series of breaks or steps, as shown on the left. When this is done, it will be necessary to match up a plain paper, using triangular pieces to fill in the gaps in the stiling. The border that caps the dado also presents the difficulty of mitering at a different angle than a right angle, and particular care must be taken,



whenever possible, to so arrange the break that the pattern will hide the cutting. This requires considerable ingenuity, but it can generally be accomplished to a greater or less extent.

The advantage of this treatment is much more evident in Fig. 2, which shows a design that may be executed either in wall paper or by means of stencils. Here the panels are so arranged that one comes above each tread of the stairs. If the panels sloped, the floral figures in the center of each one would look unbalanced, and this would be even more noticeable in the case of a square set figure, or a heraldic pattern or shield. While considering this design, it might be well to suggest a suitable color treatment. The long panels might be either in bright red, or in a strong deep, rich blue, against which, as a background, the stencil can be done in ivory white or gold bronze, either of which would show very well indeed. The same coloring would be used for the narrow border at the top of the dado, which takes the place of a moulding. The upper wall could be in a tone of gray or deep straw color.

When we come to the use of stencils, many original treatments can be introduced effectively. For example, we illustrate a design based on the Greek honeysuckle ornament, which would look very effective indeed for a side wall treatment. The pattern terminates in a series of pointed figures that rise one above the other as they follow the slope of the stairs. The vertical lines serve to connect the design with the baseboard in such a way as to carry up the lines of the stair risers and show at a glance the reason for the peculiar treatment. The band of color below the ornament serves to bind the whole design together. The Art Noveau style is full of motives for decoration which are particularly suitable for carrying up the rake of a staircase, the long stems of the flowers and the flowing lines adapting themselves remarkably well to an irregular space such as will be found here.

Siding a Circle

OPERATIONS NECESSARY TO DO THE WORK SATISFACTORILY — FULL EXPLANATION TELLS HOW AND WHY IT IS DONE

By T. B. Kidner

ONE of your correspondents in the April number asks for the method of siding a circle. I presume he wishes to cover a circular corner of a building with weather or clap-boarding, and beg to submit an answer to his query.

While the operation of boarding a circular corner is not difficult, yet it is often avoided by substituting shingles and thus getting over the trouble of making a mould or pattern and sawing special stock. This, however, is unworthy of a true craftsman, and I am glad to offer this communication for the benefit of your correspondent and others who may be interested.

The accompanying diagram (Fig. 1) shows a vertical section with several rows of weather boarding nailed to a stud, and also the plan of the circular corner. To find the pattern for a piece of board which will bend round on a perfectly level line, proceed as follows:

(1) Draw a line (A B) from the lower edge of one board and at right angles to the stud.

(2) Draw an upright line through the center (C).

(3) Continue the line of the face of the board upwards until it cuts the upright line at D.

(4) With D as center, and radius D B, draw a portion of a circle as shown. From the same center and radius D E, draw a similar portion of another circle.

These curves will form the pattern of a board which will bend round the circular corner on a level line. This curved pattern should be sawed out from a piece of thin stuff (the length of the pattern being immaterial), and used to mark out the boarding from wide stock, planed to thickness. It will be noticed that the boarding is the same thickness at top and bottom edges, the usual method of cutting weather boarding thicker on one edge than on the other not being possible in covering a circular corner.

The geometrical reason for the foregoing method is that each piece of boarding is really a part of a cone, the problem being to find the shape of the surface of the cone when stretched out or developed. The principle is capable of being applied in numerous ways and in various trades, especially in sheet metal work and in circular work in carpentry and joinery. As a firm believer in teaching not only the "how" but also the "why," I shall try to make clear the principle involved.

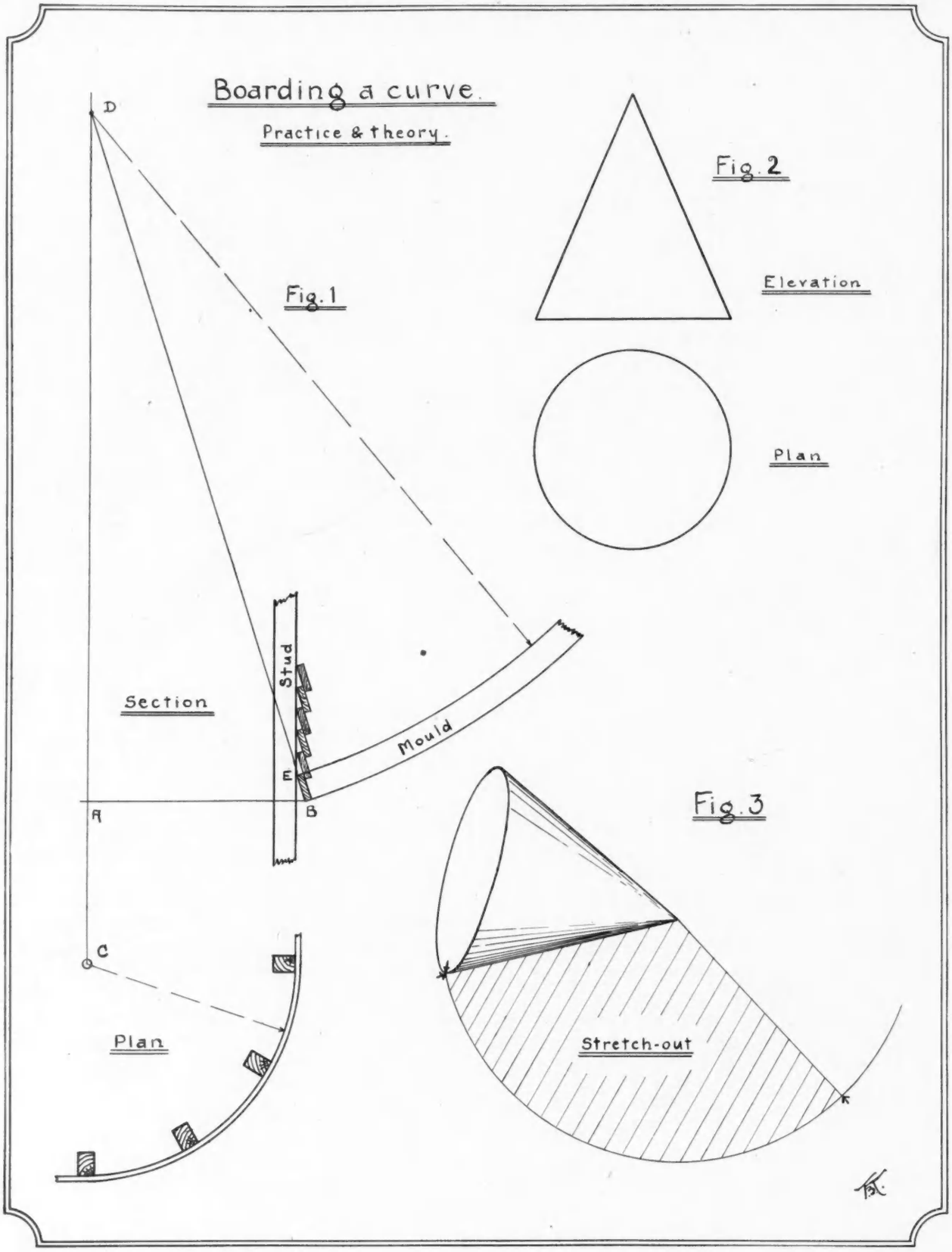
The accompanying diagram will show the method of working in solving the problem mentioned above, namely, to find the shape of a piece of material to cover exactly the surface of any given cone.

Fig. 2 is a plan and elevation of a cone. Fig. 3 is a view of the cone lying down on a drawing board or some convenient flat surface. If the tip of the cone be held in one spot and the cone rolled round it, its base will trace a circle on the board. By placing a mark on the base and starting the mark from another mark on the board, the rolling of the cone will bring this mark on its base down to the board again and indicate the exact shape of the piece of material (say, paper) which would cover the cone. In other words, the shaded portion in the diagram is the stretch-out or development of the surface of the cone.

A common application of this principle is found in the obtaining of the shape of the veneer for the head of a circular window frame with splayed linings. In teaching this, the writer has never found any difficulty in demonstrating to students and craftsmen the "why" of the method. With a small wooden cone, turned on a lathe, and a sheet of paper, it is quite easy to make

the matter clear. It is not, however, quite so easy to do this in a letter with one or two diagrams, but if any reader of your interesting paper cares to have a small cone turned he can easily demonstrate it for himself.

A reference to Fig. 1 will show that the circular boarding of the corner may be regarded as covering the quarter of a cone, or, rather, a series of cones one above the other. The base of the cone is the lower edge of any one board, and the tip of the cone is found by the intersection of the upright line through



the center and the line of the face of the board in the sectional view.

In fixing the boarding it will be necessary to steam the pieces unless the curved corner is of very large radius. Should a wheelwright or boat-builder's steam-box be available, the matter of steaming is easily settled. But it is not difficult to improvise a rough steam box which will serve the purpose; or if that is too much trouble, soaking in very hot water for an hour or two will be as effective as regular steaming.

How to Finish a Store Front

OLD TIME METHODS AS COMPARED TO THOSE OF THE PRESENT TIME—BEST ARRANGEMENTS FOR PLATE GLASS WINDOWS

By A. W. Woods

AS THIS question is one which is bothering a number of our family, it has been thought best to go into the subject rather fully.

To the Editor: Rush City, Minn.

I would like to have some of your able staff give illustrations and describe one or two ways of finishing off store fronts where rectangular cast iron columns are used. This refers especially to wood work in connection with same. I am a reader of several publications and to my knowledge I have never seen anything relating to the above subject

M. POECHMANN.

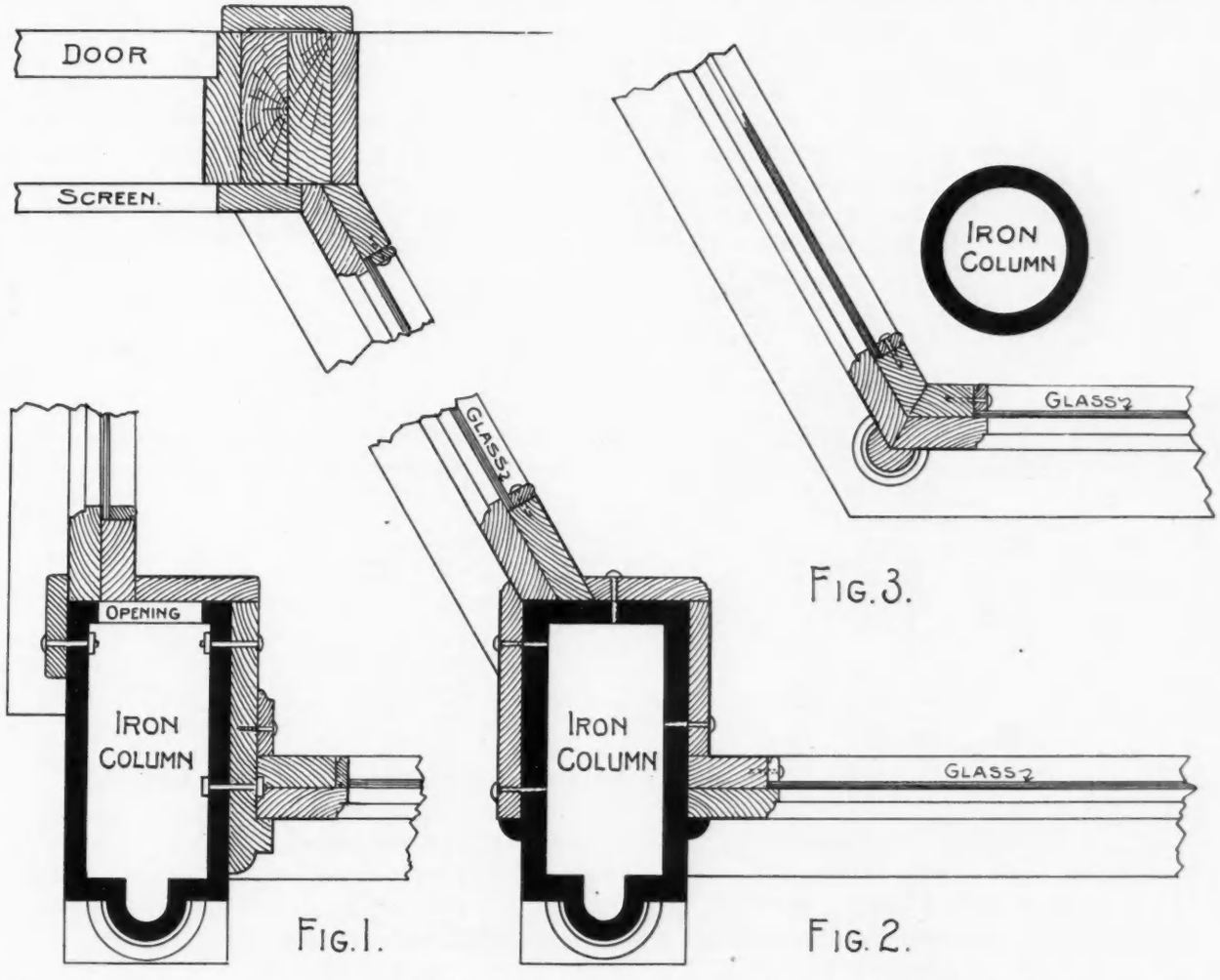


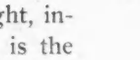
FIG. 1. FIG. 2. FIG. 3.

Answer: Fifteen or twenty years ago it was quite the common way to use columns and cast lintels to support the upper work of store fronts, and we daresay most every contractor has oftentimes had a proposition of this kind to work out. The columns were, as a rule, selected from stock patterns—something that the local foundrymen happened to have on hand, to save time and cost of a new pattern, you know; consequently, the builder did not always know just what kind of a column, or how he was going to fit the woodwork to it, till he was ready to put it in. In the accompanying illustration are shown some of the ways we have used in our own work.

In Fig. 1 is shown a plain box column, with several openings in the back. These openings were usually oval shape and large enough to insert the hand. In that case, the woodwork can be made secure by having a few holes drilled and using stove bolts as shown.

In Fig. 2 is shown another style of box column,

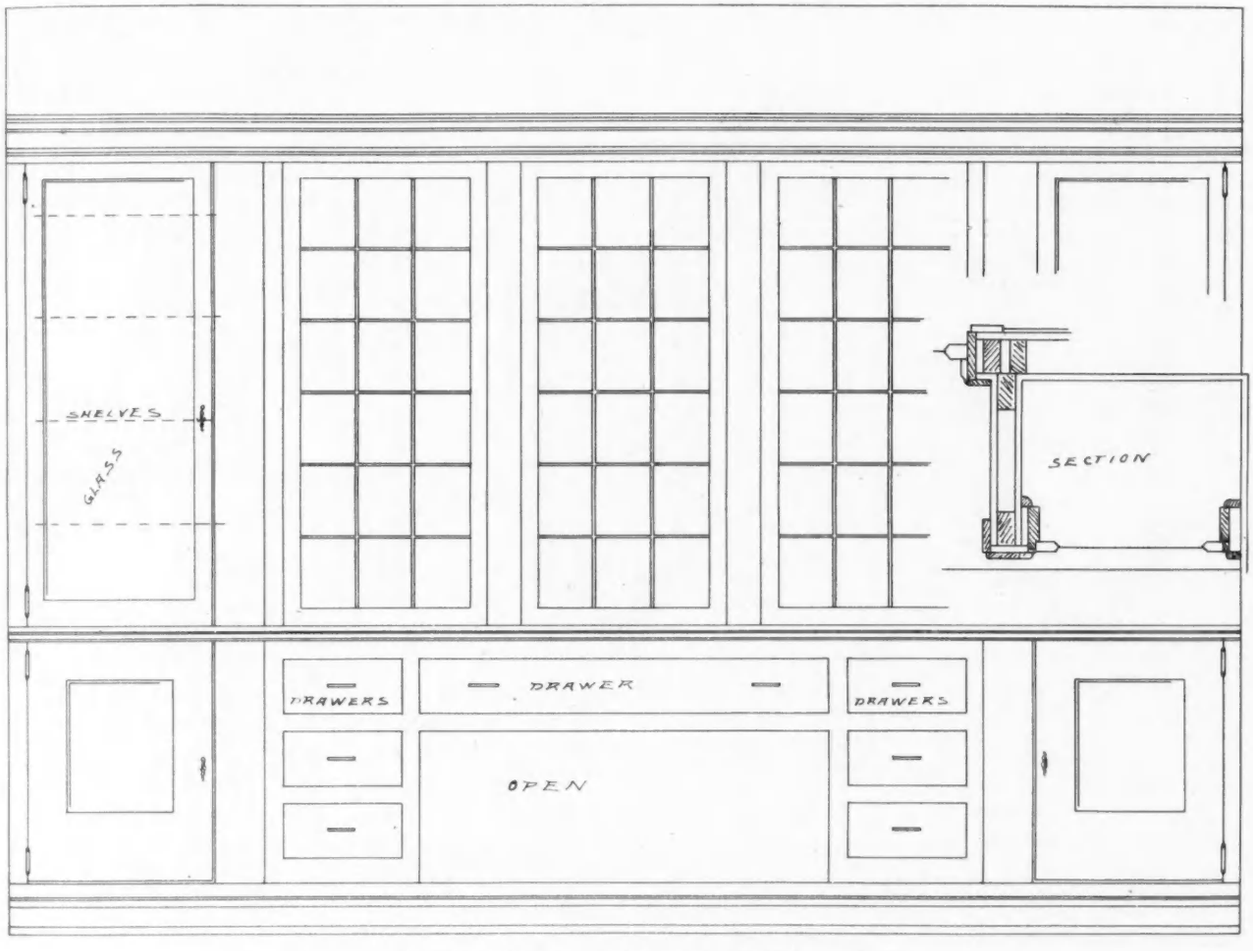
suitable for a mullion or an angle column. In this, the back is cast solid, and with quarter rounds cast at the sides, near the front, which serves as a stop for the face of the sash, and the woodwork back of the sash is made secure by means of lug screws. Now, since the casting is usually more or less rough and not suitable to take on a finish to correspond with the interior woodwork, it is a good idea to get out the boards that form the stops wide enough to cover all of the iron work that would show from the inside. However, this kind of construction is fast giving way to the more metropolitan style of large plate glass windows with the least obstruction to the view. Architects and builders are now being quite frequently called upon to prepare plans for remodeling such fronts as shown in Figs. 1 and 2, the columns usually being removed and the masonry work above carried on steel beams. This generally requires reinforcement at the ends, or pilasters, because the weight, instead of being distributed along the front, as is the case in the use of columns, falls on the piers or pilasters. The frame work can then be built in entirely of wood or light iron work, and future changes can be made without shoring up of the front. This construction is usually for a 25-foot front. If it be a 50-foot front, then two plain, round columns should be used at either side of the angle, at the splay of entrance, as shown in Fig. 3. These columns are independent of the woodwork and should have a firm footing below and independent of the watertable. The latter can then be set at any time in front of the column and the woodwork fitted to it. There being no extra weight on the watertable at the columns, will always keep in alignment. The columns in a front of this kind are not objectionable, as they can be used for decorative purposes, and, if given a finishing coat of aluminum paint, they rather add than detract from the appearance of the building. There are now on the market a number of patented devices for sash bars and angle columns, each possessing more or less merit, but it is not our purpose to talk about these at this time, but more to show what may be done with wood to give a clear, open front.



Has Done Me Lots of Good.

I must say that the AMERICAN CARPENTER AND BUILDER has done me lots of good and I will recommend it to every carpenter and contractor.—Geo. M. Belew, Alexandria, Va.

Detail of Drawer Case



ELEVATION OF DRAWER CASE

Something the Boys Can Make

HOW TO MAKE THE VARIOUS APPARATUS WHICH IS NECESSARY IN DRAWING, SUCH AS DRAWING BOARD, T SQUARE AND OTHER ESSENTIAL ARTICLES—KINDS OF WOOD TO USE AND HOW TO GET ACCURATE RESULTS

EVERY boy who is interested in woodwork ought to own and be able to use a set of drawing instruments.

So important is it that one should know exactly what he is going to do before he undertakes to do a piece of woodwork that many manual training teachers will not allow a boy to begin a piece of any importance until the boy has first made a drawing, showing

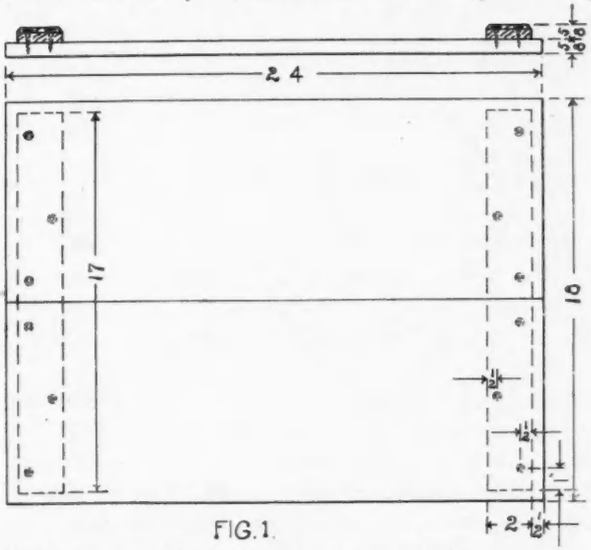


FIG. 1.

all the parts, with their dimensions and the manner of assembling, putting them together.

True, many good carpenters and cabinet makers never make drawings, but simply work out their ideas as the work progresses. This method of working has limitations, however. It means that the one having the idea must work out that idea. If he should wish to have another do so; or, if he should wish the help of another he must make drawings.

Boys have not the ability to forsee the difficulties of construction which will arise, as has the experienced workman, hence the planning necessary to make the drawing will insure his avoiding many mistakes by becoming thoroughly acquainted with his work before he begins it.

The necessary instruments for ordinary work are few in number and can, for the most part, be made by the boy himself.

The drawing board, Fig. 1, should be constructed of the softest material. Soft or white pine is probably the easiest to secure and is most commonly used. The stock must be soft, else the thumb tacks which are used to fasten the paper to the board could not be easily placed and removed.

Cut roughly two or more boards, which can be squared up to five-eighths by eighteen by twenty-four inches after they have been jointed together. Square the edges, using trysquare and straight edge for testing. The edges should be so planed that when two adjoining edges are placed together they shall fit at all points. Glue the edges and clamp the pieces together by means of cabinet maker's clamps. Use hand clamps also, if necessary, to keep the boards from buckling.

While the glue is drying, prepare two cleats by squaring up two pieces to five-eighths by two by seventeen inches. They may be beveled, as shown in Fig. 1. Drill and countersink holes in them for a sufficient number of screws to fasten the pieces together firmly.

After the glue has hardened, scrape off the surplus and plane up the two broad surfaces smooth and level. Square up the edges and ends. The ends must be absolutely straight and square, as the handle of the T square will usually be placed against them.

Next, fasten the cleats near the ends of what is to become the underside of the board. The construction shown in Fig. 1 is probably not the best, but it will be

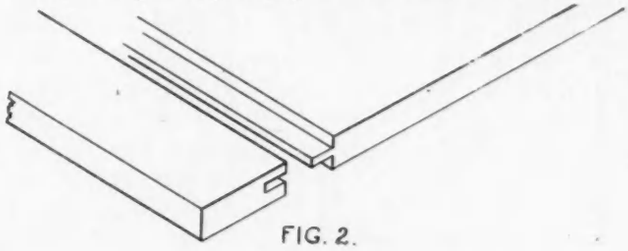


FIG. 2.

found difficult enough for the average boy. Those boys who can are advised to put the cleats on the ends of the board instead of underneath.

This can be done by matching the cleats to the ends of the board. Use a matching plane to put tongues on the ends of the board and also, after changing the bit, to put the corresponding grooves in the cleats. Fig. 2 shows this joint.

If the board is to be of the approximate size of the one just described, the ten-inch boards should be cut so as to square to five-eighths by eighteen by twenty and three-fourths inches. This allows three-eighths of an inch for the length of each tongue.

The cleats should be cut roughly a little longer than eighteen inches so as to allow for cutting off after they have been fastened in place.

Glue the tongues, put on the cleats, and clamp the whole together. Sometimes a screw is placed through the cleat at its middle and then into the board.

There are several advantages in this construction

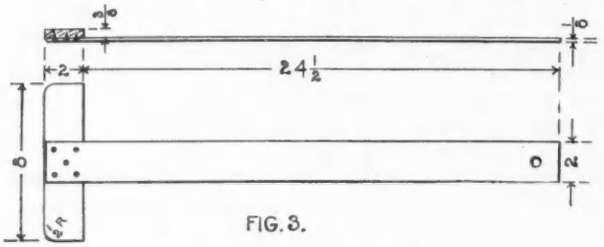


FIG. 3.

over the first described. The cleats are less in the way. When the cleats are screwed across the grain of the wood the shrinkage of a board as wide as this might cause it to crack or open at the glue joint. Or the swelling of the board might cause its surface to become curved. With the second fastening the board may move in the grooves of the cleats without hindrance unless too much glue has been used.

Allowance for the "give and take" of a board which has cleats fastened to it is often made by making the screw holes larger than is necessary for the screw itself. Round-head screws with washers are then used, the washers covering the holes.

The T square, Fig. 3, should be made of a harder wood than that of which the drawing board was made. Pear wood makes a serviceable instrument. Any wood that will not mar readily nor warp easily will do.

Sometimes several kinds of wood are glued together

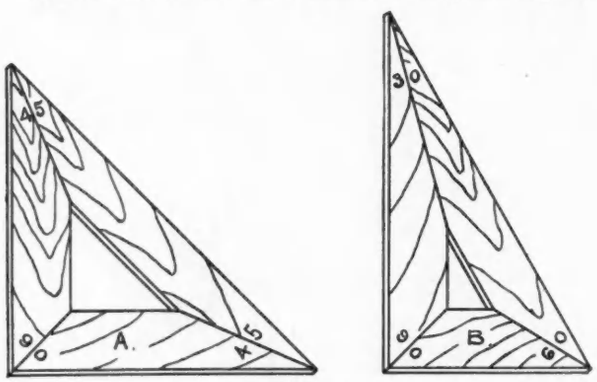


FIG. 4.

so that the warping of one may be counteracted by that of the others. Again, T squares often have their edges made of some transparent substance such as celluloid, so that the markings on the paper can be seen through them. The advantage is obvious. The one-piece T square, however, will answer all purposes of the beginner.

For the beam, or handle, square up a piece of stock to three-eighths by two by eight inches. The outer corners are to be rounded, using a one-half-inch radius. The inside edge, or the edge which is to rest against the board, must be perfectly straight and square.

The blade of the T square should be squared up to one-eighth by two by twenty-four and one-half inches. The edges, especially the upper edge, should be perfectly straight and square.

Fasten the blade to the beam, using five small screws as shown in Fig. 3. Use the steel square to get the edges of the blade at right angles to the inside edge of the beam. A one-quarter-inch hole in the blade near the end will form a convenient place by which to hang the instrument upon a nail when it is not in use.

The triangles, Fig. 4, are to be made of the same material as that of which the T square was constructed.

They might each be made of one solid piece of wood, but would be likely to warp out of shape. A better way would be to square up about four feet of three-sixteenth by one and one-eighth inches.

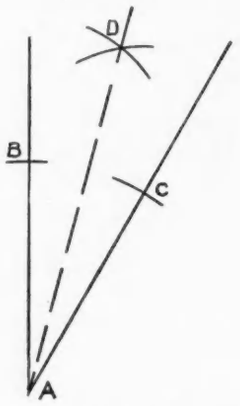


FIG. 5.

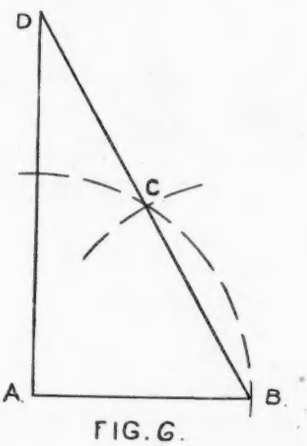


FIG. 6.

In as much as it is the angles only and not the sides which need to be of a definite size, little attention will be paid to the length of the sides.

For the forty-five degree triangle, Fig. 4, saw off two pieces about six inches long and one about nine inches long. Cut a forty-five degree mitre on one end of each of the six-inch pieces. On the other end of each cut a twenty-two and one-half inch mitre, whose long point shall be six inches from the long point of the miter just made and which shall be on the same edge.

Fit the forty-five degree miter so that the sides of the pieces on which they were cut shall make a right angle.

Next, get the length of the hypothenuse, or long side, by measuring from point to point of the twenty-two and one-half degree miters which were cut on the two six-inch pieces; or measure from the six-inch mark on the blade of the steel square to the six-inch mark on the beam. Cut twenty-two and one-half degree miters on each end and fit to those already made.

After fitting the three joints, clamp two sides in position in such a way that the joint may be sawed in a line parallel with the broad surfaces. Saw and place in the kerf, after gluing, a thin piece of wood of a thickness equal to that of the kerf, which shall serve

to hold the parts together. Treat the remaining joints in the same way.

Plane the surfaces smooth, and the edges so that they shall make proper angles one with another. The

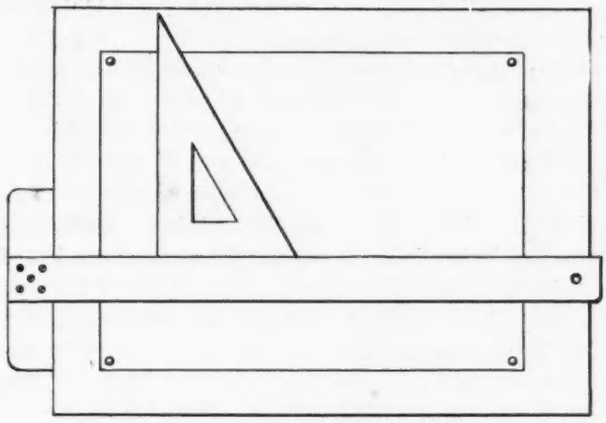


FIG. 7.

bevel square should be set and used for testing in conjunction with the try-square.

The thirty-sixty degree triangle is similarly constructed. The length of the shortest side may be four and one-half inches. Fig. 6 shows the manner of determining the length of the other two sides and also gives the angles required. Draw two lines that shall be perpendicular one to the other. Set the compass at four and one-half inches between the points and, using the point where the two lines meet, Fig. 6, A, as a center, describe a quarter of a circle. With the same radius, place the point at B and cut the circle at C. Draw a line from B through C until it cuts the vertical line at D. The angle at B is the one of 60 degrees, at A ninety degrees, and at D is thirty degrees, and by measuring the length of the sides A-D and B-D we get the lengths of the unknown sides of the triangle.

The angles used to make the miter cuts will, of course, be but one-half of those given; that at A being forty-five, at B thirty and at C fifteen degrees respectively.

The manner of getting these angles from the steel square will be found in the article on the steel square by A. W. Woods in the May, 1905, issue of this journal.

Any high school boy with a knowledge of plane geometry will find pleasure and no trouble in bisecting his own angles. Fig. 5 will serve as a reminder.

A description of the manner of using the drawing instruments is not in the province of this article. Fig. 7 shows them placed ready for use.

Estimating on Houses of Different Materials

COMPARATIVE ESTIMATES GIVEN OF HOUSES CONSTRUCTED OF DIFFERENT BUILDING MATERIALS—THINGS TO BE CONSIDERED IN GETTING THE APPROXIMATE COST

By George E. Walsh

THE modern builder and architect finds it increasingly more difficult to estimate in advance the approximate cost of a projected building, and with the rapidly changing prices in building materials, increased cost of labor, and the manufacture and application of new constructional materials, a successful builder must study many problems which a few years ago were outside of his province. To keep abreast of the times in modern architecture a good deal of reading and study commands more and more of the time of the builder. When we built simply houses of wood, constructed on plain lines, the task of the architect and builder was comparatively easy; but to-day clients demand variety and artistic forms, and above all else they require comparative estimates of the cost of different types of houses.

When plans of a house are drawn by an architect his client is more than apt to suggest many changes, and then ask such questions as these: What will it cost to build the house in wood, brick, brick veneer, stone, cement blocks, hollow terra cotta blocks, and stucco work? These are natural and legitimate questions in this age when all of these different building materials have their use, and when thousands of houses are going up in different parts of the country composed entirely or in part of all the various materials. The aim of the builder or architect must be to suit clients without sacrificing any of the fundamental laws of good construction and designing.

We all know that stone costs a good deal more in fact than almost any other material, unless it may be in certain localities where stone quarries make the delivery of the stone comparatively reasonable. Yet many people want stone houses, and refuse to accept any substitute. The durability of the stone makes it a desirable building material, and in expensive houses it lends itself to artistic treatment which proves a potent factor in its favor. The various manufactured building materials amply testify to this by their endeavor to imitate rough and tooled stone on the outside of the blocks.

Brick and terra cotta are also durable materials, and possess with stone many virtues of special importance. Manufacturers of these building materials have sought to attract special attention to their products by making them in a great variety of forms, sizes and surface finish. They cost less than stone, and they serve in many respects equally well in modern buildings. Cement blocks have attracted wide attention in the past year or two, and their manufacture and use on a large scale has caused the builder to stop and consider their merits. They have entered the field so that both architect and builder must include them in their estimates. Stucco work, with cement plaster applied to the exterior walls of plain bricks, terra cotta blocks or cement blocks, has commanded the attention of many householders, and a great variety of houses of this character are being constructed in all parts of the

country. The ease and cost of repairing the exterior made of stucco work are important items of consideration, especially along our coasts where the salt air tends to destroy paint, wood, and other unprotected materials.

But few houses are constructed entirely of one material. Combinations of two or more of these materials are found everywhere, and their use in this way increases the difficulty of the builder in estimating comparative costs. Wood is employed in all of the buildings, and it can never be entirely ignored in building conditions. We may build brick and stone houses, but wood must be used for the interior trim and decoration. Lumber is also used in most of these houses for piazzas, porches, roofs, and bay windows. Wood beams and joists for carrying the floor loads must also continue to be employed until manufacturers of steel work can find equally satisfactory substitutes in the ordinary detached house. Both from an artistic and practical point of view wood is used extensively in brick, stone, terra cotta and cement block houses, and it does not seem probable that this material will ever be discarded. The steadily increasing cost of lumber is one of the most important factors in this situation.

Substitutes for Lumber

But while we are told that lumber has increased almost to the prohibitive point in many localities, and that as a consequence our houses must in the future be constructed chiefly of brick, stone, terra cotta and cement, it should be clearly understood that nearly all other building materials have increased. This instead of limiting building operations seems to have had no influence whatever. In 1905 there were expended in building operations in 165 cities of this country a trifle over $711,000,000, which is nearly two hundred millions greater than ever before invested in similar enterprises in the same cities scattered pretty uniformly throughout the East, West and South. In the past ten years bricks have nearly doubled in value, Hudson River hard bricks going from $5.25 per thousand in 1896 to $10.25 in 1906. Lime has advanced from 70 cents per barrel for common Eastern in 1896 to 92 cents in 1906. Nails have decreased in cost in the same time, but window glass has increased from $1.55 to $1.72 per box, although in 1905 the price quoted was $2.04, showing that cost has declined in the past year from the highest record. Yellow pine has increased from $17 to $26 per thousand, yard schedule, in the past ten years; Pennsylvania hemlock timber from $11 to $21 per thousand feet, and Eastern spruce timber from $15 to $27.

Lumber has not, therefore, been the only material that has steadily advanced, and its declining use cannot be attributed entirely to this fact. More artistic effects and variety are sometimes obtained in the exterior by combining lumber with stone, brick and cement, and the apparent demand for the day is for such pleasing combinations. The question of how much of each material is to be used is one that must be answered by the builder and the house owner in respect to the relative cost. Comfort is the first aim in house construction; then artistic and pleasing effect, followed in order by cost, durability, and general details. The addition of piazzas, spacious windows, elaborate cornices and bay windows is a matter dictated by the desire to secure comfort and attractive effects. They cost money, but physical comfort in a home cannot be entirely dissociated from the idea of mental rest and appreciation. A comfortable house may be so ugly in appearance that it will offend the eye continually, and thus produce irritation and dissatisfaction so that its value is weakened one-half.

But it is better to secure pleasing effects without elaborate ornamentation than to spend money in unnecessary and inartistic trim and frills. Plain, simple, but proportionate lines give more satisfaction than ornate designs which demand an expensive outlay of money and material. Frequently an elaborately over-ornamented modern house costs more to construct than a brick, brick veneer, or even stone structure built on plain, simple classic lines. Of the two the latter is to be preferred a hundred times over. Thus it may be seen that in the combination of different kinds of building materials a clear sense of the fitness of things is a most necessary step to secure the best results.

Approximate Cost of Houses

An ordinary house, twenty-six by forty feet on the ground, and thirty feet from the bottom of the cellar floor to the top of the roof, would contain 1,040 square feet, or 31,200 cubic feet. An architect figuring roughly on such a house would place the cost at about three dollars a square foot or ten cents a cubic foot. The house in either case would figure out about $3,120. This of course is based upon plain inside work and no fancy equipment. It would include sufficient windows and doors to make the house light and comfortable. The rooms would be of the ordinary standard size for such a cottage, and the whole work fully up to grade. It would represent an ordinary good house such as we find constructed by the thousands in different parts of the country.

The price of lumber and labor in different parts of the country would make it possible to bring this price down. It is possible to build such a house, with two stories plastered and the third or attic left unfinished, at a cost of nine and possibly eight cents per cubic foot; but to secure this some of the comforts and conveniences of the ordinary house would have to be omitted. There could be a saving made in quality of lumber, shingles, hardware, and plaster, but it would hardly be wise to adopt such a course unless the inferior material used was plainly stated to the owner in advance. Frequently owners who know nothing about the quality of building materials are deceived by the architects and build-

ers who dishonestly say that the cheaper house is just as good. It is wiser to be frank with the owner and explain patiently the difference in the work. In the end the reputation of the builder will be safer.

On the other hand to run the price up to twelve and fifteen cents per cubic foot is just as easy. That means more comforts in the interior, more elaborate trim, superior grade of walls and ceilings, and better equipments generally. The tendency of some to save by decreasing the size of the house is a mistake too often made. Other things equal the larger a house is built the less it will cost per cubic foot. Large, commodious rooms are more to be desired than small, cramped ones. Unless more elaborate trim and equipment are placed in the larger house, its cost should show a relative decline per cubic foot over the small structure. With no more angles, bay windows, doors and hips on the roof to build the cubic foot cost is increased only so far as actual plain work is concerned. Figuring on a house of the above size and of another forty by fifty, with the same interior trim and equipment, it should demonstrate to an owner that a commodious house is the better investment where land is ample and unrestricted.

Porches, piazzas, and elaborate plumbing and heating systems are the luxuries which most house owners stumble upon, and they invariably blame the builder in the end for what they consider exorbitant cost. Estimates of different kinds of plumbing and heating should therefore be made separately so that the owner can get just what he contracts for. Here, too, honesty of representation is the wisest policy for the builder or architect. It is a fatal mistake to recommend an inadequate heating plant for a building simply for fear that a higher-priced one will frighten the owner. If after a free, dispassionate presentation of the facts, the owner wishes to adopt the cheaper system the risk is his and not that of builder or designer.

While estimates on a simple small cottage may thus vary from $3 to $5 per square foot, omitting porches, a brick house can be built for prices ranging from $5 to $6 per square foot. A fair brick veneer might be constructed for $4 per square foot, omitting porches, and finishing off only the first and second floors, and with a fair cellar floor and walls. Bricks of the better class have advanced so that a house built ten or even five years ago at a cost of $10,000 would more than likely cost $13,000 to-day. The cubic contents of a brick house can be estimated at 14 to 22 cents per cubic foot. These figures represent the extremes. A house costing 22 cents per cubic foot should have rather elaborate equipment and finish, while one constructed at a cost of only 14cents would have to be skimped in many ways. The quality of the bricks used and the cost of masons in any part of the country are factors which enter greatly into the question, and must be settled in each individual case.

Comparative Cost of Stone and Wood

Combination of bricks and lumber naturally increase the difficulty of advance estimates. A house with brick walls, but a shingle roof and wooden bay windows, should cost a little less than a house of bricks throughout, but much depends upon the number of angles and curves in the structure. Where the house is designed on plain lines so that many turning of corners is avoided the cost can be kept within reasonable limits. A brick veneer house is a very satisfactory structure, and this combination is being used very extensively.

A stone house costs the most, and it is only by combining stone with wood that an economy can be obtained so that its final cost will come anywhere near brick. One of the factors in stone houses is the cost of handling the heavy blocks. While a brick mason can handle his bricks easily without machinery, or a carpenter depend almost entirely upon hand power for putting his frames together, the workman with stones must resort more or less to hoists and derricks to get his heavy blocks in position. There is apparently no way to overcome this difficulty, and stone masons cannot facilitate their work by any device. The cost of rough stone even in the most favorable locations is in advance of bricks, and the cost of construction does not vary much from year to year. But with the combination of lumber with stone some very handsome houses have been constructed at 22 to 25 cents per cubic yard.

Stucco work is popular. This is combined with many kinds of materials. Stucco and shingles on a wooden frame have proved very satisfactory in some towns, and at a cost of 20 cents per cubic foot. A stone house of equal refinement and construction would probably cost upward of 30 cents per cubic foot. Stucco on frame houses costing 25 cents per cubic foot are quite common, but local conditions may increase or decrease this cost. A brick and plaster house is another improved method of construction that gives very pleasing and durable effects. With walls of frame, sheathed and veneered with brick and stucco, a house can be constructed for 20 cents per cubic foot if the lines are plain and simple and no elaborate inside trim is attempted. A brick and plaster house costing 24 cents per cubic foot permits of some rather elaborate interior trim and equipment.

It will be seen from the foregoing that the question of estimating in a rough way on the relative cost of different types of houses is one that depends upon local conditions, the price of labor, and the character of the interior trim, heating and plumbing systems, and similar equipments. Nevertheless, with a little care a builder or architect can secure for his client estimates that may in the end run within a few hundred dollars of the actual cost, but to do this one must study modern conditions and changes closely and carefully.

✦

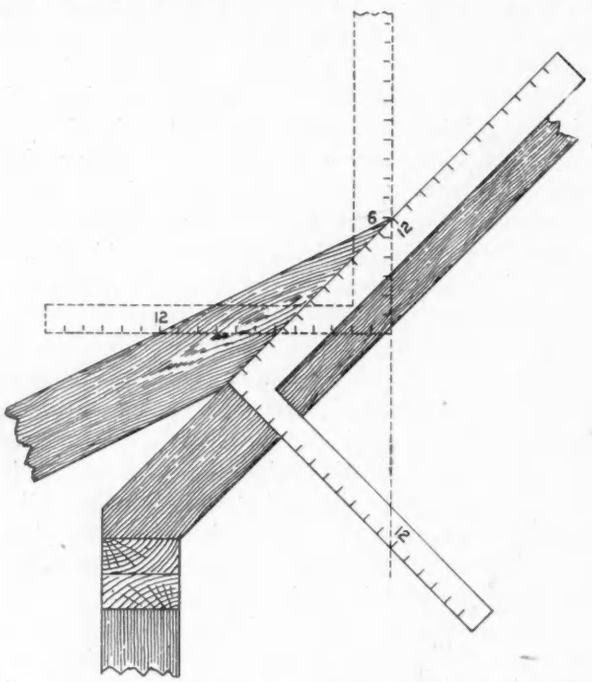
Best Medium of Information

I consider your magazine the best of its kind and the best medium of information.—S. Fluor, Oshkosh, Wis.

Adjusting One Pitch to Another

To the Editor: Wiconisco, Pa.

Is there any way of obtaining the bevel of the top end of a rafter having ¼ pitch to fit on top of another rafter having ½ pitch without first making a sketch? I thought perhaps there is a rule by which this can be done, and if there is, it



will often be handy to cut braces in roof trusses and other places. PETER C. BODDORFF.

Answer: Lay off the plumb cut of the lesser pitch and to the bevel thus obtained apply the square with the figures that gives the steeper pitch. Taking Mr. B's example, 12 and 6 would give the plumb cut for the ¼ pitch and 12 and 12 gives the same for the steeper pitch. These figures applied to the plumb cut of the lesser pitch gives the required angle. The blade giving the cut as shown in the illustration.

A. W. WOODS.

Finishing White Pine

To the Editor: Marcellus, Mich.

I am building a kitchen cabinet of Georgia and white pine. We would like it a little darker, something on the order of light cherry. How would you finish it?

WILL M. BEADLE.

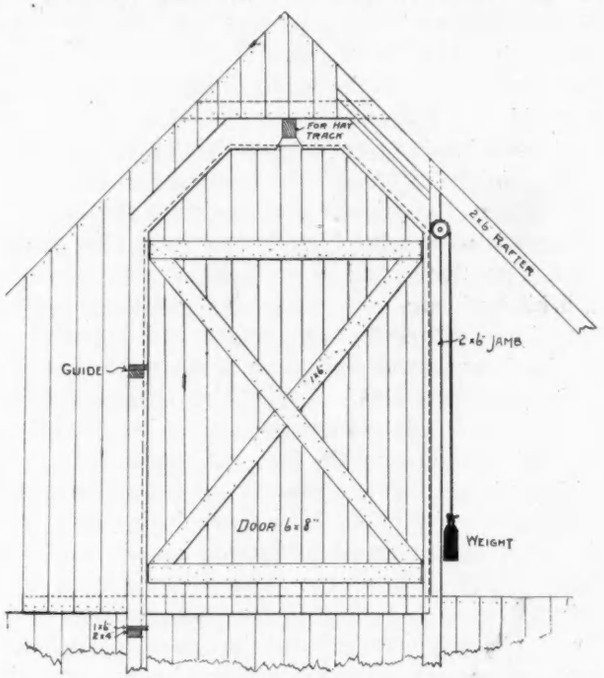
Answer: The wood should first be given a coat of cherry oil stain, such as can be bought at any paint dealer's, thinning with turpentine if necessary. Then give a coat of thin shellac and finally give two additional coats of a first-class interior varnish. If a dull finish is desired, the simplest method would be to use one of the dull drying varnishes as a last coat. Another method would be to give the wood a thin coat of grain alcohol shellac and finish with two additional coats of any of the varnish stains made with aniline color, extensively advertised by many of the varnish manufacturers under fancy trade names. These dry so quickly that great care is needed in applying them to broad surface, like large panels, but most of them would give good results on a piece of furniture such as is mentioned.

EDWARD HURST BROWN.

Making Hay Doors

To the Editor: Chula, Mo.

I herewith send you my plan for making hay doors. Having built a great many hay barns I have adopted this plan for doors. It is both light and durable and is I think the



best way that I have seen. In making the door use 6 penny common nails, they extend through both thicknesses of lumber and make a good clinch. This door can be made on the ground and then hung in place. I think the sketch will explain itself. GEO. W. HARMAN.

Cause of Plaster Cracking

To the Editor: Litchfield, Minn.

Please tell me what is the cause of the cracking of the plastering along the lath in a house I built this summer. The

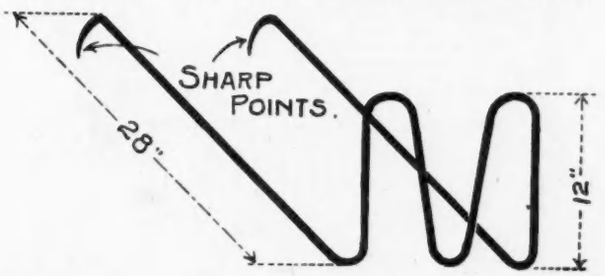
plastering has been on for two months and has been fine up to a short time ago. About three weeks ago the house was overheated. JOHN A. EKBLAD.

Answer: There are several causes for plaster cracking. The real cause in some cases is hard to determine without a personal examination. I judge that in this case it is due to shrinking of the lath, as the plastering seems to crack along the lath lengthwise. If the house was overheated the ceiling would get the most of the heat, as the tendency of heat is upward, which would produce a greater shrinkage of the lath. The lath might have been put on wet or green, causing extra shrinkage when dried out with extreme heat. Often the lath are put on in a stretch without breaking joints, which would make the ceiling more susceptible to cracking. Sometimes the plaster cracks because of not getting the right proportions when mixing the mortar. So if there happened to be a combination of causes the cracks would be likely to be a permanent feature of the job. I. P. HICKS.

A Device for Holding Shingles

To the Editor: Larchwood, Iowa.

Enclosed find drawing of the most useful article I have in my kit of tools. It is for shingling where the roof is sheathed tight, and especially at the top in putting on the last rows of

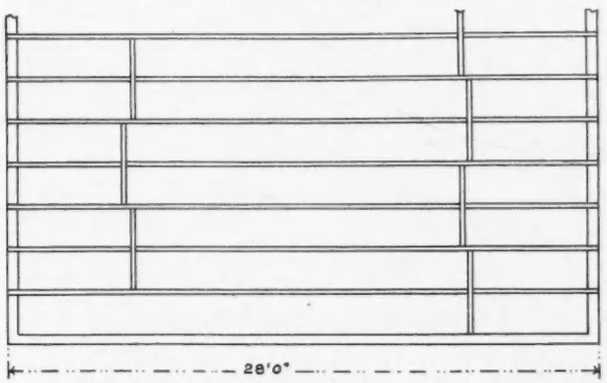


shingles. The object is to hold the loose shingles in convenient form for the workmen. The hooks are sharp and can be set anywhere on the roof or hooked over the comb. If you think it worth while to illustrate the drawing, I am sure it will be appreciated by many of the readers. It is made out of ⅜-inch steel pump rod and any blacksmith can make them. A half dozen of these holders will be plenty for most any one. HARRY KELSEY.

How to Brace a Roof

To the Editor: Clarkston, Mo.

Will you please give through your paper how to brace a flat roof building 28 feet wide. The joist will have to be



spliced at the roof and also at ceiling, as it is not desired to use columns to support the joist. J. B. LIVINGSTON.

Answer: Judging from the above, there will be no other than its own weight to support, aside from snow that may collect on the roof. That being the case, would interlace the joist as shown, using joist at least 22 feet long. Placing the ceiling joist on 16-inch centers and the roof joist on 24-inch centers and spaced so that every other roof joist will be directly over a ceiling joist and brace with fencing alternately with a vertical and diagonal brace toward the center. Would use 2 by 10-inch for the roof joist and 2 by 6-inch for the ceiling. A. W. WOODS.

How to Lay Out a Gothic Ceiling

To the Editor: Irving, Kans.

Enclosed find a sketch of a Gothic ceiling over a pulpit in a church 12 feet wide and 8 feet in depth. There will be two hips, seven main arch rafters and many cripples.

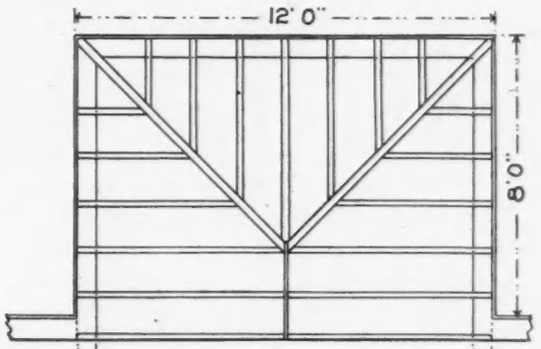


FIG. 1. PLAN.

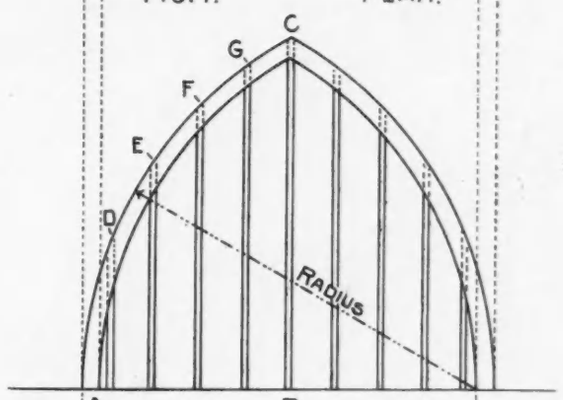


FIG. 2. ELEVATION.

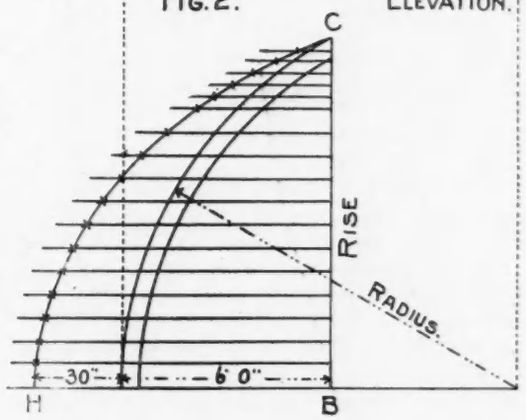


FIG. 3. DEVELOPING THE HIP.

Will you give a rule for finding the shape of the hip, also the shape and length of the cripples? E. E. BLAZIER.

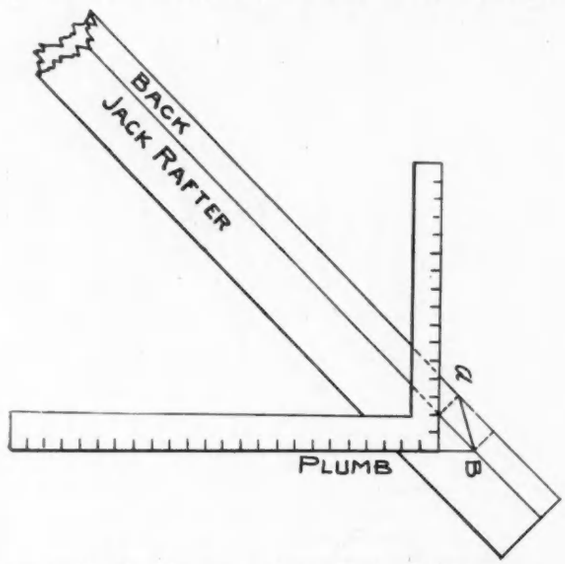
Answer: In Fig. 1 is shown the plan. This simply shows the number of rafters contained in the roof and would show the same for O. G. or any other shaped rafters or for any pitch given the rafter.

In Fig. 2 is shown an elevation of the Gothic. This should be laid out full size on a level surface, or floor—though it is only necessary to draw one-half of this diagram, as that part enclosed by A-B-C. Then A-B will be the shape of the main, or common rafters. Now the cripples, or jacks, are simply a part of the common rafter and their lengths are as from A to D for the first jack, A to E for the second and continue on to the line C-B, which is a common rafter and consequently is the same as A-C. The dotted lines across the side of the common rafter represent the distance apart the plumb lines will be for the side cut of the jack, which in the case of a square corner is the width of the jack. In Fig. 3 is shown how to find the corresponding shape for the hip. In this the common rafter is shown the same as in Fig. 2. Lay off any number of parallel lines extending beyond the curve of the rafter as shown. Now measure the length of these lines from the rise to the curve and add 5-12 to that length. In other words, the first or bottom line is 6 feet long, to this add 5 inches for each foot, or 30 inches to the line beyond the curve and check. Proceed in like manner for all of the lines, adding 5 inches for each foot and 5-12 of an inch for each inch. After all of these lines have been thus measured, draw an offhand curve through the checks and this will be the shape of the hip. A. W. Woods.

Side Cut on Jack Rafters

To the Editor: Killbuck, Ohio.

I read an article in the American Carpenter and Builder for January on hip roof frames, but Mr. Martz did not give a rule for the side cut on jack rafters. Here is my plan for laying off side cut of jack rafters with the steel square, which



is very simple when once learned. It will apply to any pitch of hip or valley jack rafter when the hip or valley sets on an angle of forty-five degrees. I find in my experience very few carpenters are able to lay off jack rafters with any set plan. The plumb cut is always the same as the plumb cut on a common rafter. To get the side cut, set off the thickness of your rafter, which in this case is two inches shown on the plan. Square across back of the rafter to A. Then mark A. B., which is the desired cut. After you have laid off one rafter with the steel square set bevels A. B. to lay off the balance of the rafters. A. H. Uhl.

Adding One-Half Story

To the Editor: Stockwell, Ind.

Which would be the best way to raise a house from 1 story to a story and half? The roof is a good one and do not care to take it off. Simply to cut nails under plate and raise the rafters with plate to the required height, then put studding under the required length. The house is built like a T. Wm. W. Lehr.

Answer: I think it would be better to cut the studding off about one foot below the plate, then raise the roof and splice the studding. The piece of studding left hanging to the plate can be nailed to the spliced piece which should run up to the plate. This would be much easier than to cut the nails as referred to, besides there is no way of getting at the plate to securely renail it to the new studding. A. W. Woods

Constructing a Circular Porch

To the Editor:

The method shown herewith, I have used for several years

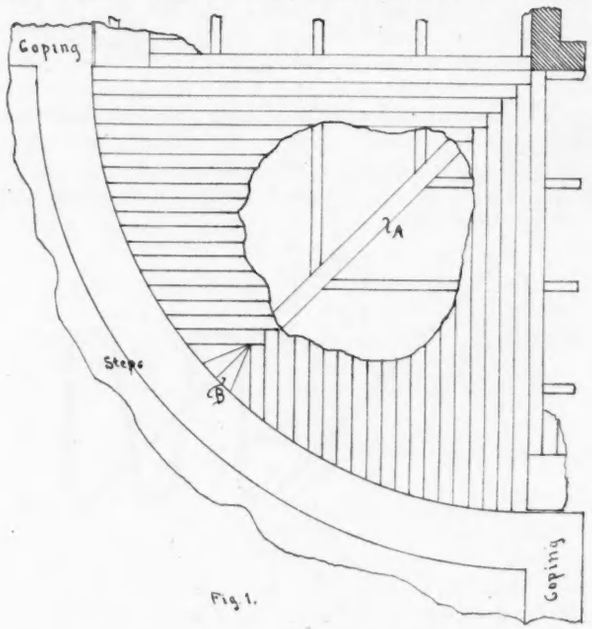
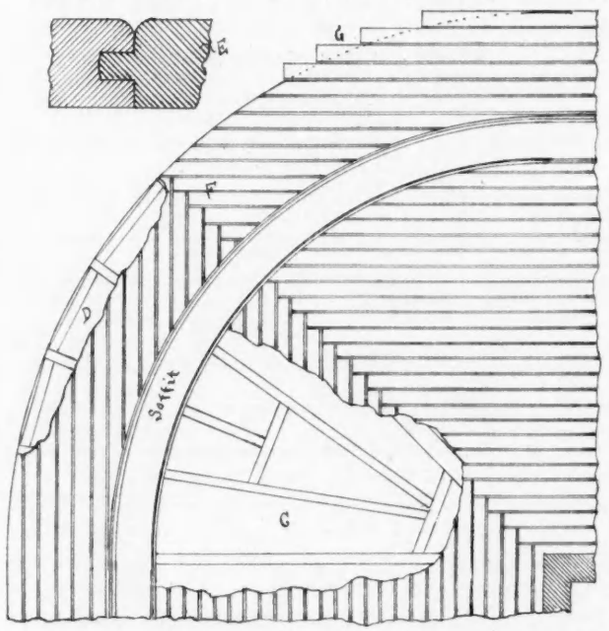


Fig. 1.

It looks better than the mitered seam, is perhaps as good and is cheaper.

In Fig. 1 A is a 4″x6″ timber, which gives a good bearing



for the ends of the flooring boards. *B* shows the method of finishing the floor where steps come on the circle.

Opening C in Fig. 2 shows how the heels of the ceiling joists are put in to give support for the heels of the rafters.

F in Fig. 2 shows the method I use for putting a ceiling planceer on a quarter circle porch. D shows cripples fitted in between the joists to which the ends of the ceiling boards are nailed. I put the planceer on and saw to the circle afterwards as shown at G.

The ends of the ceiling boards are pared with a gouge to match the boards running the other way. E shows a neat way to make a ceiling. S. F. GORE.

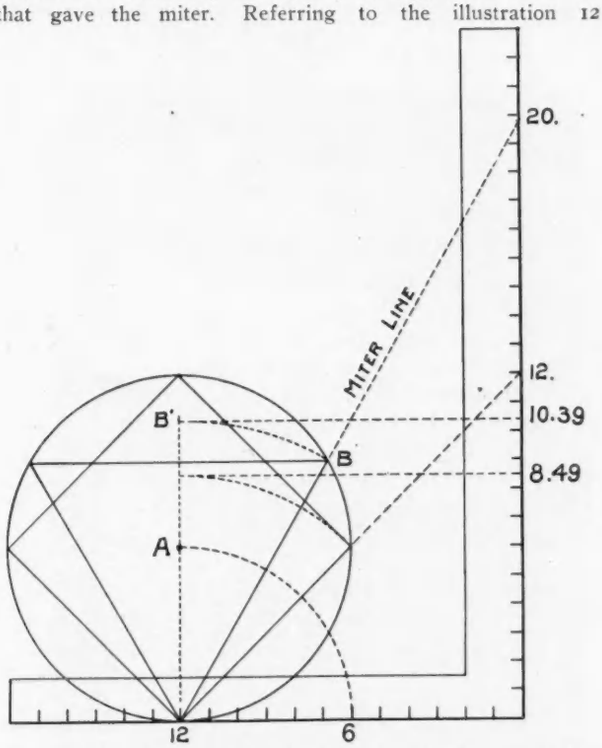
Length of Sides of a Polygon

To the Editor: St. Paul, Minn.

I wish you would give a rule for finding the lengths of the sides of a polygon to go inside of a given circle.

A. C. OLSEN.

Answer: This may be done by the figures on the blade that gave the miter. Referring to the illustration 12



and 20.78 (20¾) gives the miter for the triangle. The latter figures also represent the length of the sides of the triangle when it has a one-foot inscribed diameter. These same figures are also used to find the length of the sides when the circumscribed diameter is one foot as follows:

The diameter being 12 the radius must be 6, and this this taken at a point vertically over 12 as to A, from which describe the circle. Intersection of the miter line as at B. Then 12-B is the length and this taken on the vertical line as at B′ and squaring across to the blade will intersect at 10.39 (10⅜) and represents the length of the sides, for a one-foot diameter. The length of the sides of a square is also shown in the diagram. A. W. WOODS.

Preventing Leaky Window Frames

To the Editor: Equality, Ill.

I read with interest Mr. Woods' article in the January number in regard to leaky window frames. This is all right so far as the frame alone is concerned, but the trouble is not always in the making of the frame, but elsewhere as I will show further on. First it is seldom that a storm sheeted house leaks at the frame. Second, a newly weatherboarded house nearly always leaks at the windows if there happens to come a fine blowing mist. Some painters do not take the pains to work the paint well into the joints between siding and casing, but shrinkage of casing and corner boards will leave an open joint through which a fine blowing rain will find its way to the studding and finding its way down the trimmer under the frame, it then spreads to the plastering. I have more confidence in paint properly applied around the frames than I have in the frames themselves. In proof of this theory, some houses will leak at the corners as well as at the frames. Another proof which I have tried is to leave out the trimmer under the frame entirely. I have never tried this but once. Late last fall I built a house and as an experiment I left out the trimmer. This house did not leak at the frames, while another built at the same time of the same kind of material and the same kind of a house with frames made exactly alike did leak at the frames. See that the joints are well filled with paint and I think your trouble with leaky window frames will be greatly reduced.

J. H. GODFREY.

How to Support a Gambrel Roof

To the Editor: Owasa, Iowa.

I would like to know which is the best way to support a gambrel roof on a barn 36 feet wide and posts 20 feet high. The floor being 11 feet below the plate. Please give sketch of same. W. H. BOWMAN.

Answer: The space from floor to plate being 11 feet, will require extra strong bracing. Would recommend using 6-inch studding set on 24-inch centers and brace as shown in the

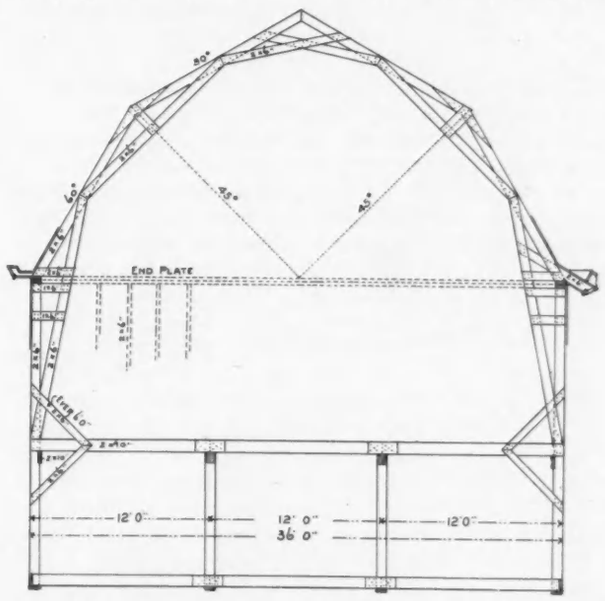


illustration. The rafters to set directly over the studding and braced to same. The floor joist should be tied to each other, either by letting them lap, or by nailing a board on the side. All parts should be framed accurately and well nailed.

A. W. WOODS.

Painting Structural Iron Bridges

To the Editor: Newry, Pa.

Could you give me some information about estimating the painting of structural bridges? Some of the bridges have structural work over the top and the bids call for scraping, painting and tightening bolts. G. W. WEAVER.

Answer: It is almost impossible to give any general rule which will apply to estimating the painting of iron bridges,

since it will depend not only upon the condition of the surface but upon the kind of bridge. It costs more, for example, to paint a through truss bridge than a plate girder, since the former is more difficult to clean the rust from, and in some cases the work must be done from a boatswain's chair. Moreover, railroad bridges will require more labor than highway bridges, since all scaffolding, etc., must be swung so as to avoid delaying trains. We fear our correspondent must use his own judgment in this matter, examining carefully each bridge to see just how much scale and rust may be required to be scraped or removed and whether the parts are difficult to reach or not and what appliances can be used. If it is possible to use it, a portable sand blast, mounted on a car or wagon and run by a steam or gasoline engine, is an economical method of cleaning off rust and scale. If the sandblast is not available, the least expensive way is to scrape the iron well and then remove all rust or scale with a special hammer, made with a hammer face on one side and a chisel edge on the other. Where this will not reach, a tool similar to a cold chisel, only longer, must be used. After the metal is well hammered and scraped, it should be thoroughly cleaned with wire brushes and dusted off before painting. The iron must be painted before any rain or other moisture gets on it. Old chipped paint can be removed from ironwork by giving it a coat of kerosene and after it has partially softened the paint, burning it off with a gasoline torch. No special paint is mentioned by our correspondent as having been specified. The cost will depend on the kind of paint used and the number of coats. Red lead is difficult to apply on account of its tendency to sag. The addition of about 20 per cent of whiting corrects this tendency and does not materially affect the red lead. The Union Pacific Railroad uses 10 ounces of lamp black and 12 lbs. of red lead to the gallon of raw linseed oil in painting all their bridges. Red lead being a natural dryer, the use of extra dryers is objectionable. Any other color may be used over a red lead priming. White lead or ready mixed house paints should never be used on the bare iron. Where the bridge is to be painted black, both graphite and several special carbon paints have proved useful. The old standby, Prince's mineral brown, is also highly recommended, and a special air drying enamel made for structural metal work by a New York varnish manufacturer, has given good satisfaction.

EDWARD HURST BROWN.

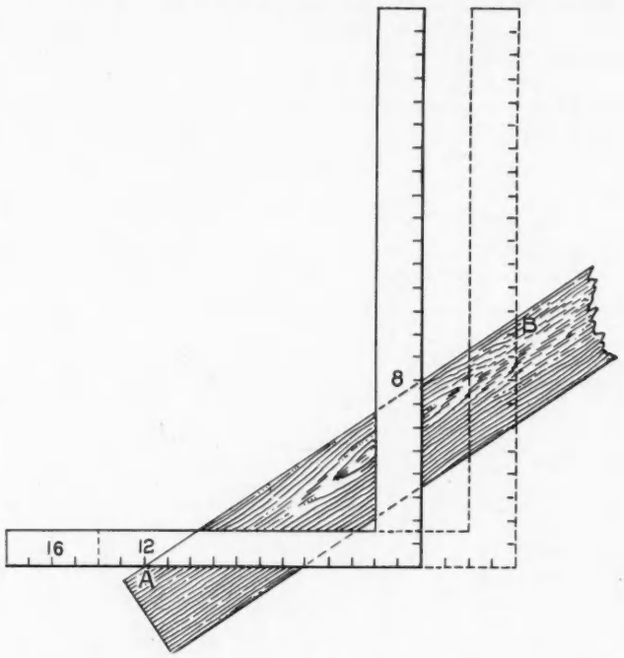
To Find the Length of Jack

To the Editor: Vining, Kans.

I would like to know how to get the length of a hip jack where they are set on 16-inch centers for the ½, ⅜, 1-3 and ¼ pitch. J. V. MARTIN.

Answer: For the ½ pitch it is simply the length taken diagonally from 16 on the tongue of the square to 16 on the blade, because in the illustration the length for the 1-3 pitch is shown as follows:

Lay the square on the timber with the figures that give



the seat and plumb cuts as 12 and 8. Now mark along the tongue and slide the square along this line till 16 on the tongue rests at the edge of the timber as at A. Then the length or common difference will be as shown along the edge of the timber as from A to B. Proceed in like manner for any other pitch. A. W. WOODS.

How to Finish Plinth Blocks

To the Editor: Fort Collins, Colo.

Please tell through your correspondence department whether plinth blocks should be square edged or rounded when used with rounded edge door casings and decide a controversy as to the correct form. All agree that the top edge should be rounded, but differ as to the sides. G. S. PRENTLER.

Answer: The plinth is the lower block of a pilaster, or column. The base of any proportion. In casing finish, it is more generally known as the "Base Block." As to whether it should be round or square edged, is largely a matter of taste. Personally we prefer to leave the perpendicular edges square, as the base and carpet strip in connection with same will make a neater looking job. A. W. WOODS.

CONTENTS FOR JUNE, 1906

PRACTICAL TRADE APPLIANCES

An Attractive Catalogue

The illustration herewith shows the cover of a very attractive catalogue just issued by the W. C. Toles Co., of Chicago, who manufacture a rapid-acting vise for wood-workers which never fails to give complete satisfaction. The cover to this little book is made direct from a photograph of a fine piece of woodwork made by Mr. W. C. Toles himself. The raised portions are pieces of wood screwed to the background, while the letters are of copper carefully glued to the surface. The

book contains illustrations and prices of the various sized vises and also of the Toles Co.'s manual training bench for boys. These are both heartily endorsed by Mr. Ira S. Griffith, who has charge of the Manual Training Department of the AMERICAN CARPENTER AND BUILDER. Every boy or man who is attempting to make the useful articles described each month by Mr. Griffith should have one of these vises and benches. Send for the handsome new catalogue. Address, W. C. Toles Co., Irving Park, Chicago, Ill.

In Advance of the Trade

The rapid strides being made in the concrete building block business along the line of artistic effects in blocks, pillars, balusters, etc., is surely a criterion of the stability of this industry. New designs are coming out almost every day and the manufacturers are becoming more daring in their attempts at attaining the highest point reached by the sculptors in stone, marble and other rock products.

Some of the most advanced work is being turned out by the Cement Working Machinery Co., of Detroit. This concern has in its employ some high class designers and the results attained are worthy of attention.

The latest mould brought out is what is called the Empire Pillar. The design is of the bold, handsome style, which will compel attention from almost every one. The column is of the popular size, being eighteen inches in diameter. The lines in this column are remarkably clean cut. The proportions are architecturally perfect and will doubtless meet with the approval of the most critical builders. Five moulds are required for making this column, while the moulds for making the capital are very simple, twelve different parts being necessary on account of making the detail on the edge of the scroll.

The cost of making this pillar in concrete, including material, is $7, while at the least calculation the same pillar in cut stone would cost $125, and an expert would be necessary to detect the difference in the two columns.

Kno-Burn Steel Lath

What does Kno-Burn Steel Lath do for a building? It absolutely prevents cracking and falling of plastered walls and ceilings. When embedded in a good coat of mortar it provides the most perfect form of fire retardent known. The most intense heat, under which brick and tile will crumble, will not cause it to lose its hold.

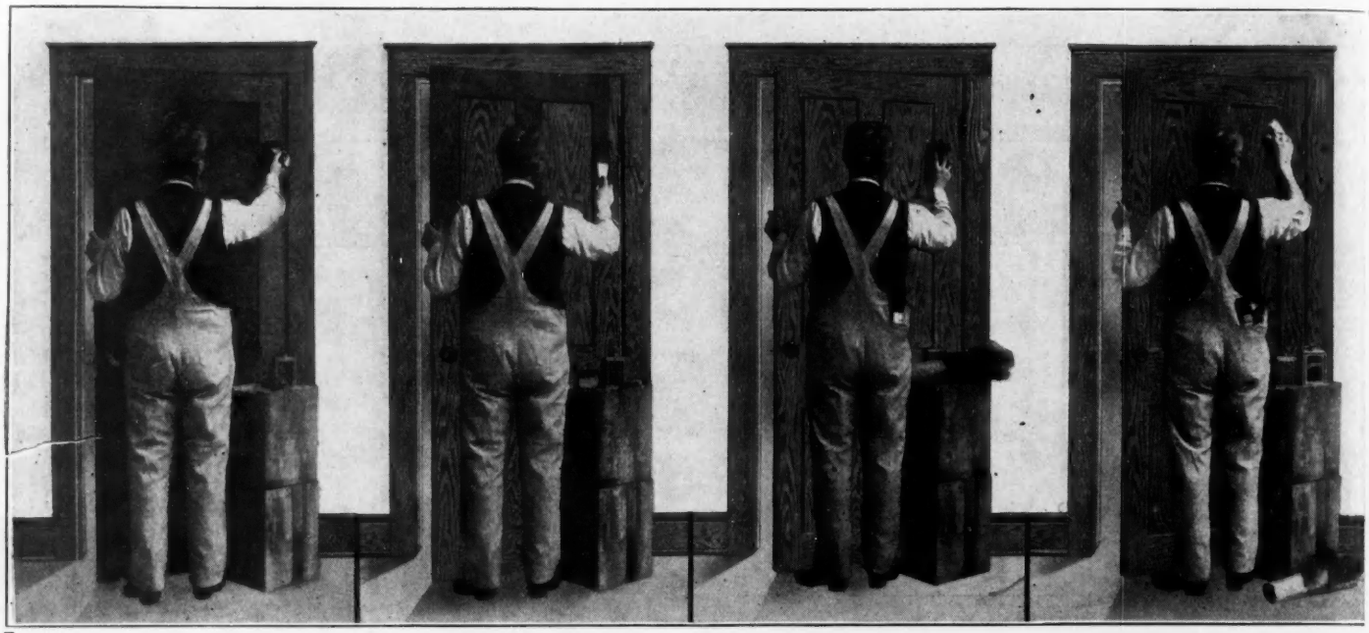
The building, if of wood, is safeguarded from the flames, and if of steel construction the latter is saved from the intense heat which would otherwise cause it to warp out of shape and ruin the building. To the last it will stand a bar between the flames and destruction.

It furnishes a stone wall throughout the house of about an inch and a quarter in thickness, thereby preventing a circulation of air through the walls; making the house comfortable by excluding the heat in summer and retaining it in winter. Kno-Burn Steel Lath inside and outside will effect a saving over wood construction of about one-half. It builds walls within walls, making an indestructible building. There can be no opening up of jagged cracks, no falling of plaster to mar the beauty of the walls and decorations. It adds to the value of the building. It prolongs human life by removing one of the most potent causes of worry and dissatisfaction.

An Interesting Book on Concrete

Another book from the "Ideal" press is being circulated to the concrete trade. By the Ideal press is meant the printing shops of the Ideal Concrete Machinery Co., of South Bend, Ind. There emanates every month from this South Bend concern many interesting pieces of printed matter in the shape of practical instructions to prospective block makers and literature of a general nature on the concrete industry.

The missionary work being done by this concern is of inestimable value to the trade. Those behind the Ideal business are far-sighted enough to see that while they may not get



Apply Johnson's Electric Solvo with a brush. It will immediately soften all the old finish.

Now remove the old finish with a putty knife.

Using Steel Wool to remove the old finish from carvings and mouldings.

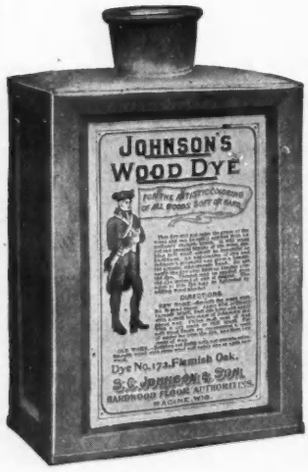
Wipe the wood clean with a cloth saturated with benzine or wood alcohol.

The Refinis

To properly refinish all old woodwork, furni

Johnson's Electric Solvo for softening old finish upon wood, glass or metal so that it may be easily removed

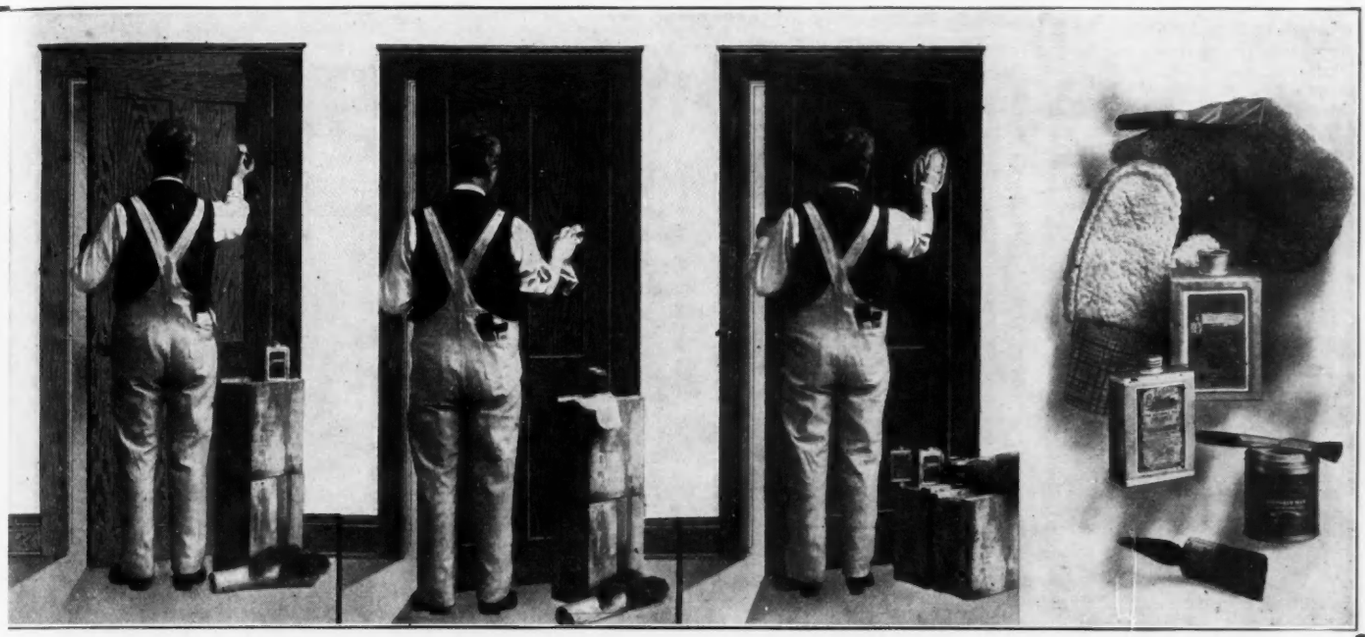
Apply with an ordinary varnish brush and allow it to remain until the old finish becomes softened, then remove with a putty knife and Steel Wool. Now wipe clean with a cloth dampened with benzine or alcohol. It will leave the wood bare and clean, ready for the new finish. List Prices:—Gallon cans, $2.50; half-gallons, $1.25; quarts, 75c.; pints, 40c., and half-pints, 25c.



Johnson's Wood Dye for the artistic coloring of all wood. Apply with a camel's hair or fitch brush. It will immediately penetrate the wood, properly coloring it. It does not raise the grain, but brings out the beauty and high-lights of the wood. With Johnson's Wood Dye inexpensive woods such as cypress, Southern and Western pine may be made as beautiful as hardwood. Made in the following shades:

No. 130, Weathered Oak; No. 131, Brown Weathered Oak; No. 132, Green Weathered Oak; No. 128, Light Mahogany; No. 129, Dark Mahogany; No. 172 Flemish Oak; No. 140, Manila Oak; No. 126, Light Oak; No. 123, Dark Oak; No. 110, Bog Oak; No. 121, Moss Green; No. 122, Forest Green; No. 125, Mission Oak and No. 178 Brown Flemish Oak.

If you prefer a high glossed, shiny finish, varnish may be applied over the dye instead of Johnson's Prepared Wax. List Prices:—Gallons, $3.00; quarts, 85c.; pints, 50c., and half-pints, 30c.



Now apply Johnson's Wood Dye the desired shade, with a camel's air or fitch brush.

When dry, spread on Johnson's Prepared Wax with a cloth.

Bring to a polish by rubbing with a dry cloth or polishing mitt.

Johnson's Electric Solvo, Wood Dye and Prepared Wax and these tools are all that is necessary to properly refinish all old wood, furniture, woodwork or floors.

hing of Wood

ture or floors we recommend the following preparations:

Johnson's Paste Wood Filler for filling the grains of all wood, soft or hard. Our Natural Paste Wood Filler No. 10 should always be used when finishing all wood, soft or hard, natural. One coat of varnish or wax over our Paste Wood Filler is a better finish than two coats of varnish or wax upon the bare wood. For shades of golden, dark or antique, antwerp or green antwerp, we recommend our Paste Wood Filler, the desired shade, instead of our Wood Dyes. List Prices:—18c. per lb. in one-pound and two-pound cans; 12c. per lb. in twenty-five pound cans.

Johnson's Prepared Wax "A Complete Finish and Polish for all Wood." It is entirely different from any wax finish on the market, as it contains a very large percentage of hard polishing wax, making it easy to bring it to a beautiful and permanent polish. Our Prepared Wax should be spread on with a cloth and polished with a clean, dry cloth, polishing mitt, or when used upon floors with a weighted brush. When applying wax over dark Paste Wood Fillers or Wood Dyes, we recommend our Prepared Wax Black, exactly the same as our regular wax, except the color.

We are very anxious that every painter become acquainted with the advantages of our leading specialties. To carry out this idea we make this free proposition to every reader of this magazine.

Free Offer If you will give us, on the coupon below, the name and address of your paint dealer, or better still, his card, we will send you by express, prepaid, a sample can of Johnson's Electric Solvo, Wood Dye, any desired shade, and Johnson's Prepared Wax Black. Please bear in mind that these samples will not cost you one cent; all we ask is the card, or name and address, of your paint dealer. We must have this information. Don't delay—send today and learn of the best method of refinishing wood.

S. C. JOHNSON & SON, Racine, Wis.

"The Wood-Finishing Authorities."

ACB6

COUPON

S. C. JOHNSON & SON
Racine, Wis.

Gentlemen: My paint dealer's name is

_____

His address is

_____

Please send by express, prepaid, free samples of Johnson's Electric Solvo, Wood Dye (state shade desired) ..... and Johnson's Prepared Wax Black.

I agree to test the samples, and if I find them satisfactory I will insist upon my dealer supplying me.

Name.....Address.....

direct returns from this missionary work, commensurate with the cost to them, ultimate good is sure to be realized.

Under the title of "Straws which show the way the wind blows" a list of sales made by this concern is being sent out each month. Taking the steady increase of sales as a criterion, it is not hard to understand why this concern believes in good printed matter.

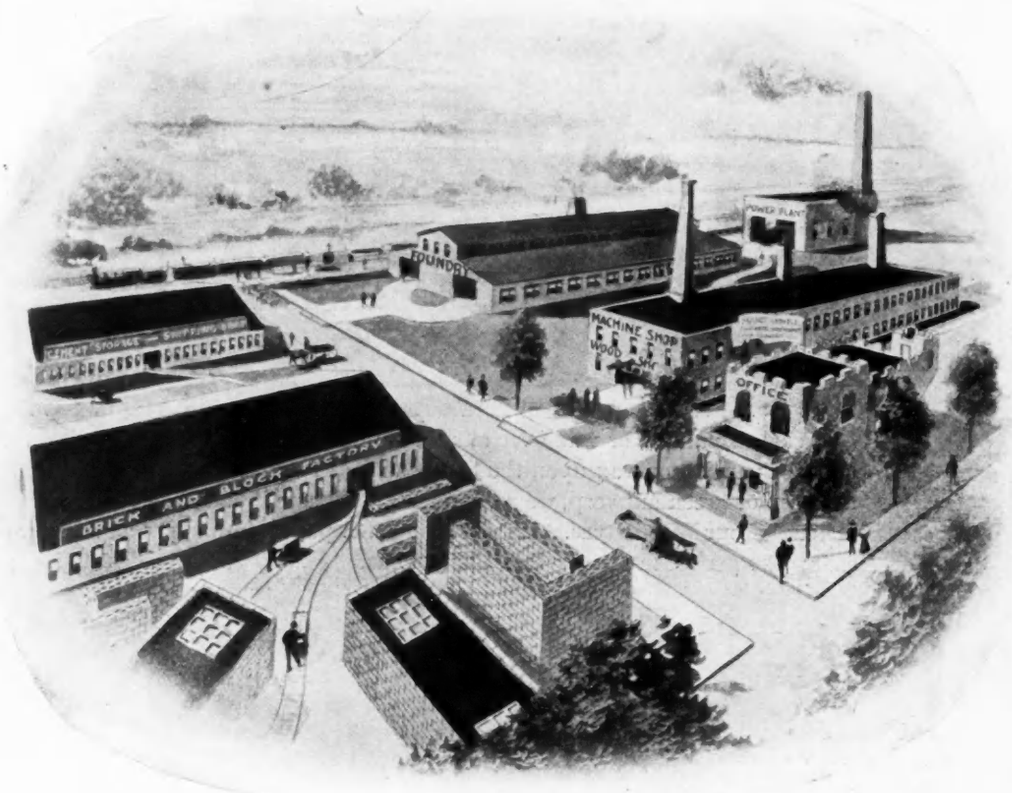
Success of a Concrete Block Plant

The following interview with Mr. M. G. Mandt, president and manager of the Mandt-Powell Concrete Machinery and Foundry Company of Stoughton, Wis., will undoubtedly be of much interest and benefit to our readers. The Mandt-Powell plant is one of the great successful companies in the concrete building block industry, and in the interview Mr. Mandt makes clear why his company has succeeded, his only regret being that he has been so overwhelmed with orders that he has found it necessary to hold back on orders. Mr. Mandt says:

"Since we started in business one year ago we have placed on the market a great number of outfits for the manufacture of the Mandt Concrete Building Blocks. At the present time the orders are coming in a great deal faster than we can fill them and we are, therefore, forced to hold back a little until we can get the facilities to handle this large volume of business. We have, therefore, made arrangements for the finishing of our modern foundry and machine shops to be built at Stoughton. We have at the present time, arrangements with two large foundries with the outfits. The system we resort to of facing a wall is very simple and absolutely safe. Instead of trying to put the facing onto the block we make the entire front block of a little better mixture than is commonly used. This will bring out a block with an appearance, if rubbed or chemicals applied, as that of other polished stone. For the inside block, gravel and coarser material is used, resulting in a block equal in strength to any, though not as nice appearing, yet a great deal cheaper.

"The above feature is by no means the important one, as our ventilation stands out strongly as the best. Let us tell our exact ventilation and then it can be compared with the rest of the blocks. The Mandt concrete building block, when laid up into the wall, will have three separate air passages. The central air passage, which entirely disconnects the outer block with the inner one, will run continuously from the bottom to the top and horizontally around the entire wall, and because of the fact that this air passage does away with any connection between the outer and inner wall and being that the air passages are horizontal as well as vertical, it shows that we can do what no other concrete block manufacturer can do, in that we can plaster direct over the wall onto the block without furring the lathing, we wish it to be known very strictly that we furnish with our machine, that is to every customer, a signed guarantee to cover our ventilation. Think of the advantage that a man using our machinery will have in that he can in turn guarantee his customers absolutely dry walls. We are certain that we are the only company that has enough faith in its system to do this, and it speaks very strongly for the Mandt.

"There are a great many other features that we might bring



out, such as our bondage. We have a natural bondage of one block binding three, also a saving of manufacturing constructions of these blocks, as well as our large variety of ornamental blocks, which will also show up very strong in the walls and help push the business in the artistic line.

"Now a word for our system: We have a set or series of forms and molds. Each one of these molds is a complete machine in itself and the average daily capacity of each of our set of molds for making the Mandt will be found as a case of the 24-inch mold to be 300 feet of blocks, while we have, with an experienced man, made as high as 424 feet. Remember, this is strictly with one man handling the mold and carrying his own blocks. You can readily see what an enormous daily capacity our outfit has when we can furnish 10 of these complete molds. The advantage is very plain, as by putting sev-

eral men to work the corner stone of stones, inside and outside blocks can be made at the same time and will all be seasoned alike. It will mean further that as a large job is being worked, the contractor will not have to purchase two or three machines, as would be absolutely necessary to make one-half of the blocks that we can turn out with our general outfit. These molds for our machines are built of the very best material and are strong, and because of the fact that there are no cogs, chains or wheels to be clogged with concrete and get out of order, there will be very little repairing. Because all these parts are eliminated the mold which we turn out is very simple, in fact, so simple that any common sense man can operate it and make money. It requires no high priced mechanic to set it up. The machines are adaptable and adjustable.

"One of the advantages found by the use of the Mandt mold is that they are *portable,* so that either the block or the mold can be moved. Some people prefer to make the block direct on the plates remove the mold, as this will result in less breakage; however, it is found more preferable to make the blocks and benches and carry them off.

"In regard to plates. In the manufacture of concrete blocks with machinery it is necessary that the man using the machine will have to have cast at his own expense two or three tons of iron plates, which, of course, means a large outlay of money, while in our system all that is required is wooden plates. One size of plate can be used for all sizes and shapes of blocks. We manufacture molds for all kinds of ornamental work, so that the man using the Mandt will not be handicapped; in fact, he will have a great advantage over most of the machine men. We manufacture molds for making baseball caps, ornamental friezes, watertables, caps, copings, sills, ornamental construction and a large variety of molds for similar construction and it will be found that we have made a specialty of obtaining the finest rock effects. Our patterns are cast by artists in the line from fine cut stone, and we furnish a large variety of these natural rock patterns, so that the blocks made will have the appearance of natural cut rock."

A Simply Constructed Machine

A report from Rochester states that the Century Cement Machine Co., makers of the Hercules cement stone machine, is increasing its facilities as rapidly as possible to keep up with the rapidly increasing demand for the Hercules machine.

Besides doing a large domestic business this concern is receiving many orders from foreign countries. Last week four machines were shipped to Ireland, the third order from a contractor who has been using the Hercules for over two years.

The manufacturers of the Hercules have had several years of experience, being among the first to turn out a good cement stone machine, and this experience is shown to good purpose in the 1906 model Hercules, a machine that seems as perfect in construction as it is possible to make.

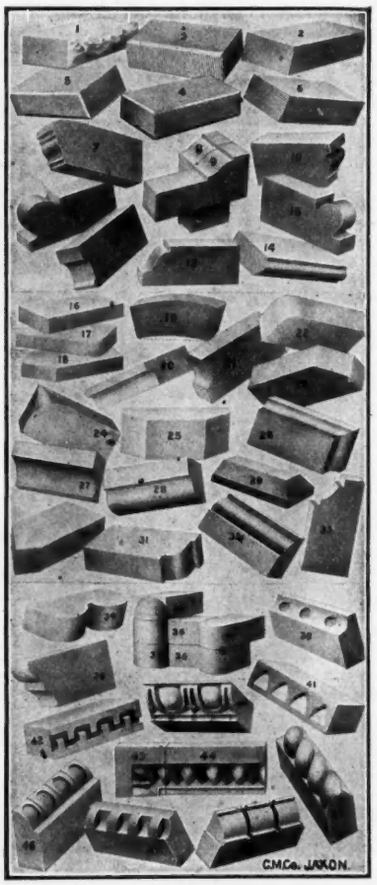
The Hercules is a very simply constructed machine built without chains, cogs, bolts or springs. It is so arranged that two stones of the same size or design or of different sizes and designs can be made on the one machine at the same time.

On the Hercules, blocks and also all kinds of ornamental work, columns, cornices, etc., from two inches to six feet can be made rapidly and perfectly.

Many residences, apartment houses, factories, business blocks and churches are now being built of concrete, made on the Hercules, and the Century Cement Machine Co. is anticipating a large demand for machines during the summer months.

A Great Variety of Shapes

These are Favorite Sand Cement Bricks made on the Favorite brick machine, manufactured by the Cement Ma-



chinery Company, of Jackson, Mich. They will be pleased to send descriptive circular to any of our readers who are interested in an up-to-date brick machine.

Tiles Laid on Wood Floors

The Wisconsin Mantel & Tile Co. advertise in another column their method of laying tiles on all kinds of wood floors, giving a rich appearance at comparatively small cost. These floors can be put down without interfering with business in any way, as they are laid over the old floors and can be used immediately. Recent Milwaukee customers to whom they refer are Bunde & Upmeyer, jewelers; Alsted & Kasten, jewelers; New York Central ticket office and the Fidelity Trust Co., and also to the Wood County National Bank of Grand Rapids, Wis. They solicit correspondence in reference to laying contracts of 100 square feet or more, or will ship the tile anywhere for any size job. This firm also manufactures a fine line of wood mantels and carry everything pertaining to the fireplace. They have tiles for all purposes, including the famous Grueby tile, and are importers of English and Dutch tiles and mosaics. Address Wisconsin Mantel & Tile Co., 420 Milwaukee street, Milwaukee, Wis.

New Concrete Mixer Charging Elevator

A large part of the expense of mixing concrete by mechanical power, particularly in mixers of large size, has been the elevating of the materials to the mixer. The usual method of accomplishing this is by constructing elevated

platforms and runways and elevating the ingredients up an inclined plane in wheelbarrows by manual labor.

To obviate this some manufacturers have built elevating structures, but heretofore these devices were constructed of heavy timbers and occupied large ground space, and had to be completely dismantled whenever the machine was removed, and as a result, they have not come into general use nor can they be regarded as being important labor saving devices.

The Municipal Engineering & Contracting Company, of Chicago, builders of the Chicago Improved Cube Concrete Mixer, have recently introduced a new charging elevator which is a demonstrated success, and not only saves an enormous amount of manual labor but will reduce the time of mixing in the cube fully 25 per cent as compared with charging with wheel-barrows from runways. This charging elevator is constructed entirely of steel, and is carried by the same truck as the mixer, requiring no ground support of any kind.

The charging bucket is lowered to the ground and loaded with an entire batch direct from wheel-barrow, without the use of runways of any kind, as the top of the bucket is only fourteen inches above the surface of the ground. When loaded, the bucket is elevated to the top by means of a hoisting drum, when a door in the bottom of the bucket is released, discharging the entire batch into the mixer at a single operation. The bucket is then immediately lowered to the ground to be loaded with the aggregates for another batch while the preceding batch is being mixed.

Since elevator, engine and mixer are carried on a single truck, the machine is as portable with the elevator attached as without it, thus saving all the time and labor of tearing down, removing and setting up runways each time the machine is removed.

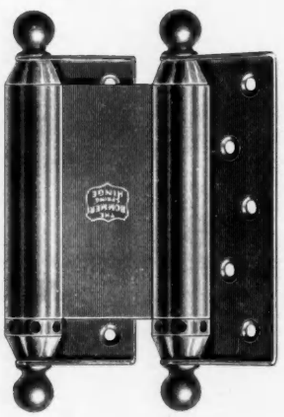
Equipped with this charging elevator the Cube Mixer will mix a batch of perfect concrete a minute and maintain this record indefinitely, as the mixer is in continuous operation, the charging requires but a few seconds and the construction and operation of the loading bucket is such that the materials receive a gravity mixing in being discharged into the mixer.

Greenhouse Construction

The Foley Mfg. Co. of Chicago has issued a very interesting catalogue on Greenhouse Construction. It is very profusely illustrated and also contains many plans showing the interior details of various kinds of greenhouses. It is a subject that will be interesting to all carpenters and builders, as it will give them many new ideas along this line of construction. This catalogue may be had by writing to this company and mentioning the AMERICAN CARPENTER AND BUILDER.

Bommer Spring Butt Hinges

Bommer Spring Butt Hinges are the standard goods in their line. They are made of wrought steel in the strongest and most durable manner in any finish desired. These hinges have wrought steel bearings, the springs are of best oil tempered steel wire, are of large diameter and unusual length, have great resilience and power, and never go lame. They will wear a lifetime if the proper size is selected. The ball tips can be unscrewed to take the hinge apart, but will not work loose of themselves. The tension is adjustable, therefore the door can be made to close as softly or as quickly as may seem desirable. The tension can be entirely taken off when fixing these hinges to the door, and the raised edges of the flanges indicate the depth for the mortise, thereby saving time to the carpenter. Bronze and brass hinges have a steel interior construction and steel bearings, which take the wear and friction, making them as durable as if they were made entirely of steel. They are characterized by elegance of appearance and by durability of finish. Material



No. 468.—Modern Mission Style, 5 feet 11 inches high and 5 feet wide; heavy plan, shelves, recessed leather panels; the brackets supporting main shelf are carved with Spanish Insignia. Terra Vitrea tile hearth and facing. Hand-wrought Andirons of Romanesque design.

LORENZEN MANTELS

A Mantel in the home is useful as well as artistic and decorative. It saves you furnace hea on chill spring and autumn days, and diffuses cheer and comfort like no other piece of furniture in the house.

Lorenzen Mantels

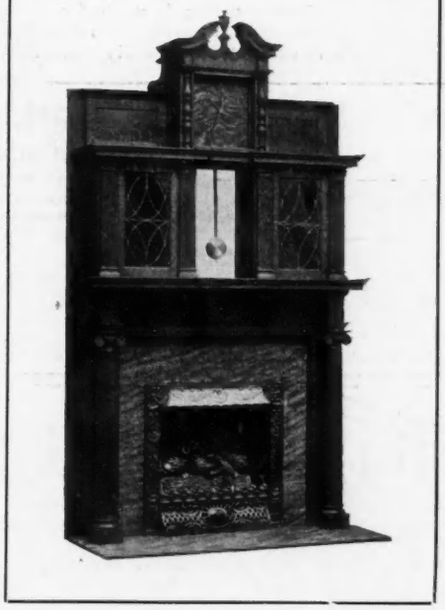
$10 to $250

In Colonial, Craftsman, Modern Mission and numerous other styles, and all woods and finishes. Our modern factory, large stock of air-seasoned lumber and expert, skilled workmen all mean beautiful mantels, far above the ordinary. We are at all times prepared to furnish designs of Mantels and Fireplaces in the historic periods of architecture, such as Louis XIV, Louis XV, Louis XVI, Renaissance, Gothic, Rococo, Empire, Early English, Colonial, Chippendale, Sheraton, Adam, etc.

CATALOGUE FREE—Our new Book of Mantels, full of fascinating designs, reproduced from photographs, is now ready. It contains also illustrations in color, suggesting harmonious interior arrangements and decorations. Write for it today.

LORENZEN PAYS THE FREIGHT

CHAS. F LORENZEN & CO., Inc., **267 N. Ashland Avenue, Chicago**



MANTELS

Are an important feature of the house and should be selected with care. The price often affects the final selection.

"Attractive Designs at Attractive Prices"

Describes our catalogue, which we want to send to you, together with our best prices, FREIGHT PREPAID TO YOUR STATION. Let us hear from you **to-day**

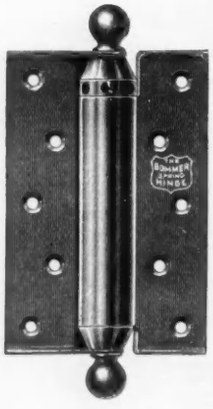
IF WE CAN SAVE YOU MONEY, YOU WANT TO KNOW IT, DON'T YOU?

THE A. W. BURRITT CO.

"THE MANTEL FOLKS"

450 KNOWLTON STREET **BRIDGEPORT, CONNECTICUT**

and workmanship are the best obtainable and every hinge is guaranteed against defects in either. All parts are interchangeable and duplicate parts can be furnished promptly from stock. For doors in public buildings, theatres, schools, railway stations, churches, libraries, banks, department stores, etc., the use of the double acting spring butt hinges should be enforced, to avoid the disastrous consequences of doors opening the wrong way in case of panic. For doors between dining room and kitchen, double acting spring butt hinges will be found very convenient. To assure the selection of hinges of the correct size to swing a door properly the requirements are given in their catalogue. As doors vary in their proportions, it must be kept in mind that regardless of height wide doors always require larger hinges than narrow doors.



Bommer Brothers, 255-271 Classon avenue, Brooklyn, N. Y., are the manufacturers.

"Inkoff" for Draughtsmen

A fluid eraser which will remove lines, figures and blots from tracing cloth, and where the lines, figures, etc., have been drawn with Black Waterproof Ink, may appear to be an impossibility, but "Inkoff" actually produces this result. The appearance of the tracing cloth is not injured and new lines may be drawn over the erased portions. A tracing upon which an error has been made usually makes a somewhat imperfect blue print, but erasures made with "Inkoff" have no effect whatever upon the blue print.

By sending a postage stamp to the firm of E. G. Soltmann, 125 East 42d Street, New York, N. Y., a sample vial can be obtained which contains sufficient fluid for giving "Inkoff" a test.

Hints on Care of Saws

The Taintor Manufacturing Company, 113 Chambers street, New York, N. Y., are sending out a circular to the trade giving full directions as to the proper care of saws of all kinds, and also giving hints on how to select them, how to file and set, and how the various kinds of saw teeth should be pointed.

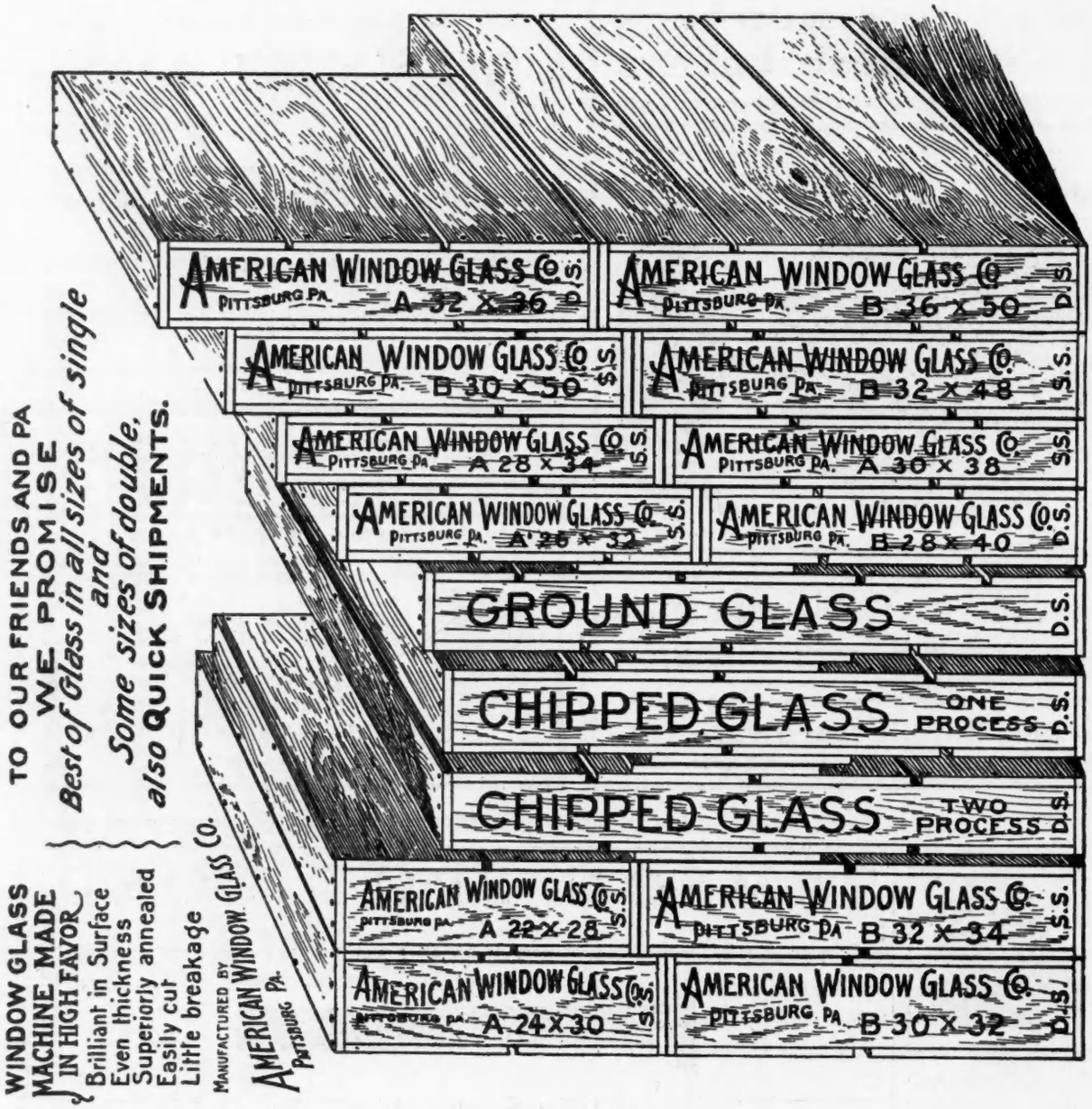
This circular also gives a complete description of the Taintor positive saw set and advises the reader: "Ask your hardware dealer for it; if he tells you some other saw set is as good insist that you must try the 'Taintor'. Be your own judge of what is the best tool for you to use. If your dealer will not get it for you send to us and we will tell you how to get it."

Some New Books

A complete work on concrete block manufacture has been issued by John Wiley & Sons of New York. It covers the subject of concrete blocks in a thorough manner, giving the various ingredients to be used and the right proportions of each. It also dwells on the subject of mixing and the various tamping processes which are in use and the merits of each. Many fine illustrations are given throughout the book, thoroughly illustrating each point as it is made, making the book

one which will be of great help to all those interested in concrete or cement.

Hicks' Estimators Price Book and Pocket Companion is a handy reference book to the estimator and will enable him to arrive at approximately correct figures in making estimates in a comparatively short time. The book dwells upon everything required in the construction of any ordinary building and gives the average market prices. The items are all conveniently arranged so as to enable the estimator to readily find what is wanted and all the matter is condensed, so that it is of real practical value. It is published by the David Williams Co., New York.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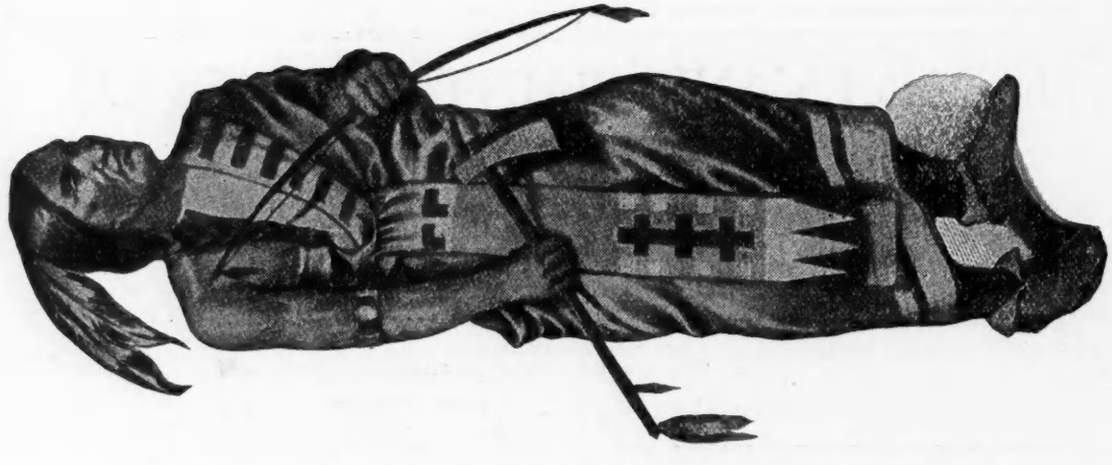
AMERICAN WINDOW GLASS Co. PITTSBURG PA. A 24 X 30 S.S.
AMERICAN WINDOW GLASS Co. PITTSBURG PA. B 30 X 32 D.S.
TO OUR FRIENDS AND PA WE PROMISE
Best of Glass in all sizes of single and
Some sizes of double,
also QUICK SHIPMENTS.
WINDOW GLASS MACHINE MADE IN HIGH FAVOR
Brilliant in Surface
Even thickness
Superiorly annealed
Easily cut
Little breakage
MANUFACTURED BY AMERICAN WINDOW GLASS CO. PITTSBURG PA.



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We show 1,998 other designs in our BIG

New Catalog

No. 15. 315 pages, 2,000 designs

Gives EXACT NET PRICES on

Doors, Windows, Mouldings,
Blinds, Frames, Porch Work,
Art Glass, Mantels, Stair Work,
Grilles, Wood Carpet, etc.

Write today. It's absolutely free—and Postage Prepaid. Write NOW.

Our **White Enamel** is a pure mineral, prepared in our own laboratory, applied upon galvanized steel, and each coat baked at varying high degrees of heat.

It presents a glossed surface, similar to porcelain, will not peel or flake, is **odorless and absolutely sanitary.** We have manufactured it for three years and it has been accorded general praise and highest commendation.

This is only one of our line of Refrigerators. Send for Circular No. 66 for other designs.
Cut shows Galv. Steel linings.
Can be furnished also in White Enamel Lining.

No.	Dimensions, Ins.	Ice, Lbs.	Weight, Lbs.	Lining	Prices
C 2903	38x22x50	160	230	White Enamel	$27.70
C 2904	38x22x50	160	230	Galv. Steel	24.50

Grille C-1910-$49.00
See catalog for size of this grille and various other designs.

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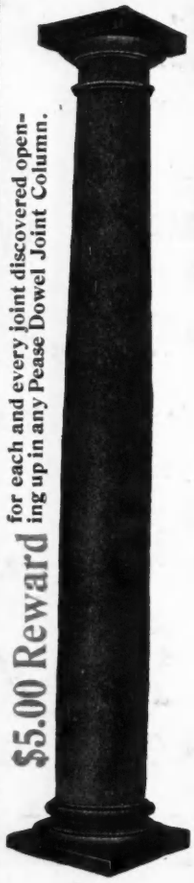
INDEX TO ADVERTISEMENTS, JUNE, 1906

NOTICE TO ADVERTISERS.

New copy, changes and corrections for advertisements must reach office of American Carpenter and Builder, 196 Fifth Ave., Chicago, not later than June 20 in order to insure insertion in the July number.

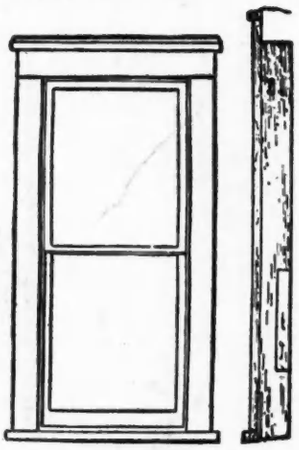


$5.00 Reward for each and every joint discovered opening up in any Pease Dowel Joint Column.

Pease Dowel Joint Column No. 70

Have You Seen the New Pease Dowel Joint Colonial Column No. 70 at $1.76 up?

Would You be Interested in Our Line of Door and Window Frames at $1.15 up?

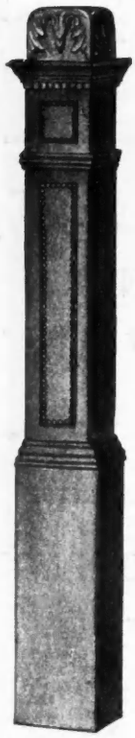


Window Frame No. 1

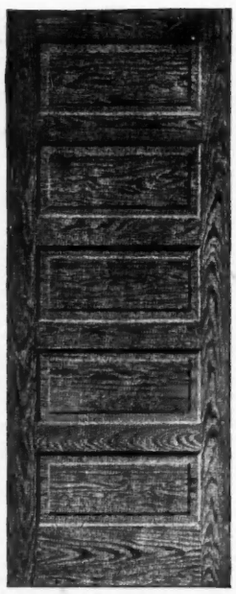
Write to-day for our FREE SAMPLES of Building Papers and Ready Roofings

What do you think of our Stair Newel

No. 7, surmounted with our elegant, genuine Wood Carved Cap, at $3.80 up?



Stair Newel No. 7



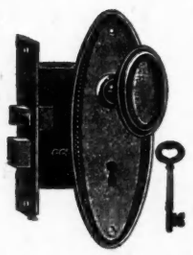
Door No. X.L., 5 Cross Panels
Soft Arkansas Yellow Pine
free from Check.

We carry the largest stock of good doors in the world.
Perfectly manufactured.

At $1.05 up

85c per gallon up

Write for our beautifully colored folder Practical Painting mailed free



Inside Door Set No. 13271.

We carry a complete line of **Builders' Hardware** at before unheard-of prices

Write To-day for our BIG ILLUSTRATED CATALOGUE and Price List. Just off the press. Gives you our low net prices on Frames, Doors, Sash, Blinds, Hardware, Paints, Screens, Mantels and thousands of other building material items.

Mailed to you FREE

THE PEASE CO., Cincinnati, Ohio, U. S. A.