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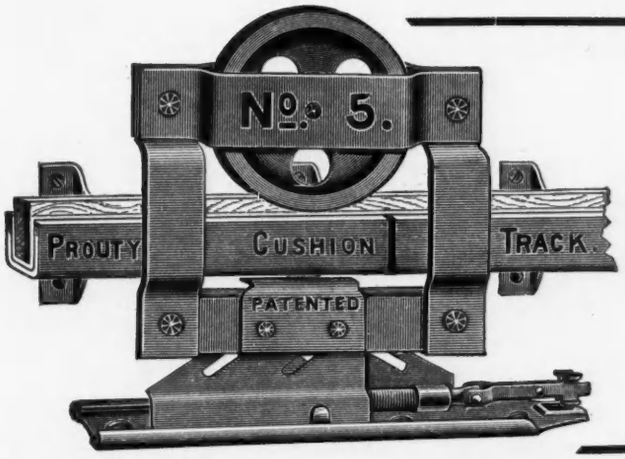

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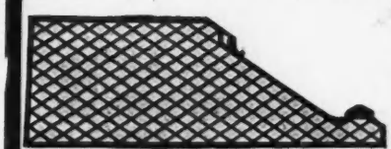

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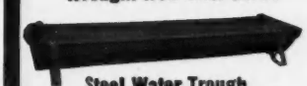

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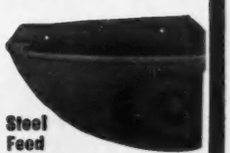

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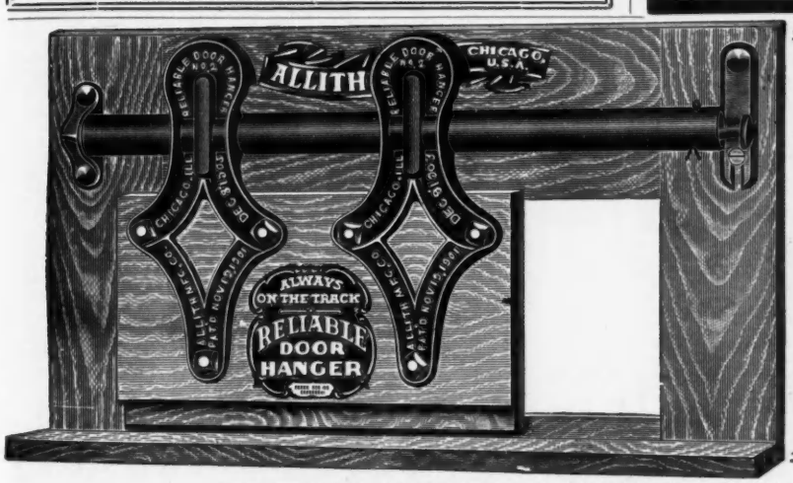

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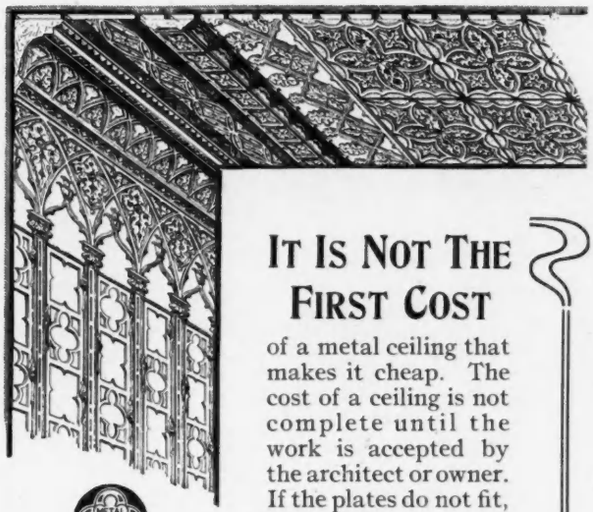

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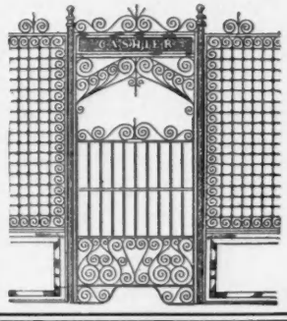

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American Carpenter and Builder

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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Short practical letters and articles on subjects pertaining to the carpentry and building trades are requested.

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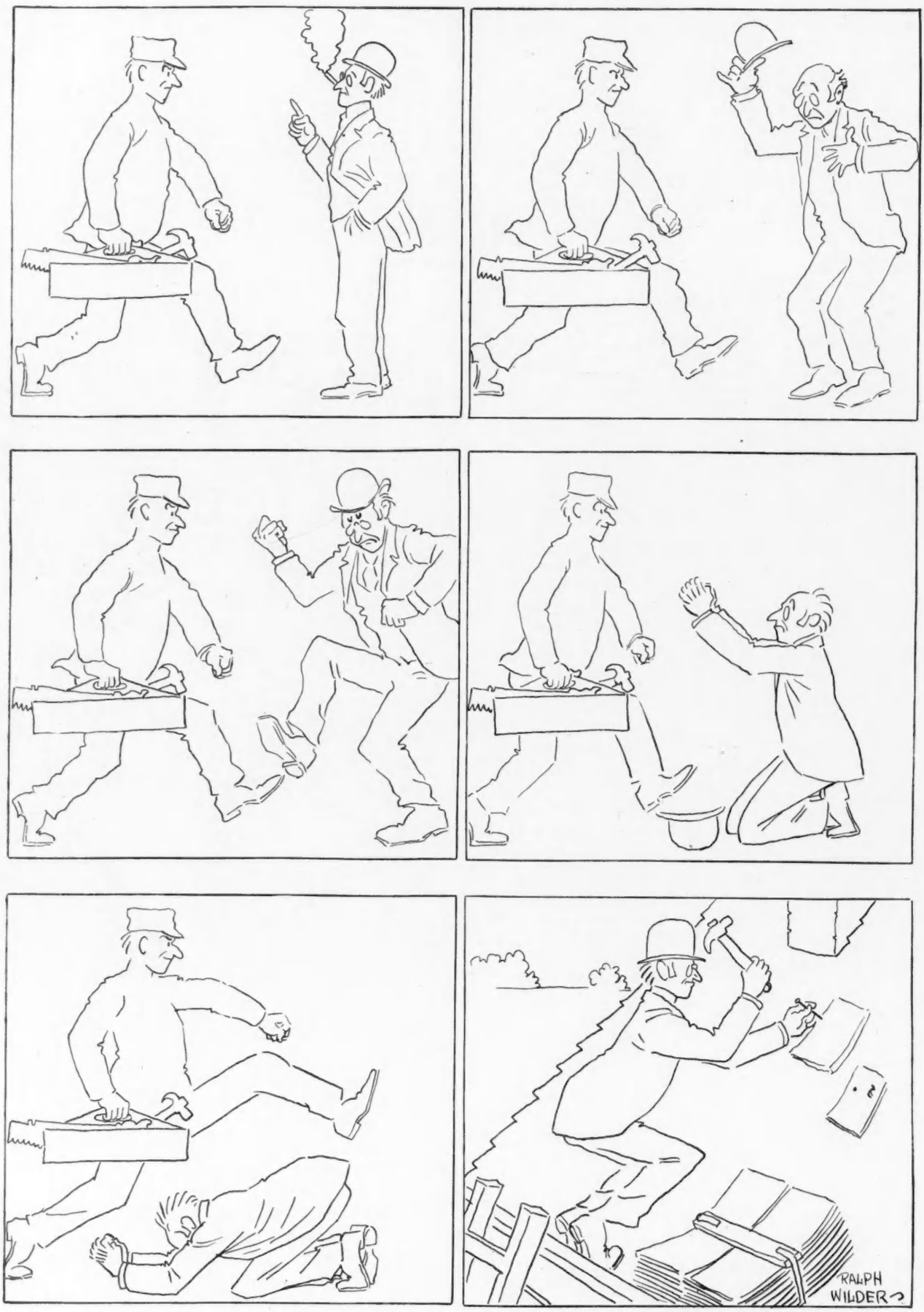
Second Concrete Machine Convention

S. L. WILTSE, Secretary of the Concrete Block Machine Manufacturers' Association of the United States, announces that the second annual convention of that association will be held at Detroit, Mich., August 8th and 9th. It promises to be a most enthusiastic meeting and all members are requested to be present. An excellent programme has been arranged and each member will have an opportunity to express his views in behalf of the concrete block and brick industry, and from an educational standpoint in this line it would be to the interest of each member to be present. This association has done much good in the past year for the industry, and "Progress" is the watchword of its continued success. For information as to where the convention will be held in Detroit, apply to the Secretary, S. L. Wiltse, Jackson, Mich.



Repair Jobs are not Popular Jast Now—Mr. Squibb Tries to Get His Roof Fixed.

Lumbering in the Northwest

BY WALDON FAWCETT

AS IT becomes more and more apparent that with the exhaustion of the major portion of the timber in Maine, Michigan, Wisconsin and other once productive regions, the United States will become more and more dependent for its main lumber supply upon the extreme Northwest, interest increases in the forest wealth of this wonderful region bordering on the Pacific and in the methods of logging employed. Climatic conditions and the unusual size of the trees to be handled have compelled the introduction of new and unique systems of machinery, and these twentieth century methods of logging by steam prove a revelation to the average producer or consumer of lumber whose days have been spent east of the Rocky Mountains.

Logging Railroad and Chute

The great timber regions of the Pacific Coast extends from Alaska to the central part of California and from the summit of the Cascade and Sierra Nevada mountain ranges to the ocean. However, the great strongholds of the lumbermen are in the States of Oregon and Washington. The State of Oregon alone contains one-sixth of the standing merchantable timber in the United States, and it is estimated that the forests in the territory drained by the Columbia River will not be exhausted for more than fifty years even at the present heavy rate of cutting.

In the greater part of the Northwestern lumber region the fir is the predominant species—trees being encountered of dimensions up to ten feet in diameter and from 100 to 200 feet in height, but cedar, hemlock and spruce are also present in great quantities. In northern California the lumbermen have the colossal redwoods and the even larger "big trees"—forest giants which by reason of their size require special treatment at every stage of the evolution from forest to sawmill. Another factor than the size of the trees has, however, compelled the lumbermen to adopt new methods, and this is found in the circumstance that the Pacific Northwest, though in the same latitude as Labrador, has a winter temperature corresponding to that of April in the East.

In the days of extensive logging in northern New

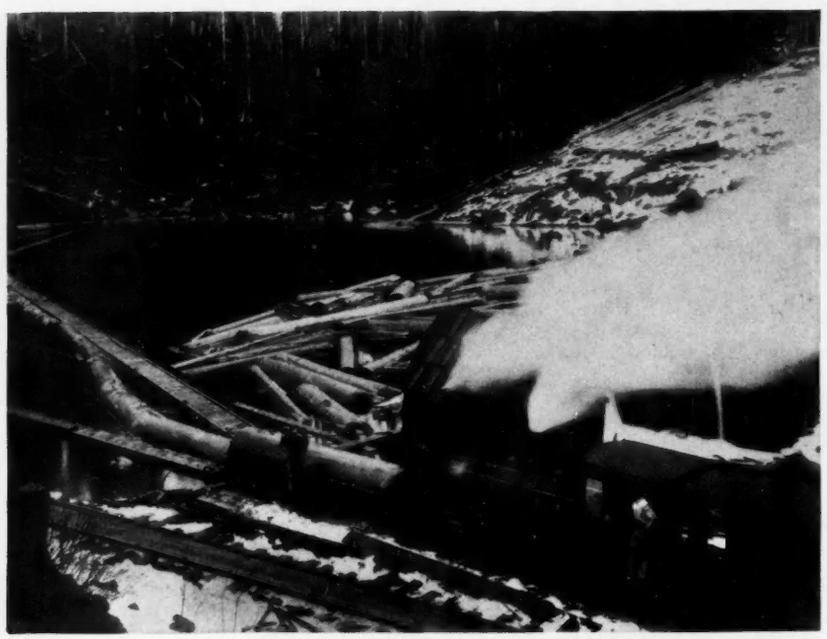
York, New England and the Middle West, the lumbermen were wont to fell the trees and cut the logs in the late summer or autumn, and then to transport them during the winter over ice roads to the banks of streams down which they were floated by the spring freshets. On the Pacific Coast, however, with little freezing weather and no snow and ice to form smooth highways for heavily laden log sleds an entirely different method of procedure was necessary and steam has supplanted nature as a motive power all along the line.

Making a Boom for Saw Mill

The initial operation of logging, the falling of the giant trees of the Pacific slope, is in itself a grave responsibility since errors in judgment or execution result in heavy loss. To bring to earth a towering tree from five to ten feet in diameter, placing it prostrate in just the desired position, regardless of its natural lean, and without shattering the trunk or damaging the surrounding standing timber calls into play the highest refinement of the woodsman's skill.

In the large timber of the west coast the swell at the butt of the tree is often of poor quality and consequently it is customary to sever the trunk at a point from four to ten feet above the ground. The sight of thousands of these high stumps left standing in Northwestern forests has brought upon the loggers charges of wasteful lumbering, and there is little doubt that these criticisms by government officials and scientific foresters, are in large measure justified, since the examination of many discarded stumps shows them to be composed of timber of very fair quality, readily saleable for certain purposes.

In order to cut a giant tree at the desired elevation above the ground notches are made in the trunk and into these is fitted a shelf or springboard, upon which the fallers and choppers stand. As the first step in falling the tree axemen cut a V notch about one-third of the distance through the trunk and facing in the direction in which the tree is to be felled. Upon the completion of this preliminary task two sawyers, operating jointly an eight-foot saw, begin work on the side of the tree opposite the notch or "undercut" and saw through the trunk until there remains only a hinge of wood from four to ten inches in width. Then wedges are inserted and the tree is gradually forced over in the direction of the undercut until finally with a splintering of the connecting "hinge" it crashes to earth.



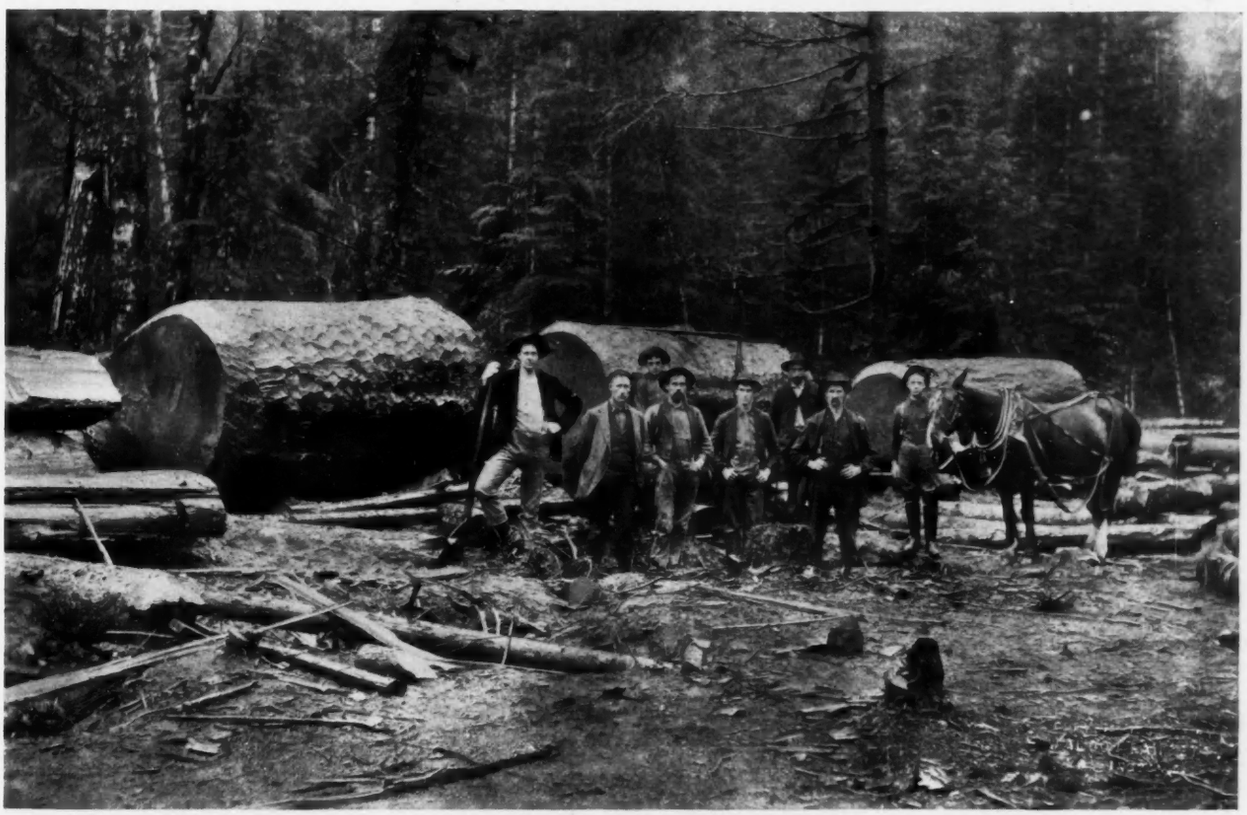
Dragging Logs on to the Skidroad

As soon as the tree is down the trunk is measured off in sections ranging from 24 to 100 feet each, according to the purpose for which the material is designed, and a gang of sawyers, each operating single-

handed an eight-foot saw, cut it up into log lengths. Each of these log lengths is "barked" or smoothed on the side on which it is to ride while being dragged out of the forest and is "sniped" or beveled to a depth of six inches at the end which will be in front during the journey, after which all is in readiness for the transit from the heart of the forest to the sawmill.

Under the up-to-date method of logging by steam as conducted in the lumber regions of the Northwest the entire task of transferring the logs from the depths of the woods to the point where they are loaded aboard railroad trucks is performed by powerful wire rope cableways. The first operation, known as "yarding," consists in moving a log from the point where the tree has fallen to the "skid-road" or main artery of a logging camp. No pathway is prepared other than the clearing away of the brush and debris and the tree section is dragged forth by a cable about one inch in diameter and 1,000 feet in length, which is wound on a huge drum by a one hundred horse power engine. At the end of the cable to which the log is attached there is fitted a pair of huge steel hooks so arranged that the harder the pull the more deeply they will be imbedded in the wood.

Arriving at the nearest point on the skid-road the logs are chained end to end in "trains" of three or more and drawn by another wire cable begin their journey to the terminus of the skid-road, which may be two miles or more distant. The skid-road, it may be explained, is composed of sections of logs, ten feet long and eighteen inches wide, set into the ground transversely of the direction of the road, and in such manner that the upper side of each log is just a little above the surface. In the middle of the top of each "skid" or log composing the roadway there is "saddled" a slight depressoin, and through the trough-like pathway formed by the successoin of these depressions the "turns" or strings of logs are dragged by the wire cable attached to the engine located at the terminus of the road and which is, in general design, very much like a huge pile-driving engine. The skid-road engine, it may be noted, is more powerful than the yarding engine employed in the operation of taking the log from the interior of the forest to the skid-road, but works more slowly. Great care must be exercised in both yarding and skidding not to rub or tear the bark from valuable standing trees or to break down the young growth, for much harm can be done in this way.



The Giant Trees cut into Log Lengths

Arriving at the end of the skid-road logs may be transferred to the sawmills in any one of a variety of ways. In the Northwest a considerable portion of the product is transported on ordinary railroad flat cars, but in some instances locomotives drag the logs behind them over the ties or they are hauled on cars which run over poles cut in the woods instead of over metal rails. Or, again, the logs may be rolled into slides and either move down hill by their own

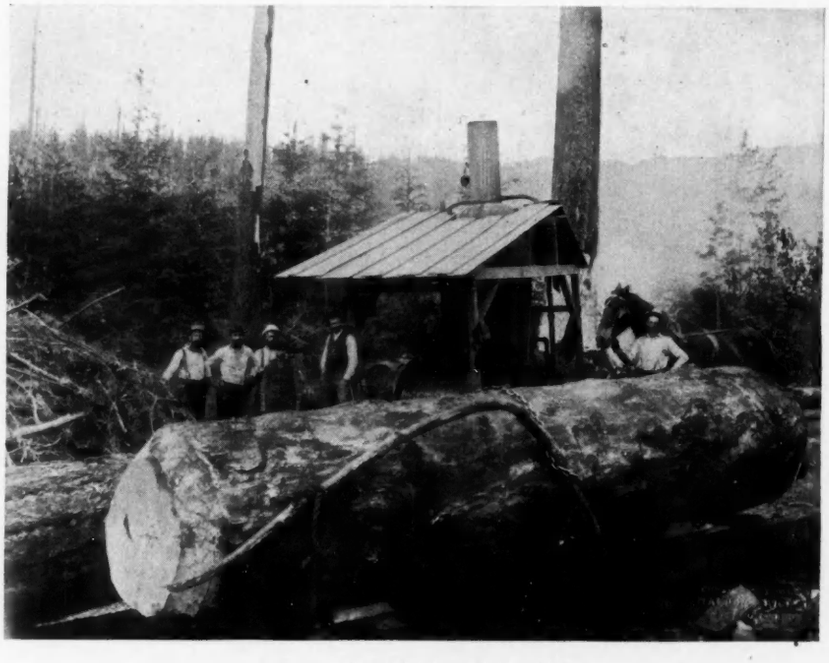
weight or are dragged along by horses or oxen. In some portions of Oregon oxen have been extensively employed in logging operations.

At the mills the logs are cut into lumber by various kinds of saws. Of these the circular saw is still extensively used, although the wide bite or kerf which it cuts in the log makes it very wasteful of lumber. A large circular saw makes a kerf a quarter of an inch wide, so that in cutting four one-inch boards enough wood to make a fifth board is ripped into sawdust. Band saws are less wasteful since they are thinner and make a narrower kerf. Their economic advantages have enabled them to displace the circular saws in many mills, although they do not do the work so rapidly. In many mills there are provided in addition to band saws and circulars, gang saws which cut out several boards at one operation. However, despite every effort to minimize waste at the mills by using sawdust and other refuse for fuel the loss from wood thrown into the great burners for destruction amounts to thousands of dollars a year.

Lumbering the Giant Trees of America

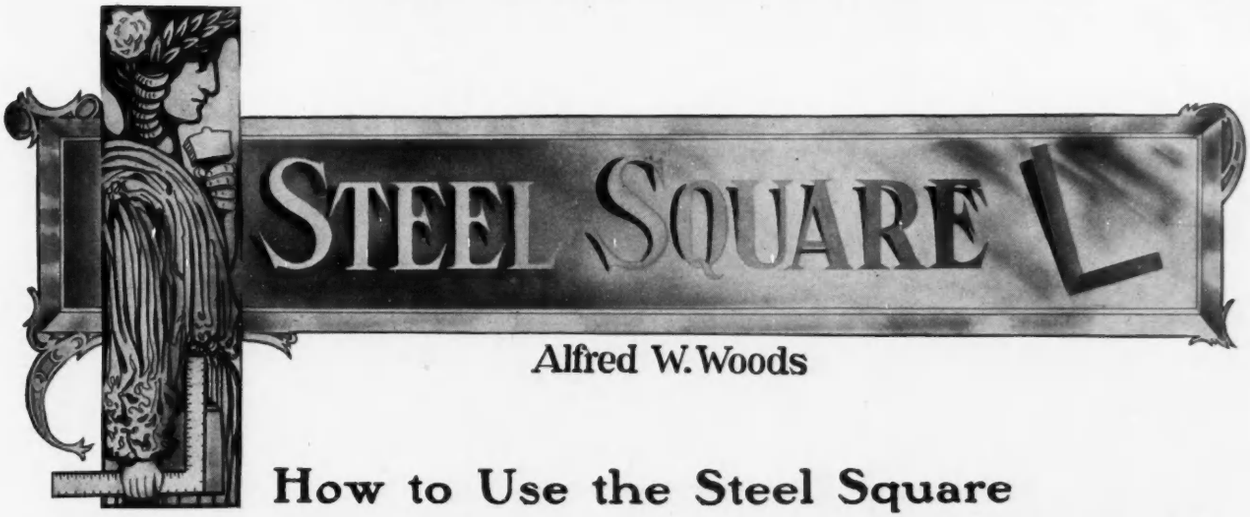
The sawmills which handle the logs from the Northwestern forests are without peers in size and equipment. Many of the mills can surface a timber 24 by 30 inches in size and of any length. The city of Portland, Oregon, which has eleven sawmills, manufactures more lumber than any other city in the world. The average daily output is in the neighborhood of two million feet of lumber, and this capacity will be considerably increased when plants now building are completed. Included among these establishments at Portland is one plant which ranks as the heaviest producing single circular sawmill in the world, giving employment to 350 men, who earn wages aggregating $1,000 a day and producing each twenty-four hours about 400,000 feet of lumber, valued at about $40,000.

After the lumber has been sawed it may be piled and seasoned in the yard or kiln dried before it is sent to market, or sold at the mill. In the dry-kilns a temperature of 180 degrees is maintained by steam or hot air from blowers, and as a rule it requires only from four to six days for the complete seasoning of the lumber. In the distribution of the product of the sawmills there is a variety of method corresponding to the measures employed in other branches of this great industry.



A Powerful Skidroad Engine

(*Continued on page* 424.)



Alfred W. Woods

How to Use the Steel Square

ILLUSTRATING THE POSITION OF THE DIFFERENT RAFTERS IN AN IMAGINARY CUBE—SHOWING WHAT PARTS OF SAME ARE TAKEN ON THE STEEL SQUARE TO OBTAIN THE CUTS AND BEVELS

THE cuts, lengths and bevels of rafters are all contained in the cube as shown in Fig. 72. The base of the cube being twelve inches square, while the altitude is regulated by the rise given the common rafter to a one-foot run, which in this case is 9 inches or ⅜ pitch. This is one of the best methods of fixing on the mind the true position of the

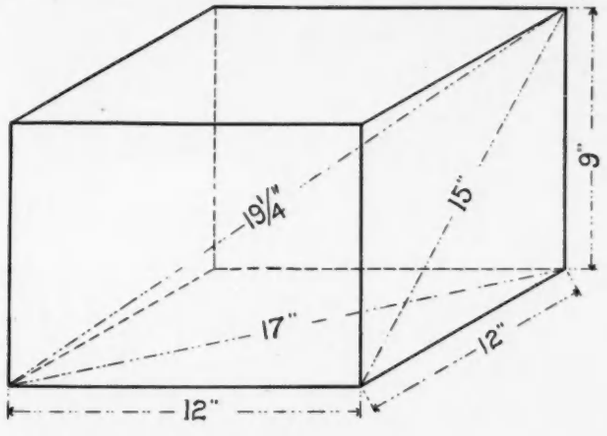


FIG. 72.

different rafters and why certain figures are used on the square to obtain the cuts as shown in illustrations 65 to 71 of the last number of this magazine. We will carry this thought a little further and show the corner of a hip roof in an imaginary cube with dimensions equal the run and rise given the common rafter, as shown in Fig. 73. Here the common rafter, the jacks and the hip are shown in position with their relative runs, rises, lengths, cuts and bevels all shown in this illustration. If the corners of the building are other than at right angles, then the base of the cube would be to the same shape as that of the corner of the building.

In Fig. 74 is shown a roof plan with right-angled corners and containing an octagon bay. This answers for any pitch given the roof, as there is nothing in it to distinguish the pitch. In fact it would show just the same if there was no pitch given at all, consequently all of the angles for the side cuts are at an angle of 45 degrees. If there was no pitch, it would simply be the common miter of 12 and 12 on the steel square, 12 being used on one arm of the square because it represents the length of the tangent when the run is one foot and remains so regardless of the pitch given the roof. 12 is used on the other arm of the square because it represents the length of the rafter for one-foot run when there is no pitch given. Therefore, we let 12 on the tongue represent the tangent because it is a fixed number and answers for any pitch. When there is a pitch given the rafter, its length is increased. Thus, in the ⅜ pitch, the length is 15 inches. Therefore, 12 on the tongue and 15 on the blade gives the side cut of the jack as before illustrated. If we were to cut off the peak end of the jack rafter on a parallel line with the seat cut after the side cut has been made, the angle would show

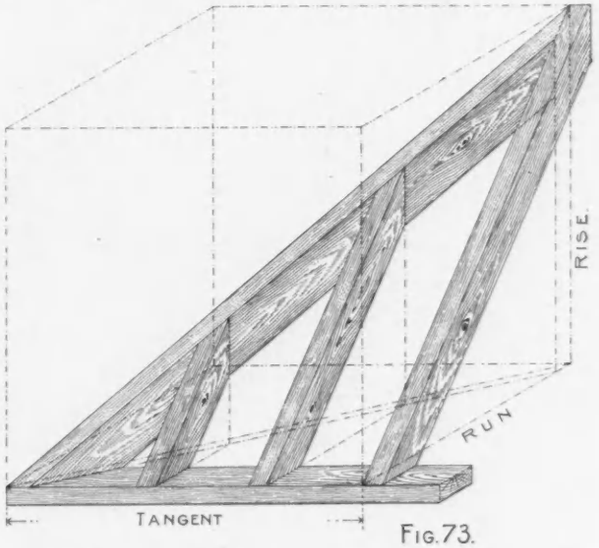


FIG. 73.

just what we started from—the 45-degree angle. For the side cut of the hip, it would be 12 and 66/17, as shown in Fig. 65, but in order to avoid the fractions

it is better to use 17 on the tongue, as described, in connection with the above figure.

The run and tangent in the case of the square cornered building being equal is very misleading. 12 taken on one arm of the square is generally ascribed to the run, when, as a matter of fact, it has nothing to do with it. The run of the rafter and its length (which gives the same result as 12 on the tongue and the length of the rafter for a one-foot run taken on the blade) gives the side cut of the jack rafter for the square-cornered building and no other. Not because 12 stands for one-foot run of the common rafter, as is generally supposed, but because the tangent equals the run, and is therefore not a general rule, but one of the things that centralizes at 45 degrees.

Now let us apply our unity rule, which, as will be seen, applies to any kind of a corner, whether square or any other shape. The rule applies to all alike. It is the tangent or the figures on the blade that gives the miter when 12 is used on the tongue, as shown for the polygons in Fig. 27, of the August, 1905, number. These figures transferred to the tongue, and the length of the common rafter for a one-foot run of the given pitch taken on the blade will give the cut. The blade giving the cut. Now, for an octagon roof.

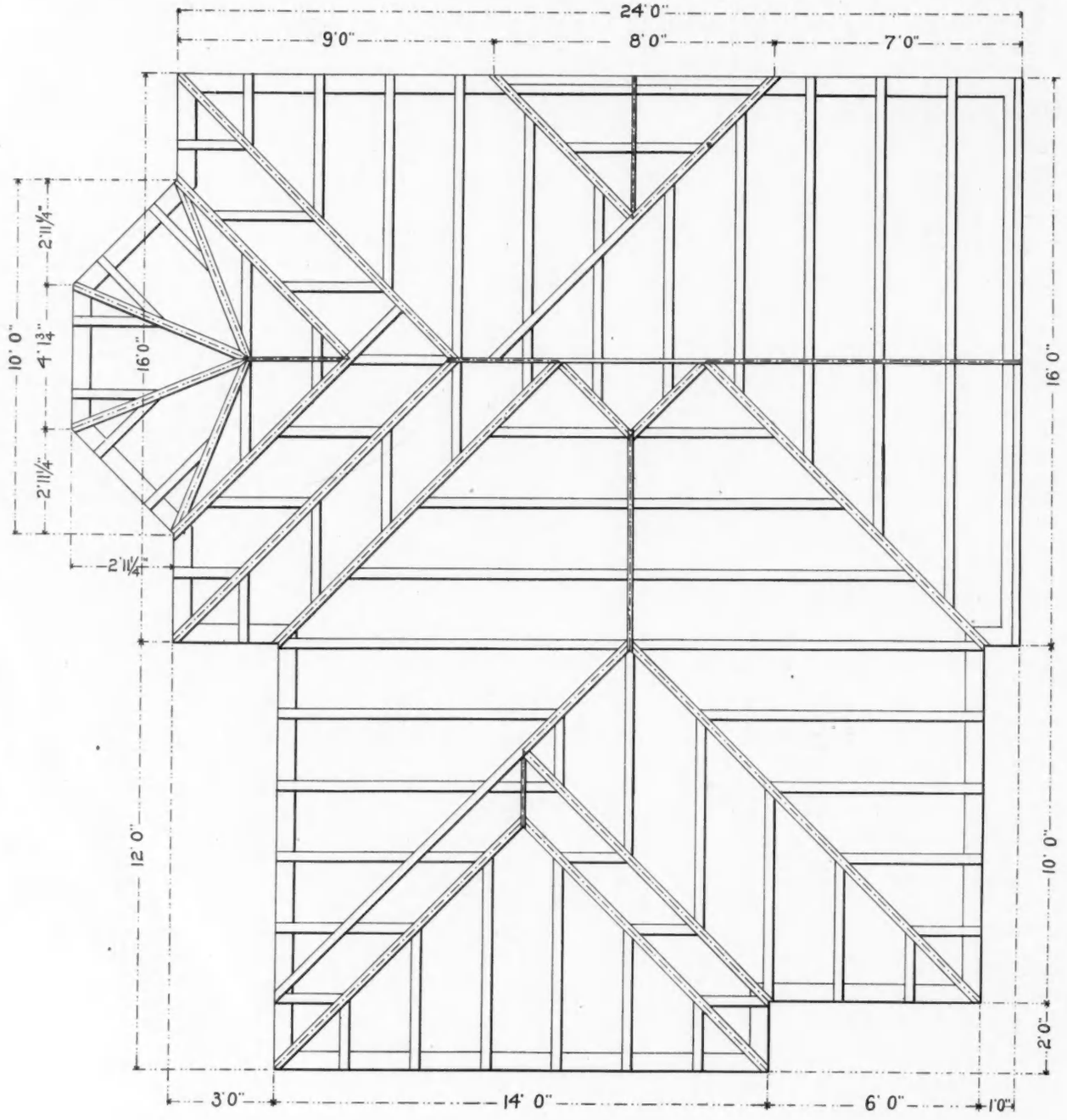


FIG. 74.

The tangent for the octagon is 4 23/24 or practically 5 inches. This taken on the tongue and 15 (the length of the rafter for the 3/8 pitch) on the blade gives the side cut of the jack, and the corresponding cut across the face of the roof board to fit over the hip. The blade giving the cut in the former and the tongue in the latter, as shown in Fig. 75.

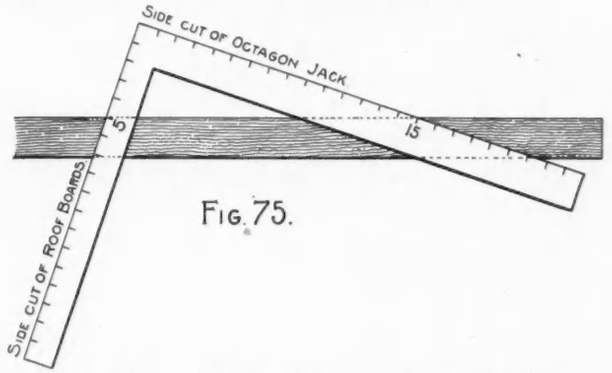


FIG. 75.

What is true of this, is true of any other polygonal roof. In Fig. 76 we show the tangents on the blade for the polygons from 4 to 10 and represent the figures to use on the tongue of the steel square instead of 12, as in the square-cornered building. In connection with this illustration is shown the figures to use for the octagon as applied in Fig. 75.

The true measurement line of all jacks, hips and

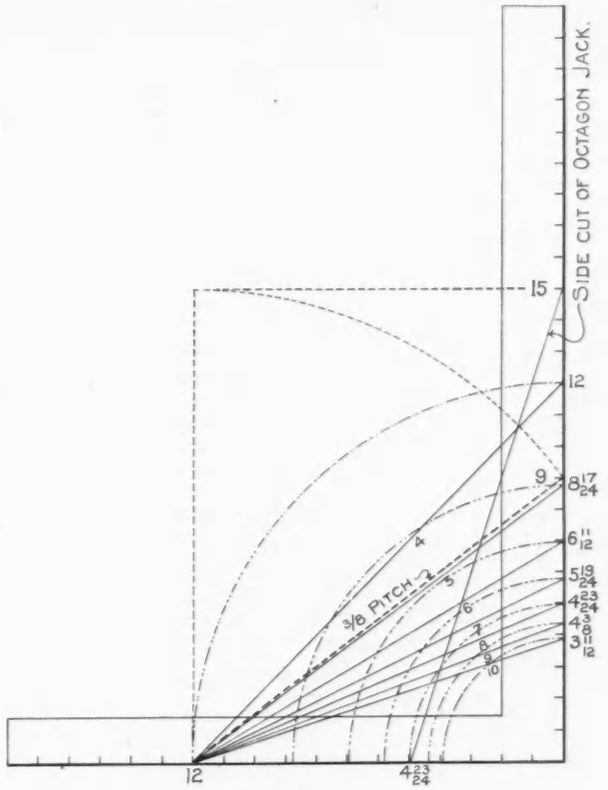


FIG. 76.

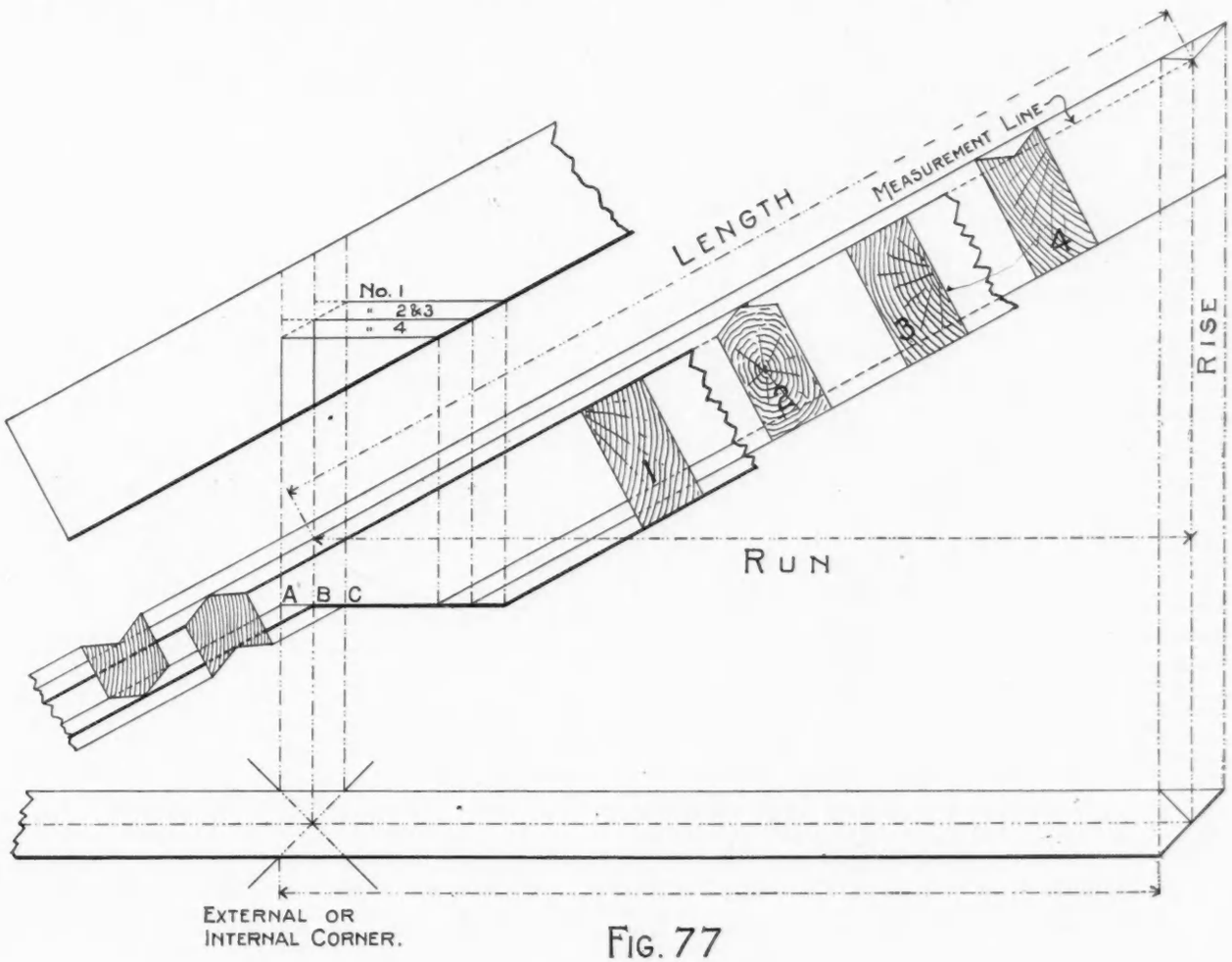


FIG. 77

valleys is at a line along the center of the back, and just where to place the square on the side of the rafter so as to make the cuts and length come right at that point is a question that taxes the skill of most carpenters, especially so in the case of the latter, where the same are to be backed.

In Fig. 77 we show the hip and valley under different conditions for a square-cornered building. Beginning at the bottom is shown the plan of the rafter. The cross lines on same represent the angle of the plates for either hip or valley. Above the plan is shown the elevation. The sections 1-2-3-4 represent the position of the rafters under the following conditions:

No. 1, hip when not backed; No. 2, hip when backed; No. 3, valley when not backed; No. 4, valley when backed. No. 1 is outlined by heavy lines and apparently sets lower than the others. By tracing the bottom line of the sections down to the seat of No. 1, thence up to the second elevation, will show just how far in the seat cut should be for each rafter. No. 1 cuts into the right-hand vertical line above the plan, as

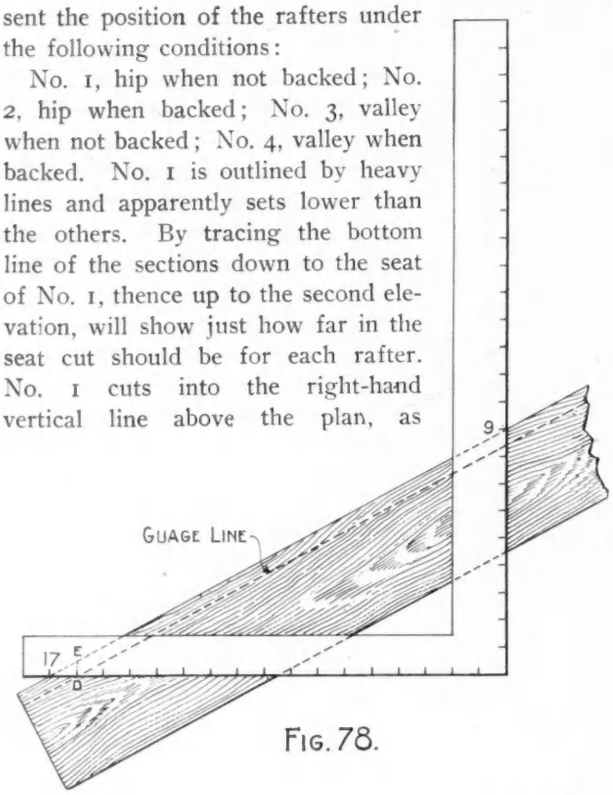


FIG. 78.

at C, which would make it stand at the right height above the plate, at the outer edge of the rafter, but in order to make the seat cut clear, the corner of plate, it is necessary to cut into the center line B. No. 2 cuts into the same point as No. 1, but owing to its being backed, the seat cut drops accordingly. No. 3, which is for the unbacked valley, also cuts into the center vertical line, and in order to clear the edges of the plate, must cut out at the sides to the left vertical line. No. 4 cuts in the same depth as the latter, but as much lower than Nos. 2 and 3 as they are below No. 1. The vertical lines "A" and "C" from the plan represent the width of the rafter. Therefore, if the rafter be two inches thick, the lines A-B-C would be one inch apart, and this amount set off along the seat cut, or a line parallel with it will give the gauge point on the side of the rafter. To make this clearer, we refer to Fig. 78. 17 and 9 gives the seat cut. Now leaving the square rest as it is, measure back from 17 one-half the thickness of the rafter, which would locate the gauge point at 16, and this will be the point for the line from which to remove the wood back to the center line of the hip. The measurement from the gauge point taken square out from the seat cut to the edge of the rafter as shown at D-E, shows how far apart the parallel lines of the seat cut will be under the above conditions. This rule applies to any pitch given the roof so long as the pitches are regular.

Lumbering in the Northwest

(*Continued from page* 420.)

Some of the sawmills on Puget Sound and on the Columbia and Willamette Rivers in Oregon are built on piles over the water, so that the lumber is loaded into vessels directly from the saws. Others load their product on the cars and distribute it by rail. Yet other plants on the Pacific Slope float their timber to market by means of a narrow wooden trough known as a flume through which flows a rapid stream of water. These flumes are sometimes over forty miles in length and cost almost as much to build as a railroad. Not a few sawmills in the Northwest have connected with them planing mills or woodworking factories of other kinds, so that the rough lumber from their saws is changed into the form of finished product ere it reaches the market.

In some of the Pacific Coast planing mills, producing moldings, ceilings, floorings and siding of every size and description, are machines which handle the lumber at the rate of sixty feet per minute, which, it will be appreciated, is a capacity quite in keeping with the capabilities of those saw carriages in the sawmills which handle fifty-ton logs, and the steel band saws fourteen inches in width and sixty-one feet in length, which are driven at a speed in excess of 10,000 feet per minute around massive wheels ten feet in diameter.

Although the lumber industry of the Pacific Northwest, which in number of employes and value of output surpasses all other industries combined, furnishes a product that is the principal source of traffic for five transcontinental railroad systems, by no means all of the timber yield goes to market via the steam roads. As a matter of fact the export business with all quarters of the globe is increasing rapidly. From the Columbia River district alone there have been exported to China, Japan and the Philippines within recent years no less than fifteen cargoes of lumber.

On the north California coast, where the sea coast is bold and where wharves cannot be maintained the lumber for export is placed aboard deep-sea ships by means of steel-wire cables stretched from the high bank to the vessels. A pulley wheel or traveler operates on the cable, and from this the load of lumber is suspended in a sling of chains. The force of gravity carries the load to the ship. At Noyo River there is a plant of this character which enables the loading of 150,000 feet of lumber per day.

Short Talks With Our Subscribers.

DOES anyone ever borrow your magazine? Perhaps, though, you don't get it at your shop or office, but have it sent to your home. Do you find that your friends are interested in it when they call at your house? Don't they think it looks practical? Don't they admire the way it is printed and illustrated? Did you ever ask them if they would like to subscribe for it?

We know what *you* think of it because you have told us in your letter—that is, the most of you have. And the only reason the others haven't is undoubtedly because they have not had time to write.

Now if *you* like the magazine, and you find that your judgment is borne out by the judgment of your friends at your work or who call at your home, wouldn't you be interested in getting others to become regular subscribers?

✣

We want our subscribers, who *know* the magazine, and who *know* its practical value, to be our agents. An agent who is one of the family, and who is really interested in the great success of the AMERICAN CARPENTER AND BUILDER, is the best possible kind of an agent. We have over 500 just such agents, but this is not any where near enough. The magazine now goes to nearly 9,000 towns, and there should be a subscriber in every town sufficiently interested to act as agent, and thereby become more closely connected with the editors and managers, and be in fact an integral part of the great and growing family.

Every day we hear from many of these 500 subscriber-agents, who send in the subscriptions of others, and thereby add to their own income as well as having a share in the great success of "The World's Greatest Building Paper." We make very liberal arrangements with these agents and if there is none in your town we want you to be interested enough to write us for particulars regarding commissions, etc.

✣

Those who have taken up the work find it not only agreeable, but fascinating. They have faith in what they are working for and know that the subscriber they secure will get in return for his money many times its value. When one new subscriber is secured, he often influences others to send in their subscriptions through the agent, and these in turn get more, until the work becomes a veritable "endless chain" in favor of the subscriber-agent.

Don't neglect writing us on this subject until too late. Some other subscriber may get ahead of you and then you will be sorry that you let the opportunity go by. You can add many dollars of spending money to your income by starting right now. Write us to-day.

✣

Our Mr. E. L. Hatfield, assistant manager of the AMERICAN CARPENTER AND BUILDER, is already well known to you, as it is he who has corresponded with you in regard to your subscription. He keeps in close touch with our subscriber-agents, and has made many close acquaintances and friends through the promptness with which he attends to their requests. Every letter received he attends to himself and replies the same day. Address your letter to him personally and you can depend upon its receiving the most prompt and careful attention.

✣

What is Your Opinion?

How did you like our cover last month? We may give you another something like it in August, but this month—the anniversary of the "Glorious Fourth"—we thought we would return to the typical "red, white and blue."

✣

We like to receive the opinions of our subscribers on anything in the magazine that they like or don't like. The contents is designed to please and instruct *you*. And if *you* don't tell us how you like it how are we to know if we have accomplished what we are trying to accomplish? Help us to help you. Let's all work together for the best interests of all.

✣

Envelopes Better Than Wrappers

Have you ever noticed that your magazine comes to you every month flat instead of being tightly rolled? A magazine which is rolled never looks neat. It is almost impossible to get the roll out of it, and if you do get it out it is badly mussed at the best. It costs a lot more to put out 28,000 magazines in envelopes than it does to roll them in plain wrappers, but we want our subscribers to have the best. Did you ever notice that about the only publications that come in envelopes are the $5.00 kind? We are giving you a $5.00 publication, mailed in an envelope, for only $2.00. Many enthusiastic members tell us that it is worth $10.00. What do *you* think?

Qualities Necessary for Good Artificial Stone

ESSENTIAL REQUISITES OF GOOD ARTIFICAL STONE—KINDS AND QUANTITIES OF MATERIAL TO USE—PROPER PROPORTIONS OF COLORING MATTER TO USE IN ORDER TO SECURE GOOD RESULTS

By Harmon S. Palmer

THE qualities which artificial stone must possess in order to make acceptable hollow building blocks are *strength, color, density, fire resistance, moisture proof, even texture* and absolutely *free from seams* caused by improper raming, to which must be added the cost. No one of these is of less importance than another and all must co-operate together, each being the best of its kind in order to do so. The ingredients which must be employed are Portland cement, the aggregate and water. In selecting Portland cement it is deemed safe to purchase in the open market of any well known and responsible dealer who is always willing to guarantee this product to be equal to government standard in strength and all other qualities. In the writer's experience of over thirty years but two small lots were found of bad quality, which the manufacturers were glad to replace without cost. It is their desire and to their interest to keep their reputations and standard of cement to the highest point, but for those who wish to investigate and ascertain so as to rely upon their own knowledge it is deemed advisable to follow the advice given by the manufacturers which is found in the literature of almost everyone. Professor S. B. Newberry of Sandusky, Ohio, is perhaps the best authority on Portland cement in this country, and any of his able articles, exclusively on this product, should be read by all who wish to learn the technicalities in its manufacture and testing. However, this fact should not be overlooked that there is a wide difference between the scientific production of Portland cement and its applications in the arts. In other words a person may be an expert in the chemical constituents of cement and mode of manufacture while his judgment in building construction and mechanical appliances might be very defective. This also applies to other chemical compounds such as waterproofing for cement products which is believed to be the height of perfection for this purpose, but hollow blocks and buildings call for another branch of education which should not be diverted to the interest of clamoring Portland cement dealers.

Selecting Aggregates

Next, after cement, is the selection of aggregate; this consists of sand, gravel, crushed rock, or brick, or screenings from rock crushers. It is from these that selections must be made to go with the cement, and the qualities of the stone produced will depend upon the skill, judgment, and carefulness of the manipulation by the operator. Experts in this line with access to all the above items in varying degrees, can produce stone that is almost equal to granite for any purpose; but owing to local causes or conditions only a few of them are ever found in one locality, so that in practice selections are made from the best at hand, which is generally sand and gravel.

The desirable qualities in sand is its sharp irregular grains, showing under the microscope, corners and angles which will fit together, interlocking with each other as much as possible, which gives the cement a chance to bind each grain to another like welding iron; whatever aggregate is used it is this principle which one should have in mind, but another of as much importance is the different *sizes* of grains, the object being to reduce the interstices between the grains to the lowest limit by using finer grains and finer still until the cement will fill the smallest voids, making an absolutely dense and solid stone. To arrive at the proper proportions the following method is recommended:

Testing for Voids

Take any vessel which will hold water and fill it with the coarsest gravel or sand which it is desired to use; then fill it with water, which will seek all the voids left by the gravel; turn the water out into another vessel and its cubic contents will tell exactly what voids there are in the aggregate of gravel. Now take the next smaller size which it is desired to use and fill this with water in the same way, and measure the voids, working down through all the grades which it is expedient to use, but lastly measure the voids for the cement; however, when the proportion is definitely ascertained it is best to add about one-sixth or one-eighth of cement so as to make up for any possible discrepancies in the operation and to have something over for good measure which will be found to add to both the density and strength of the resultant stone.

Now the first thing to do when about to start a block plant is to ascertain what aggregates are available in the immediate locality, taking into account the conditions of roads, location, etc., giving preference to those which are most accessible and nearest to the place of shipment, or to where they would most likely be used. In most all localities there are various aggregates ranging from coarse to fine and it is easy from the foregoing principle to figure out the voids and the cost of each grade, cost to handle, and quality of finished stone; samples of which should be made, experimenting with such different materials as are at hand, all of which will be readily understood and easily figured by any practical man.

Should a rock crusher be in the neighborhood working on any hard stone the screenings could be used to great advantage, and if properly graded, as spoken of above, sand and gravel could be dispensed with altogether, the only requisite desirable is to blow out the very fine dust. There is apt to be too much of this in the general run of the crusher, although stone is often

made without going to this trouble, and the difference in quality, color, density, etc., should be determined by samples and experimenting. Often these screenings are mixed with sand and the results are according to the different combinations. It is here that the enthusiast gets in his fine work, and as he finds himself master of the situation his satisfaction increases; he watches for color of all shades made possible by the screening from dark, red, green, or buff stone with such additions of sand as its color suits; bearing in mind that it is the hard, sharp particles that make good stone and not the soft or greasy particles, as is the case with marble, shale or slate or even the top layers of limestone. It is often asked whether marble dust can be used to make a white stone, but this is not practical for the reason mentioned above; and it may be added that no white stone can be made from the Portland cement found in the present market, because it is the cement which is the controlling feature in the permanent color of the stone. This is one of the most fortunate of the necessary elements in stone making and but for its natural favorable color would have been a serious hindrance to its introduction.

While it is possible to add pigments of color which will change the same to any desired shade, all this takes time and money, and experts in this line are scarce, so that the natural color of cement stone if it suits nine-tenths of the people is preferable. It is said by various chemists and cement men that a new Portland cement can be made and will soon be on the market which is perfectly white, and if this is true we shall hope and expect to see its general introduction because the fact is plain that white stone in many cases would be a great improvement in combination with other colors.

Coloring Concrete Blocks

For those who wish to experiment and learn how to mix and use the pigments for various colors the following is recommended. Although care should be exercised at all times to the end that the least amount that will get the desired shade should be employed; because the pigments in most cases are ground earths which being of a clayey nature are not at all adapted to the needs of cement in stone making and too large a proportion would spoil any material however good otherwise. It may be said here that there are two exceptions to this rule within certain limits, and that is oxide of iron and ultramarine.

The most usual color desired is red sandstone or sometimes called Lake Superior sandstone; this is easily imitated by the addition to the dry mixture of cement and aggregate iron oxide, often called mineral paint, which is plentiful in the market and of varying shades. About twenty-two pounds of this to one barrel of cement will give a good red stone, but its shade can be varied by different proportions using a less amount; this addition also is claimed to add a trifle to the density of the stone and, if properly mixed, will not streak or fade.

Sometimes Germantown lampblack is added to this to get a brown, and this lampblack is also used alone for producing a pleasing gray. Two pounds to one barrel of cement is sufficient.

For a good black there is nothing equal to manganese dioxide, and it requires about forty-five pounds to one barrel of cement. Lampblack is frequently used, but it is not so good.

Blue and green are both produced by the use of ultramarine. Nineteen pounds of the ultramarine will give a good blue when mixed with one barrel of cement, and a greater proportion will get the green, about four pounds more or twenty-three pounds in all. This will add some to the strength of the stone, but additional quantities will weaken it so it will disintegrate.

For yellow and brown the ochers are used. Do not use more than twenty-three pounds to the barrel of cement for the yellow and no more than the same amount of brown ocher for the brown color.

All of these ingredients should be mixed while the same is in the dry state so that no streaks will be visible, and then add the water, mixing and tamping as before. It will be understood that while the stone is in its moist state the color will be much darker than when it is dried out, so that it is only after several days that one can see what the permanent color will be.

Of all these colors that which is most likely to show efflorence is the black, but in some cases it will show on the red, and it is the addition of these colors which increase the liability of efflorescence. This need not deter the use of coloring within reasonable limits; in fact it is only in peculiar conditions of weather that this unsightly defect occurs in colored blocks, and the same may be said with the natural cement color. When this appears, which is the case in very many fine pressed brick structures, it is only for the time being, pleasant and sunshiny weather tending to remove it altogether until the age of the stone will prevent its recurrence. The subject of efflorescence will be taken up later.

✤

Rule for Coloring Cement Blocks

On account of the interest manifested at the present time in the use of hollow cement blocks in connection with building construction it may not be amiss to refer to a rule which is claimed to secure good results for coloring blocks of this character. An authority on the subject states that the best proportions are as follows: Two sacks of sand, one sack of Portland cement and 15 pounds of red or brown (dry) mortar color, or, in other words, about one-sixth (in weight) as much color as cement. This mixture must be thoroughly turned (dry) four or five times, so that the coloring matter will be evenly distributed throughout the mixture. After this mixture has been turned several times, as stated above, it is a good idea to run the entire mass through a fine screen before adding water; after which proceed as usual.

Arch Construction

A SERIES OF ILLUSTRATED ARTICLES COVERING THE CONSTRUCTION OF STANDARD CONCRETE ARCHES, SHOWING THE SIMPLEST METHODS FOR THE FORM BUILDER

By Thomas P. Ellis

AS THE small-sized arches cost more per yard to construct and are more numerous than larger ones, we are giving this series of articles with a standard 4-foot arch. Figs. 1 and 2 show a square head wall, built in sections which can be used a number of times. The end should be made full height and when done should be ripped at the bottom from about 2 inches at the center to about 4 inches at the sides, as the footing is often too high and trouble results. When it is set in place, put a block under the center that will bring it up to the proper height, and when the front side is plumb, put a block under each corner. You will find this better, as the blocks can be knocked down when the form is taken down, giving the clearance under the coping, and as the filling covers the bottom, it requires no further attention. See A in Fig. 1. When both ends are set up, put the face of head wall in place and put bolts in, as shown at B in Fig. 2. The board that forms the back of the coping should now be put on to hold the form in place. The whole can now be shifted into position. As the opening C C in Fig 2 permits the center line to be drawn from one end to the other, hang the plumb bob at D in Fig. 2, taking the center line of track measure out the required distance. As the back of the head wall is open the arch ring or core should now be put in.

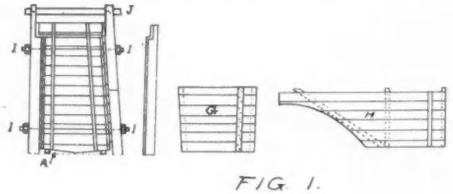


FIG. 1.

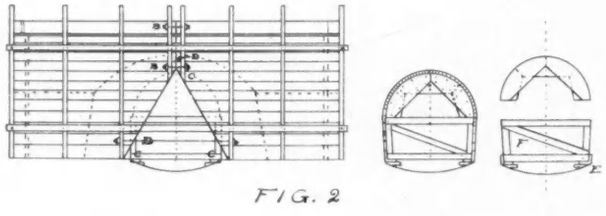


FIG. 2

Begin by putting down the sills, which are made of two pieces of 2 by 8 nailed together, as shown at E in Fig. 2, and leveling with a wedge. Next put frames F in place and board up. Semicircles can now be put in place and lagging put on. Sections G and H in Fig. 1 can now be placed, forming back of head wall and the whaling timbers ii in Fig. 1 put on and tightened up with bolts. Then the back of bench wall is put in place and a small V strip tacked up the front corners and around the arch ring and against the head wall. The coping can be straightened and strips nailed across the studding as shown at J in Fig. 1. The form is now ready for concrete.

Fig. 3 shows the plan with 30 degree wings, which can also be put in sections, but as they are easily knocked out of true, I think it cheaper to build them on footing unless there are several of the same kind, then I would build them in sections, the bench wall frames and the semicircles being identical with each other. The arch ring is built the same way, and for ring or head walls a sill of 2 by 6 should be laid on the footing to nail the studding to. When the studding is set up to the top of the wing, get the height of the wings at the top and bottom and cut the studding off 3 inches below these points, and put a plate 2 by 8 on top of them as it will straighten and hold them in line. When the back wing wall is cut off to receive the coping it should be cut off, as shown at K, Fig. 4, as the 1½ to 1 slope line and the line of intersection of the wing and back wall if continued would cross each other at L, Figs. 3 and 4. Cutting it off level would send the line to L, Fig. 3, since it must come in line with the end of the coping. To find the distance down on back of wing for the lower end of cut, note the batter in inches per foot and go down accordingly. A very sure way since the center line is established is to take one-half of the length of the coping less the overhang at right angles to it, and

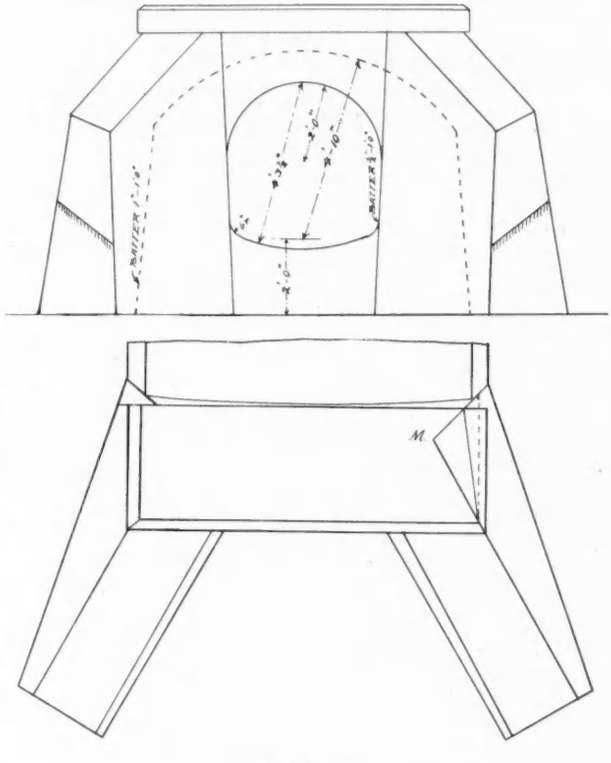


FIG. 3

drop a plumb bob to that point, the line will give the lower end of the cut. We have seen some badly twisted walls as a result of running the cut too high or too low as the case may be. Another cut in connection with the back wall which is very hard to figure out can be made in the following manner: When the wing wall is on a 30-degree angle and the batter of 2¼ inches to 1 foot and the back wall is on a batter of 1 inch to 1 foot, it is always best to build the back wall first and join the wing wall on. Put up the back

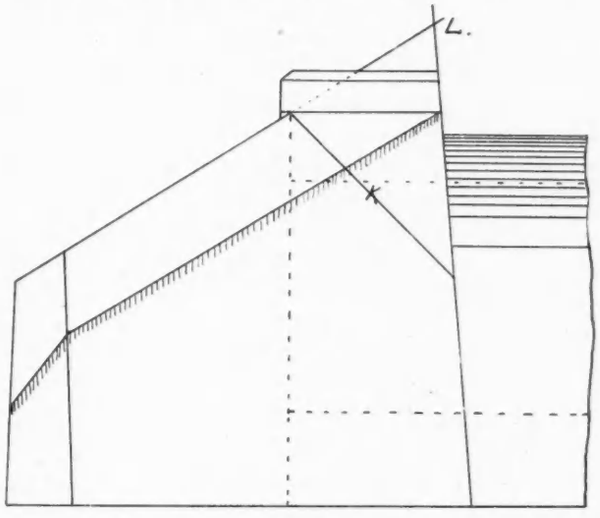


FIG. 4

wall to the correct batter and when studding is set for the wing to correct batter, draw a line from the end of the wing at the same height as the top of the back wall (furring it out the thickness of the sheeting). Where it crosses the back wall will give the top, and as the bottom is already located strike a chalk line from the two points and cut the end of back wall to it.

Cutting the front wing wall into the bench wall on a

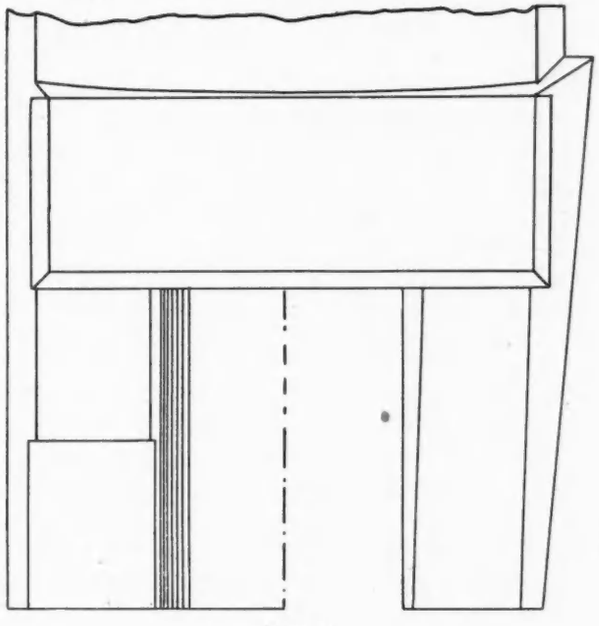


FIG. 5

30-degree angle at different batters is difficult for some, but suppose we have to join a wing with ⅞ of an inch to 1 foot batter to a bench wall 1 inch to 1

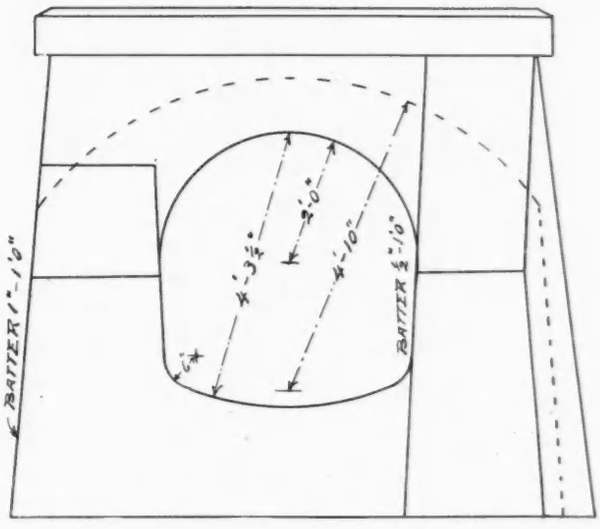


FIG. 6

foot. After drawing a plumb line down the bench wall at intersection of the wing and studding being set for same, put a two-inch block behind the board at each end and shove it down past the intersection. It is then easy to square out from top to the bottom of the board on a line and find the proper cut for both

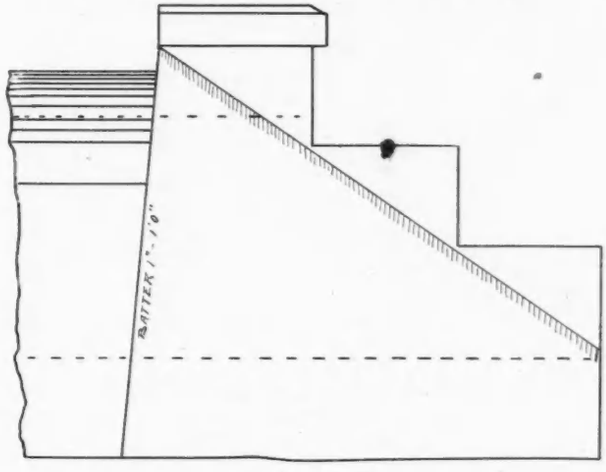


FIG. 7

the sides and edge of the board. Or if figures are preferred, we can do as follows: Since we have a 30-degree angle and at 90 degrees we would have one inch batter, we find we would have 1/3 of an inch if the wing wall was plumb, but since we have ⅞ of an inch batter in the wing wall, we find that it will cut 7/32 out of square and that added to 11/32 will give 9/16 to one batter. This is not absolutely correct, but near enough for all practical purposes.

Fig. 5, 6 and 7 show a half plan of straight and sloped wings, the construction of which is so similar to the 30-degree wings, so that it will need no further explanation. In our next article we will take up larger reinforced concrete arches.

Work for the Carpenter Machine Shop

MACHINES MOST SUITABLE FOR THE CARPENTER SHOP AND HOW TO PROPERLY RUN THEM—WORK THAT CAN BE DONE PROFITABLY

THERE is admittedly a difference between equipping a machine carpenter shop for cabinet work and equipping such a shop when the work has more to do with house building and really tends toward what is known as mill work, and may eventually lead to the addition of a lumber yard and the retail lumber business, or the machine carpenter shop. We generally assume, however, that no matter what line of work a plant of this kind may branch into there are certain machines that will be found generally everywhere. One of these machines is the rip saw and the other is the cross cut.

The other day while walking through a plant of a lumberman contractor and builder and mentally taking stock of his machinery, I was struck by the absence of a cross cut. While waiting for him to get through a job of planing he was doing so we could sit down and have a talk, I noticed that his partner, who was at the bench, cross cut some stock by hand and then brought it over to the rip saw table for ripping, which made me wonder some more. If it was good to do ripping by machine why is it not good to do cross cutting the same way?

When I got a chance I asked him how they managed to do business without a cross cut, and he admitted that it did seem queer to be running a plant containing numerous wood-working machines without having a cross cut, but the fact of the matter was that they did not really have much need for a cross cut unless it should be a type of machine which should be used for doing positive work, that is, a saw that would cut accurately, square and smooth, more so at least than it is possible to get a swing cross cut to do. Feeling that they could not depend on the swing cross cut saw to do the work they are ordinarily called on to do with a hand saw, and not having a great deal of use for the cross cut outside of this class of work they had not seen fit to install one, but for cutting short lengths and small stock they made use of their rip saw table on which they could put a cross cut.

Maybe he was right about it, but there was one idea I can't get over, and that is that every wood-working institution that has machinery should have a cross cut saw. The kind of cross cut will depend, of course, on the work being done. If the work tends toward building contracting and lumber yard work the swing cross cut is the thing to have, and they are always good things to have any time in almost any wood-working factory. For cabinet work exclusively, it is probably better to have some form of table saw or bench saw by which one can insure accuracy in cutting and use small saws with fine teeth to get smooth work. Of course, as in the case above, it is possible to use a rip saw table for cross cutting of this kind when occasion requires, but the trouble with that is it involves too much changing, and when you want to do some cross-cutting the rip saw is on and when you want to do some ripping the cross cut is likely to be on. It is like a combination machine, always set up for the wrong thing, and it takes more time to change frequently than is required to do the work. To get the full benefit out of either a cross cut saw or a rip saw, they should ordinarially be situated somewhere convenient to the bench, so that they can be made use of if there is only one piece that is wanted cut or a load of pieces, and both machines should be ready for work at any and all times.

There was another thing I noticed about this shop, another fault or weakness that can be found in many a machine wood-working institution, and that was a badly set band saw used to do scroll work. It left the face of the scroll work full of deep saw teeth marks made by the long corners on part of the saw, or else by crooks in the saw, alternating with ridges or humps due to lack of proper set in part of the saw, proper spread, and the whole resulting in such an uneven surface that it would take more work to sand it down even by hand than it had already taken to do the scrolling.

This tendency to rough work is one of the objectionable features about using a band saw for scroll work. The ordinary band saw will not do as smooth work as the scroll saw when it is in the best kind of condition, and it only takes a little bit of neglect to make it do a mighty poor job of scrolling. Eliminate this feature, keep this band saw in order, and it is a great labor saver in scroll work, as it can be made to do probably three times as much work as an ordinary

scroll saw in the same length of time. But it would be better to do the work with a scroll saw and have it smoothly done than to have the work done for nothing on the band saw and then have to smooth it down by hand. In fact, after one sees a few rough jobs like the example I saw in this man's shop he will feel like saying that the man with a carpenter shop should stick to the scroll saw. But because a man has a good band saw and neglects to properly use it is no logic for condemning the use of the saw.

The point to get from all this is a point that I believe was made once before, and that is, if you must do without one of the machines, the scroll saw or the band saw, do without the band saw until such time that you can have both machines, because the scroll saw will do a certain amount of the same work you do with the band saw, and in addition will do certain work that you cannot do with the band saw, that is, get inside of a piece and make the inside scroll. So if you are debating about or are in a quandary between these two machines, unless there is something special that calls for the use of the band saw, get the scroll saw and stick to it until you are able to afford a band saw, too, and then don't neglect your scroll saw, but keep it doing its part of the work.

This man and I sat down and had a little talk about the care of band saws in which, it being a pet hobby of mine, I took pains to point out to him the philosophy of the expert with the band saw. I told him that in the first place he must not get his saws set too wide, for if set too wide it will always cut rough, the same as a hand saw set wide will cut rough. Also to get fine work the more teeth to the inch the better, and then be sure and don't run them without enough set, for that heats the saw and causes trouble. So far the instructions sounded like the fellow that was giving instructions how to run a turning lathe, and the sum and substance of the instructions were, "under no circumstances not to run too fast, and whatever you do don't run too slow." The man was merely instructed not to set his saws too wide and not set them too close. By and by, however, we got down to the real meat of the matter, and I pointed out to him that to do scroll work right the band saw blade should be narrow and have lots of teeth, say five or seven to an inch instead of two, three and four as many of them have. With more teeth you not only have more corners, but there is less danger in the process of setting or spreading some one or two teeth out beyond the rest until it will scar the wood. Also, while it is a little more tedious job to set the saw, there are more teeth, and being of smaller dimensions, one has to be more careful in a way, but by proper care and manipulation with the set there is really less danger of getting too much set than when you have fewer teeth. There is a band saw blade made that has the back ground thin pretty much like a scroll saw for doing smooth work. They will not always clear themselves as well as you may like, but to insure smooth scroll work it is probably best to buy these thin backed saws at least until you learn how to manipulate setting appliances, so you can get a close, smooth set in a band saw.

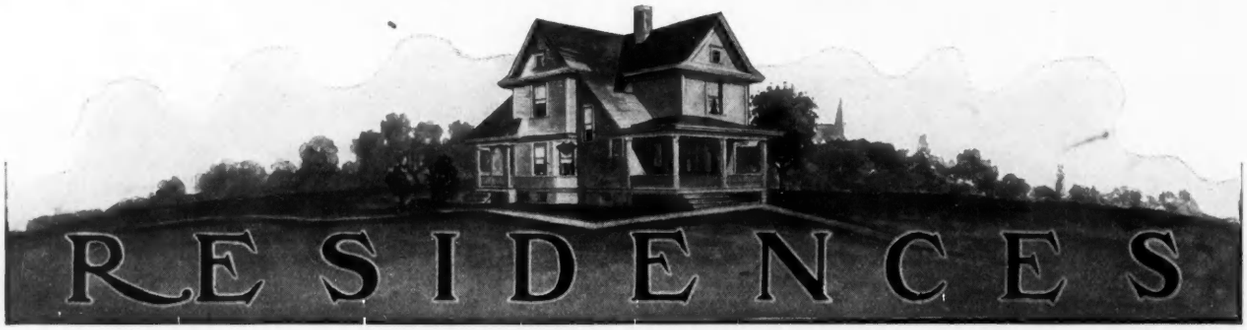
One of the things they were making in this shop were screen frames, including both door and window screens, and after we had talked machinery a while we got on to the subject of screens and whether it pays to fool with them or not. This man found that it did, but he did not confine himself to making door and window frames. He bought and sold them, kept standard sizes in stock and also kept lots of screen wire, and was doing a big business in screens, so much in fact that the hardware stores in town had practically given up this part of their trade and left him in possession of the field. I asked him how he managed it, how he managed to get the trade away from the hardware stores who made a specialty of carrying these things, and he said he worked it out very naturally. A good part of the trade when they bought screens wanted some one to put them up, a want he was prepared to fill, but the hardware man was not, and when was added to this a certain element of good trade that wanted their screen frames made to order, it took much more of the really good trade until he practically had control of the screen trade in his community, no matter whether a man wanted a special lot made, wanted to buy some and have them put up, or wanted to buy them and put them up themselves.

This subject is mentioned here because in it there may be a hint that is worth something to those carpenters who keep open shop, that is, keep a shop in operation in town all the time, because if they are letting the hardware men handle the screen trade they are giving away some of their opportunities. This is especially true where the builder operates a little lumber yard and is qualified to buy from wholesalers at wholesale prices, and it is little things like this that are worth while.

San Francisco Buildings

The committee appointed to revise the building laws has decided to rescind the action taken in respect to the height of buildings to be erected in that city. After much discussion a resolution was favored permitting the erection of class A structures to the height of two and one-half times the width of the street on which the building faces Class B buildings may rise to a height of 102 feet, or nine stories. Class C structures with steel laths may be built seventy feet high and with wooden laths fifty-five feet. Frame buildings may consist of three stories.

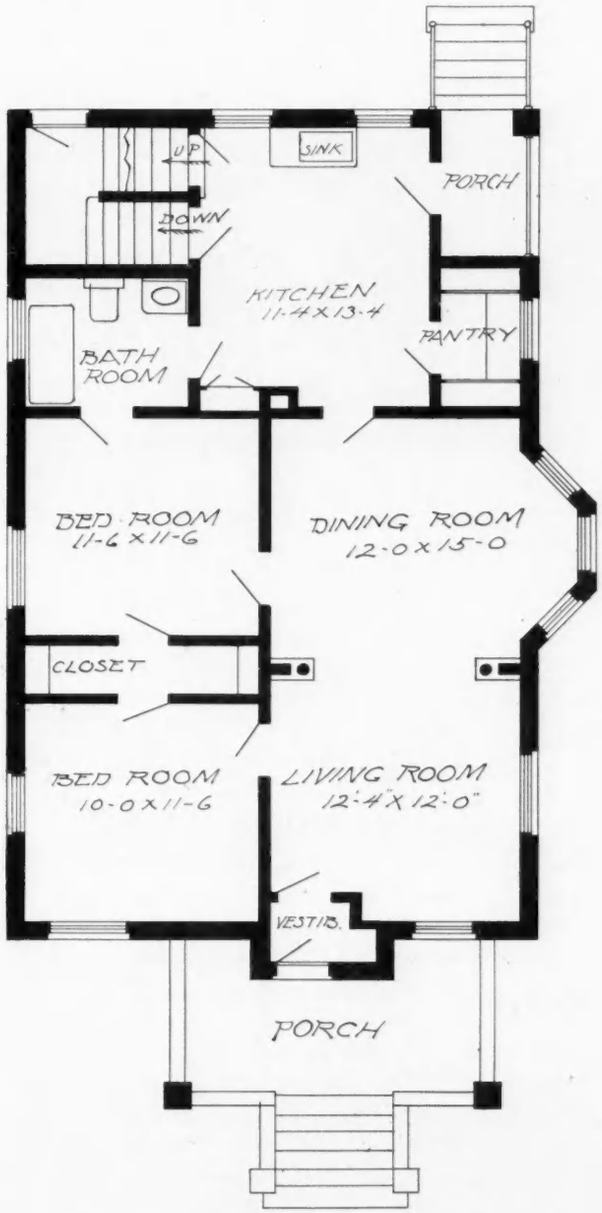
Class A buildings must be made of incombustible material with steel frames. Class B structures must be constructed in the same general way, except that concrete or other incombustible reinforcements may be used in place of steel. The class C building is of incombustible exterior and wooden floors.



Two Practical Houses

DIFFERENT TYPES OF HOUSES SHOWN TO GIVE SUGGESTIONS TO THE CARPENTERS AND BUILDERS—DESIRABLE FEATURES OF EACH DESCRIBED

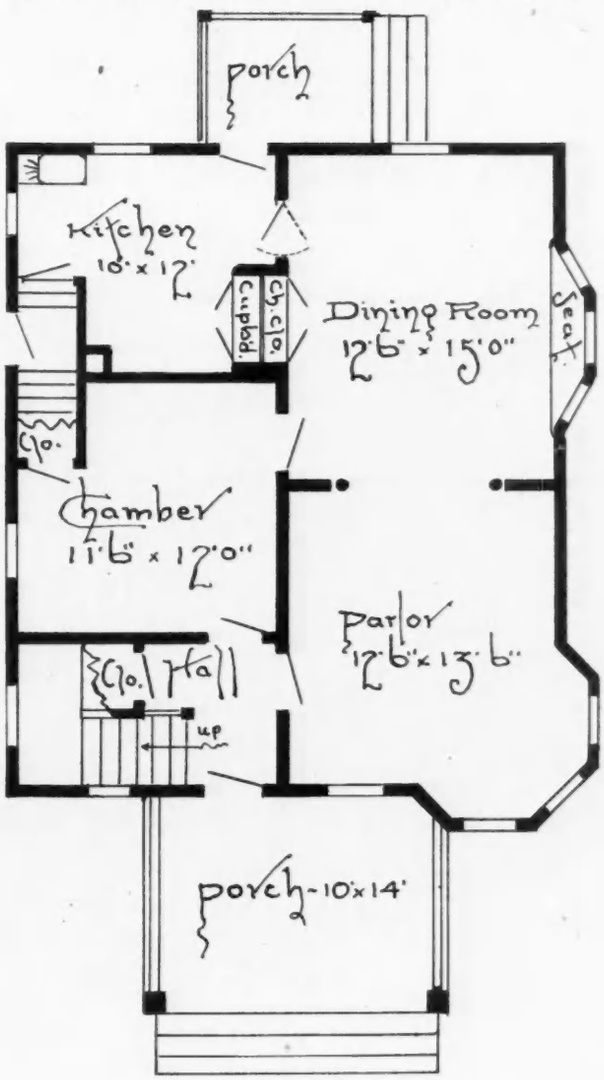
THE house shown on this page is constructed of concrete blocks and has a large gambrel roof. This house is very neat in appearance and shows the possibilities of concrete blocks. There is a cellar under the entire house which can be used for a furnace room, fuel room, laundry and storeroom. It is well lighted and does away with that damp, stuffy atmosphere so common in many cellars. The first floor is divided into the living-room, dining-room, kitchen, two bedrooms and bathroom. The dining-room has a large octagon bay, which not only adds materially to its appearance, but is also a great convenience. The kitchen in this plan is large and conveniently arranged for comfort and ease in doing the work, connecting with the rear stairway, leading upstairs as well as down to the cellar. The kitchen porch is large enough to hold an ice box. The ice box on the porch may be filled with ice without tracking mud and wet sawdust into the kitchen. This is appreciated by all housekeepers, as they take pride in keeping their kitchens clean. The arrangement of the rooms in this house is such that with the furnace placed in the center of the cellar, all the rooms can be heated uniformly. This does away with the long pipes with



numerous corners, which usually result in having one room very hot and a freezing temperature in another. The second floor of this house has not been divided into rooms, but can easily be done.

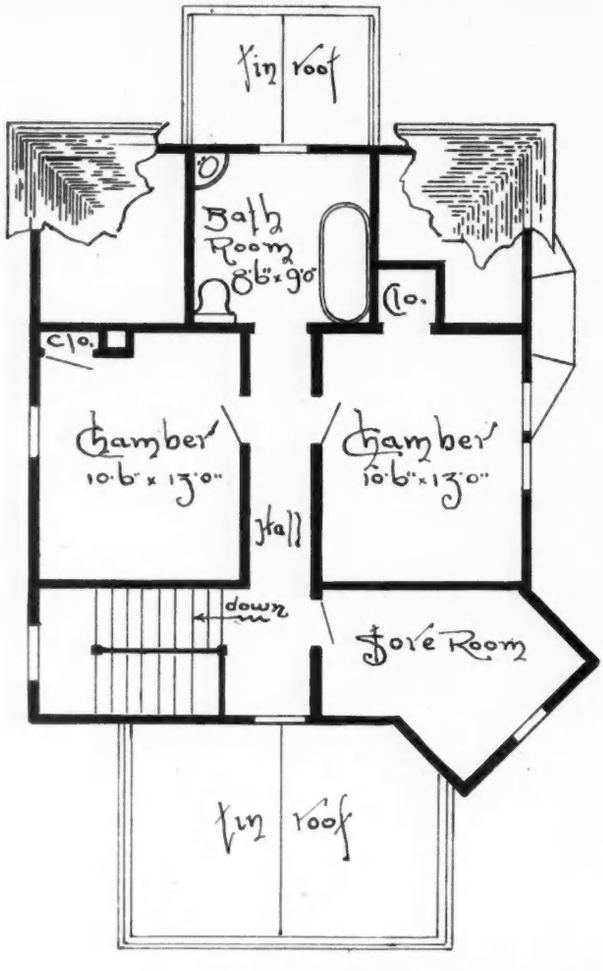
A Well Planned House

The cottage shown on page 434 was designed for a small corner lot by B. A. Wickham of Iowa City, Iowa, and meets the demand for a modern dwelling. The cellar is seven feet in depth and is partitioned off for a laundry, furnace and fuel rooms and a vegetable room. The foundation is a ten-inch hollow brick wall and is veneered above grade with rock-faced paving brick. The first floor consists of a hall, parlor, dining-room, bedroom and kitchen. No pantry is provided, but a good-sized cupboard between the kitchen and dining-room affords shelf room sufficient for the needs of an ordinary family. The lower part of the cupboard in the kitchen is fitted with drawers and flour bin. The upper part of the china closet in the dining-room is provided with glass doors. The octagon bay in the parlor is an important feature and adds greatly to the appearance and comfort of the room. The second floor consists of two bedrooms, bathroom and storeroom. The latter is not plastered or finished, but is found very useful. All the rooms throughout the house are trimmed in yellow pine, naturally finished, and all of the floors except the kitchen are waxed and polished. The building is heated by a hot air furnace and piped for gas. The cost is $1,950.



Making Wooden Rollers

A correspondent in the *American Machinist* writes as follows: "Some years ago I had to get out an order for 5,000 wooden rollers for lumber-piling yards. They were 30 inches long by 6 inches diameter, and the shaft extended 3 inches at each end. Pine logs were supplied 8 inches square. After cutting to the right length the corners were sawed off. A wooden box holder was rigged up on the faceplate of a 32-inch lathe, and the pieces were shoved in after the center of one end was roughly marked. A laborer with a long-handled auger provided the feed power,

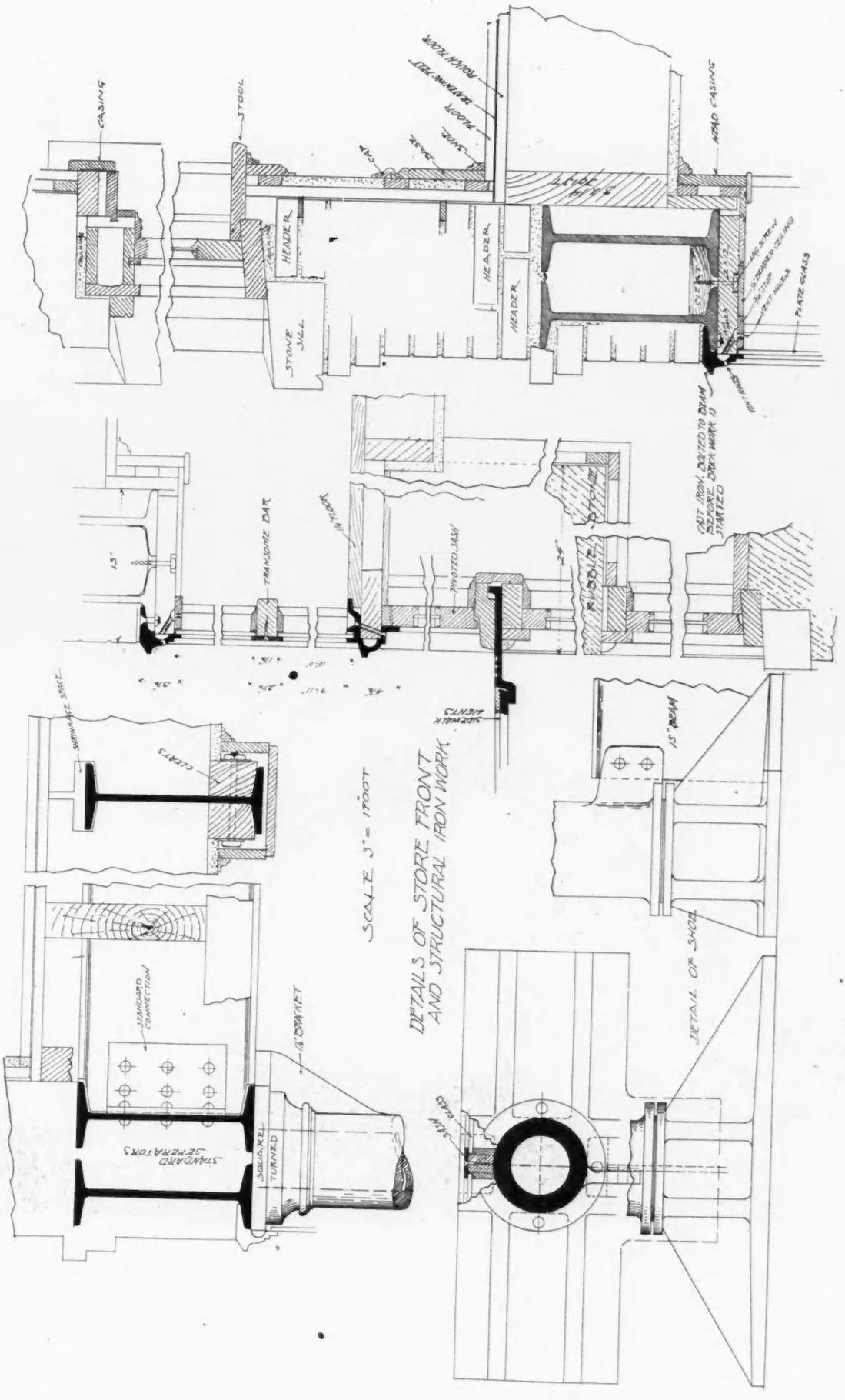


and the hole drilled ran clear through. Needless to say it often came out at the other end far from the center, but there was always enough stock to remedy this. The shafts were 1⅛-inch round iron. Each was heated in the middle and a sharp chisel driven nearly through. In this slit was placed a cold feather, which protruded about ½-inch. The part which was in the shaft was well nicked, and when the hot iron was closed on it and cooled, there was no danger of looseness. Centering and straightening was the next job, and then they were driven into the wood. A rough cut was taken, bringing it to within about ¼-inch of finished size. The ring slots in the ends were cut and rings were driven in hot, water being applied at once to prevent burning. Hardwood wedges were the next item, and the rolls then went to the finishing lathe, where the ends were also faced to length, the rings being driven in about ½-inch below surface. Rolls previously made in this way lasted as long as fifteen years, although they were exposed the year round to weather which, in northern Ontario, is none too moderate."

Valuable Information Secured

I consider one series of articles in your magazine alone, worth more than the price of subscription, not to mention the other information just as valuable.—I. C. B. Lewis, Turnerville, Texas.

To bear defeat with dignity is to win a victory.

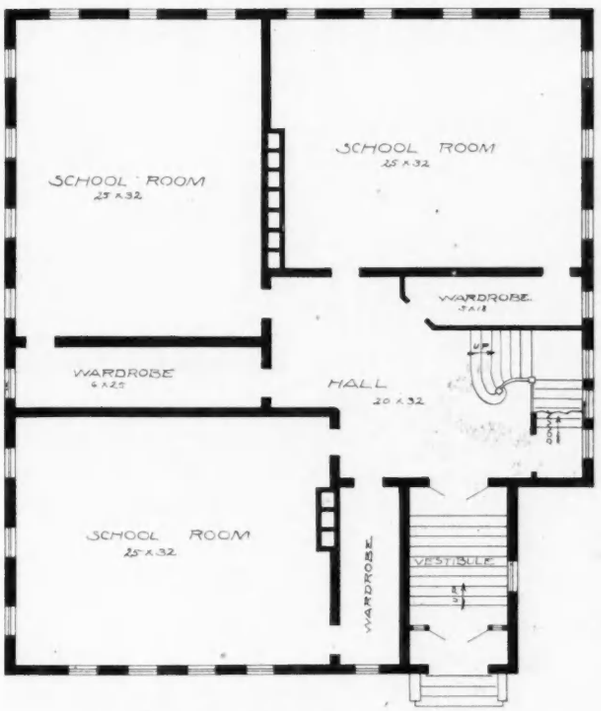

CASING
STOOL
HEADER
STONE SILL
HEADER
HEADER
HEAD CASING
PLATE GLASS
TRANSOME BAR
PIVOTED JAW
RUBBLE
CUT IRON, DATED TO BEAM BEFORE DECK WORK IS STARTED
SIDEWALK LIGHTS
SHRINKAGE SPACE
STANDARD CONNECTION
STANDARD SECTIONS
SQUARE TURNED
SCALE 3" = 1'0"
DETAILS OF STORE FRONT AND STRUCTURAL IRON WORK
DETAIL OF SHOE

SCHOOL HOUSES.

Two Desirable School Houses

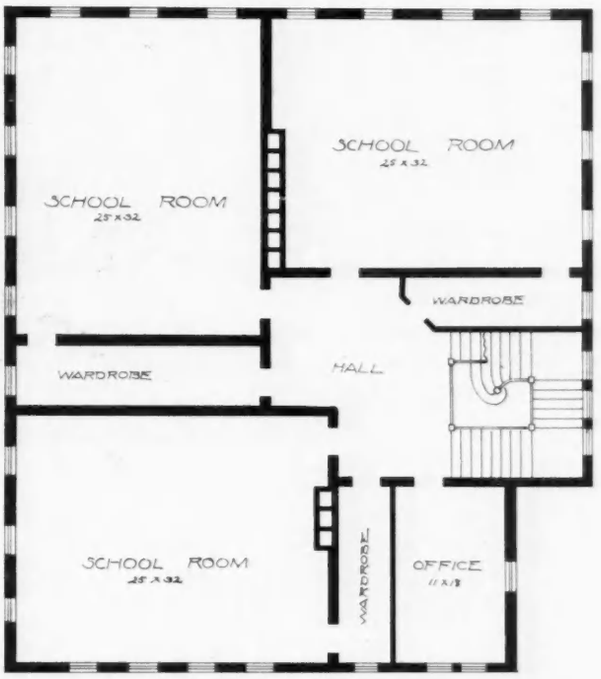
PERSPECTIVES AND FLOOR PLANS OF TWO MODERN SCHOOL BUILDINGS—DESIGNED TO CONFORM WITH THE BEST IDEAS ON SCHOOL HOUSE CONSTRUCTION

WE ARE this month illustrating two school houses, designed by G. W. Ashby, architect. The one shown on this page is a six-room school house used for a grammar school. This is sufficiently large enough for eight grades, as the classes can be arranged as follows: First, second, fourth and sixth grades in individual rooms and third and fourth grades together and the seventh and eighth grades. The reason for this arrangement is that the first and second grades are usually very crowded, as in many towns there are no kindergartens, hence the first grade is used also as a kindergarten. By the time they reach the third and fourth grades they are sifted down, as many children are kept in the second grade for two years, so as not to rush them through their work. This is a good feature, as there is a tendency to rush the children through the school as rapidly as possible with the prevailing idea of not how much they can learn, but how fast they can learn. The fifth grade is usually kept separate, as this somehow is the age when children have a tendency to become unruly. They are



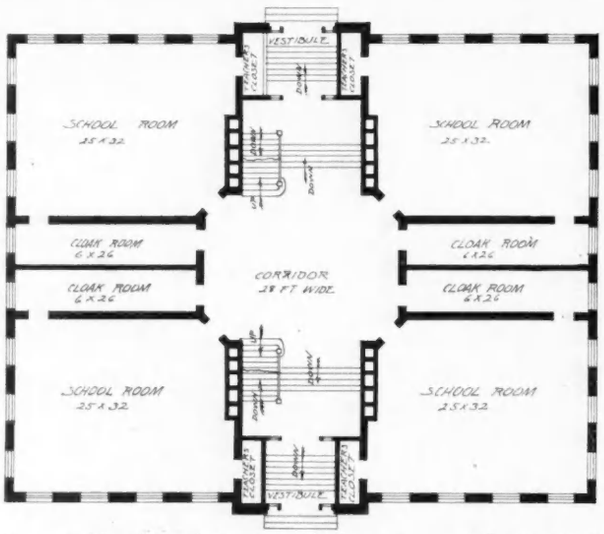
FIRST FLOOR PLAN OF A SIX ROOM SCHOOL HOUSE

then at the age when they commence to know it all, and instead of wanting to be taught, they have an idea they can teach the teacher. By the time the seventh and eighth grades are reached, students are being withdrawn from school and usually one room is sufficient for these two grades. This is a very



SECOND FLOOR PLAN OF A SIX ROOM SCHOOL HOUSE

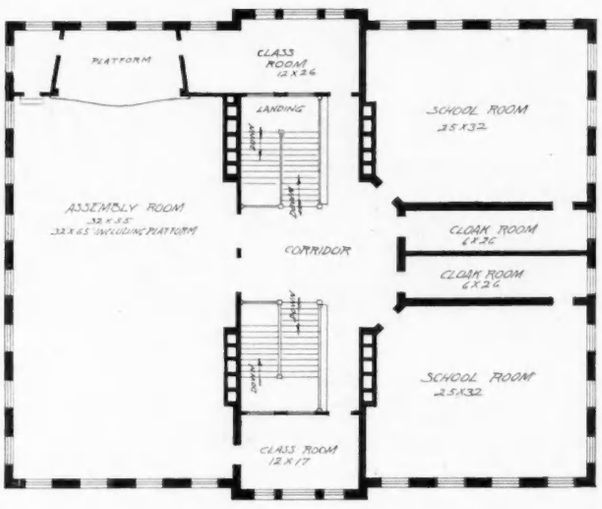
FRONT ELEVATION



lamentable fact, but nevertheless true, and we trust that before very long school houses will have to be constructed on the principle that there will be as many pupils in the eighth grade as there are in the first. No child should be withdrawn from school before finishing the eighth grade, as they have then barely received the rudiments of education and are in no position to capably solve the problems of life.

Combined Grade and High School

The school house shown on this page contains six rooms and a large assembly room. This is a desirable building for a small town, where the grade school and high school is combined. The lower floor and probably one of the rooms on the second floor can be used for the grades, and the assembly room and two class rooms and one of the larger rooms can be devoted to high school work. One of the large school rooms on the second floor can be used by the high school students as a laboratory, and it is better in this case not to put in any seats, but rather have one or two long tables with chairs around them. The arrangement of the stairs is very commendable, as it is a wise plan to have the smaller children enter and leave the building by a separate stairway, as it does away



with a great deal of confusion and possible accidents. Pupils in the high school are very liable in their enthusiasm to overlook some of the smaller children, and these separate entrances will do away with any of this. The arrangement of the cloak rooms with reference to the school room is such that no confusion will result in entering and leaving the rooms. Every room on the first floor is equipped with teachers' closets, where they can hang their wraps and keep things separate from those of the children. This is a good feature, as it adds to the discipline of the school to have some distinction of this kind between the teacher and the student. The assembly room is nicely arranged and the ten-foot platform can be used very nicely for various exercises which are given in the schools.

Perspective Drawing

PRINCIPLES THAT GOVERN PERSPECTIVE DRAWING AND HOW IT SHOULD BE STUDIED—SEVERAL EXPLANATORY DIAGRAMS GIVEN

By A. W. Woods

AS THE subject of perspective drawing is of interest to a great number and is not clearly understood, we have thought it best to go quite fully into the subject.

To the Editor: Fairmont, Nebr.

I have purchased several books on perspective drawing, but they have failed to make the subject clear to me. What I want to know is how to locate the point of sight, the vanishing points, and how far they should be from the object for the best results? Perspective drawing is something that very few understand and I think that every reader of this journal would like to see the principles explained.

W. W. PRESCOTT.

Answer: A perspective drawing shows in advance how an object will appear from a given point of view when completed, but aside from giving a general idea of the exterior construction, it is of but little use to the builder. Because there is nothing in it whereby the mechanic can secure measurements, though drawn to a scale at given points, the lines forming the sides diminish toward the vanishing points. These points are never indicated on the finished drawings; besides they are usually taken at such a distance as to be beyond the limits of the drawing paper, and when it is removed from the drawing board, their exact locations are lost and the drawing shows only as a scale of symmetrical proportions.

The writer well remembers the difficulty he experienced in taking up the study of perspective drawing of buildings, from the fact, the writers presumably in their efforts to make the subject clear, divided the

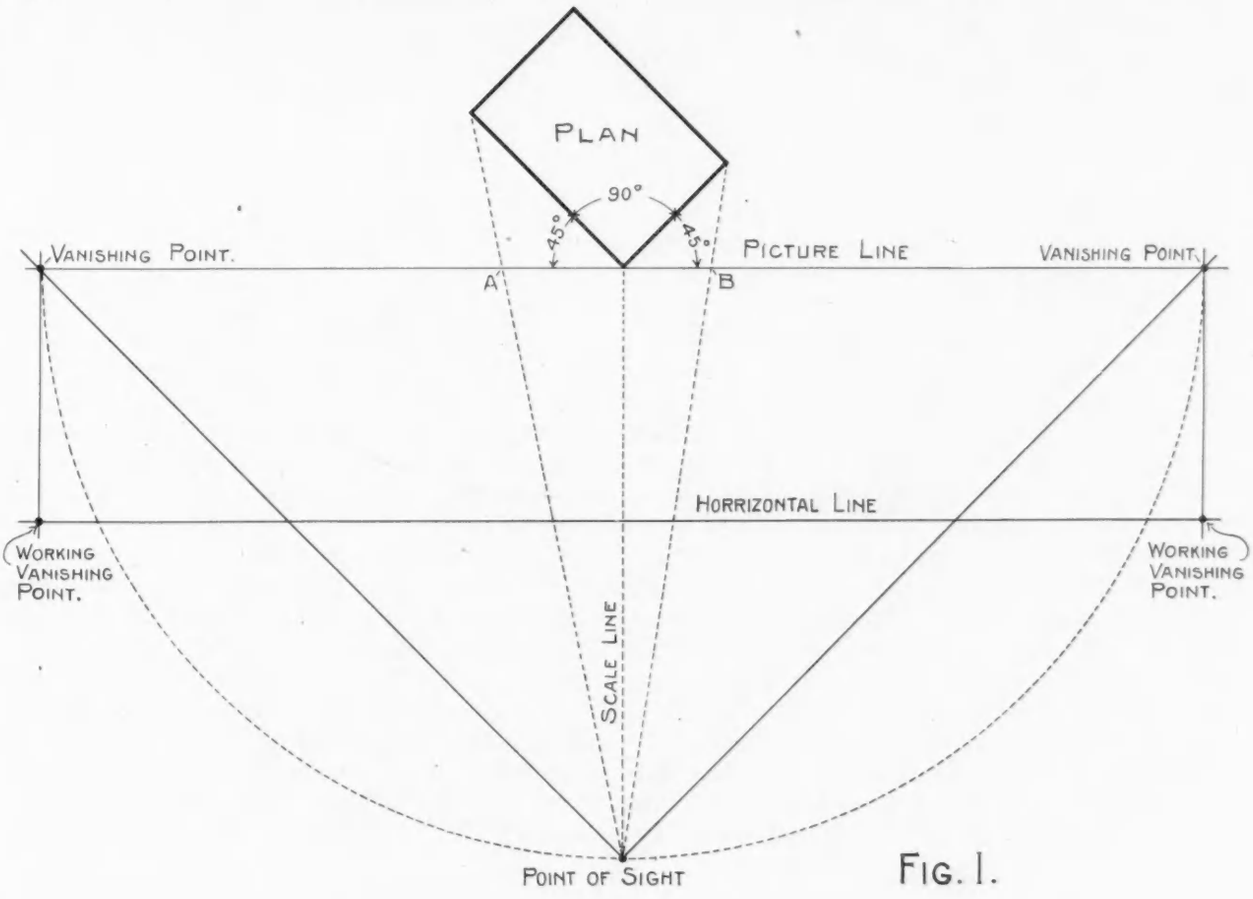


FIG. I.

work into parts, using many terms and by piece meal fashion, showing only a part as a window, or a door, steps, etc., with the idea of combining the whole in a complete drawing of the object. This, we think, is a wrong idea as the student will grasp the subject much more readily, if the whole object is shown in one diagram with the location of the various points. The would-be learner can then see the relation of these things as to size and position with one another.

Without going into technical details, we herewith present a diagram as shown in Fig. 1, how to proceed

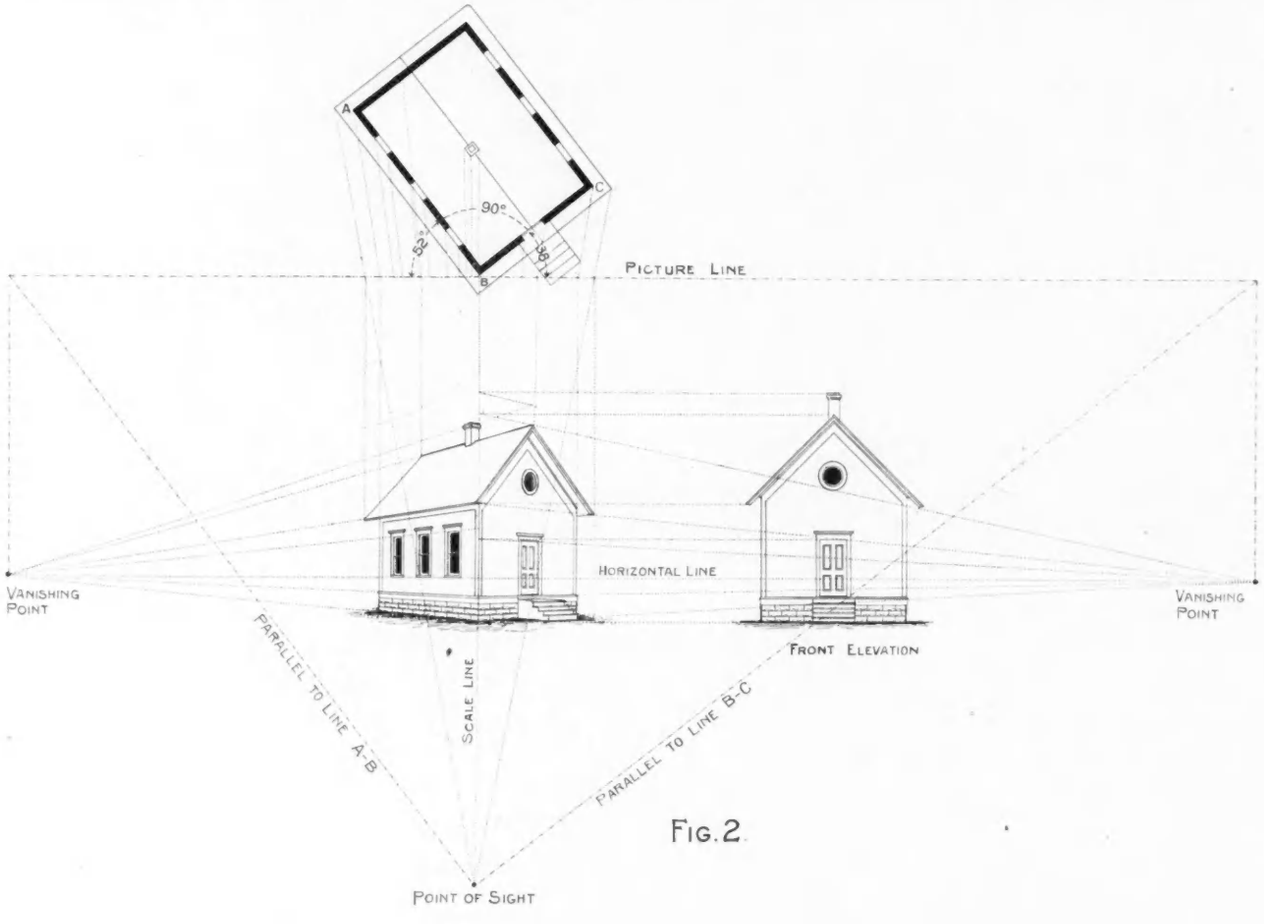


FIG. 2.

in laying out the points for a perspective. In this, the plan is set at an angle of 45 degrees with the picture line but it may be at any angle as we will show later on. For small work, such as an ordinary residence, the 45-degree angle gives about as good results as any. The reader will notice that the corner of the plan is resting at the picture line, which may be of an indefinite length, the further away the point of sight is taken, the longer will be this line. The reader will notice that the vanishing points and the point of sight are at an equal distance from the corner of the plan, as will be seen by the semi-circle described from the corner of the plan. However, this does not occur when the plan is set to any other than the 45-degree angle. The point of sight is on a perpendicular line from the corner of the plan and a line from the vanishing points to the point of sight, rests parallel to the respective sides of the plan and remains so regardless of the angle the plan may rest with the picture line.

But as we said before, the vanishing points will not be of equal distance from the corner of the plan, as shown in this diagram but will be regulated by the right angle formed by the three points radiating from the point of sight. If it is desired to show more of one side of the building than the other, the vanishing point will be further away from the scale line on that side and draw in on the other according to the tangent of the angles. The points on the picture line as from A to B will be the width the building will occupy in the perspective and this space will also be the horizontal scale line. The horizontal line is the same length as the picture line and having the same measurements, but in order to clear the plan, it may be dropped to any convenient place below the picture line.

In Fig. 2, we show the points in connection with a small building. The subject represents a country school house. The point of sight is taken at a distance of 76 feet from the corner of the building and at an angle of 52 and 38 degrees. Hence in this case, the vanishing points are not at equal distance from the scale line as shown in the previous figure. We selected the above point of view in order to condense the work, but for a pleasing effect, it should be at a

distance equal to five or six times the height of the building. The lines from the point of sight to the vanishing points are parallel to A-B and B-C of the plan. The lines from the floor plan radiate to the point of sight, until they intersect the picture line and from there they are plumb down to the elevation. In this illustration we also show the straight elevation of the front for the purpose of showing how the heights are taken on the scale line. The horizontal line can be anywhere below the picture line and the building adjusted to it as best suits the taste of the student. In this case, the building is shown to be on level ground and the horizontal line to be on a level with the eye, or about five feet above grade, as shown in the drawing and is the only straight line running through the building.

Ellipses and How to Form Them

PRACTICAL TREATISE ON FORMING A TRUE ELLIPSE—IMPORTANCE OF MAKING THEM EXACT IN BUILDING CONSTRUCTION

By T. B. Kidner

THE article in the April number on "Ellipses and How to Form Them," by Mr. Dwight L. Stoddard, called the attention of the readers of this journal to an important figure in architectural work. The subject is of particular interest, and I have, therefore, ventured to accept Mr. Stoddard's invitation and say a little more on the matter.

Mr. Stoddard named several common errors made in dealing with this figure, notably the misuse of the term "oval" when an ellipse is meant. This is widespread, for we hear of "oval" tables, "oval" mirrors, "oval" picture mounts, etc., but I have never yet seen either of

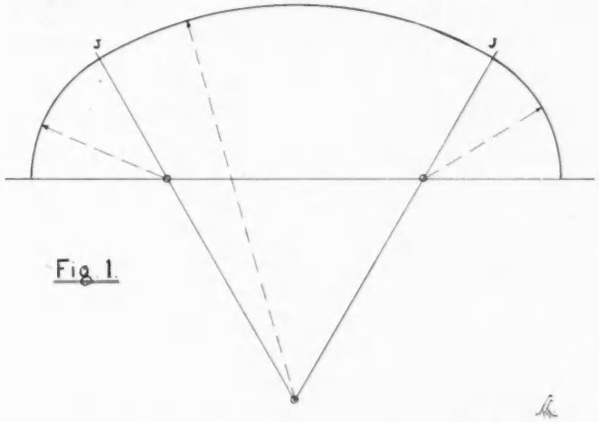


Fig. 1.

those objects of an *oval* shape, though I have seen hundreds that were *elliptical*. As a teacher of drawing and construction, I have always found it necessary to clarify the minds of young craftsmen upon this point, which was well brought out by Mr. Stoddard.

Some of the scientific definitions of an ellipse were mentioned, such as it being the section of a cylinder cut obliquely, but I have found that for use with young folks the rough and ready definition of an ellipse as "a circle looked at sideways," is a very useful way of putting it. Of course, in all freehand sketching of objects the ellipse is of very frequent occurrence, and the foregoing description is very useful in all freehand work.

The latest edition of the Standard Dictionary gives the definition of an ellipse as "a plane curve such that the sum of the distances from any point of the curve to two fixed points (foci) is constant."

This is Mr. Stoddard's Fig. 6, which is a truly scientific method of drawing the figure. I have found hundreds of craftsmen able to draw an ellipse by this string method, but few who could draw it of a given length and width. Mr. Stoddard's very plain way of putting what the dictionary states in scientific terms should make it clear that the distance from one of the points on the longer central line (major axis) out to any point on the curve and back again to the other point on the center line is equal to the length of the center line itself. This is, therefore, one of the best methods of drawing an ellipse, but in practice is open to one serious objection, namely, the stretching of the cord, which I have found very difficult to prevent. I have taken a well-woven line, stretched it thoroughly, waxed it smooth, and taken all precautions in setting the nails right, but at the finish it is often an appreciable amount out.

Mr. Stoddard's Fig. 7 is an admirable method for the drafting room, but is somewhat awkward for, say, an arch of 20-foot span or over. Mr. Stoddard mentions that there are other mechanical methods of drawing the curve, and I shall presently give one that I have found very useful in setting out large elliptical arches in practical work.

But, in my opinion, the most important point in Mr. Stoddard's article is that in which he emphasises the fact that "there is no part of a true circle in an ellipse." I hope every draftsman and practical setter-out of work will lay this to heart, for a disregard of it has led to

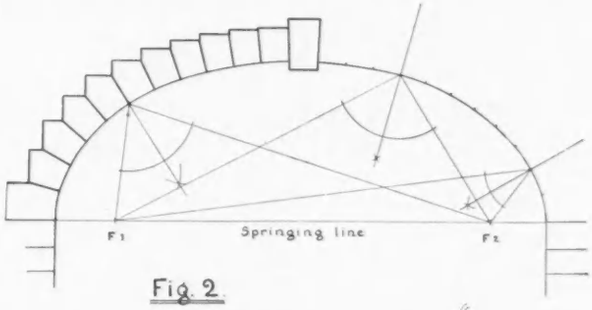
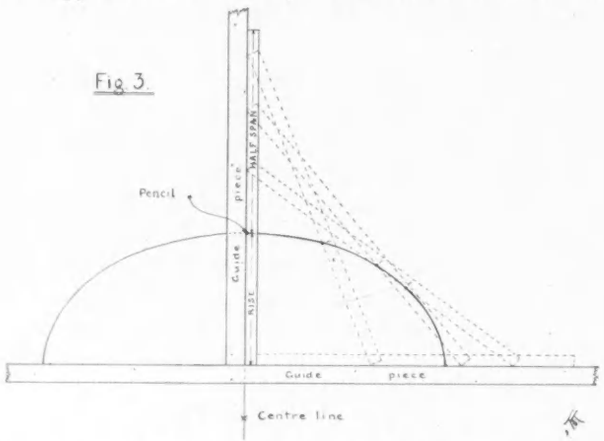


Fig. 2.

many an eye-sore. The arch is, perhaps, the commonest example in architecture of the use of this most beautiful curve, the ellipse, but five out of six workers on practical drafting and laying-out of work give a method of drawing an elliptical arch from certain cen-

ters of circles, portions of which form the curve. It is true that some of the books describe the method as *approximate,* but it should be emphatically stated that while a curve drawn in this manner is very like an ellipse, yet it is not one, and it open to two serious objections. First, as to its appearance, for as the ellipse is considered one of the most graceful figures in art, this is important. In the *approximate* curve it is impossible to avoid a "cripple" at the junction of the two circles (J J in Fig. 1). I have in my mind's eye an arch over a driveway in a splendid modern building, which always annoyed me as I passed it in my daily journeys, for the stonemason had set out his arch by the approximate method, with the result that the

Fig 3.



junction of the two circles could be clearly seen in each haunch of the arch.

This is the chief trouble with the ellipse in constructive work, and almost daily one can see examples of it. As I write I have before me a work of art in the shape of a very fine calendar, perfect in color and type but marred by the fact that the central feature of the design is not an ellipse (though probably intended for one by the designer), and, of course, exhibits the inevitable cripples where the curves join one another. Recently, I was at the opening of a fine, modern railway station, whose refreshment rooms were a miracle of plate glass and quartered oak, but, alas, a range of so-called elliptical lights, filled in with fine stained glass, had all been drawn by the "almost-right" method, and contained four distinct kinks in each curve.

But, apart from the æsthetic aspect, the engineering one is, in heavy arches at all events, of importance. The method of setting out an elliptical arch by means of three centers gives the mason a simple way of getting the lines for his joints, but, unfortunately, joints drawn from the centers of the curves, though perfectly correct in circular or segmental arches, are non-scientific in an elliptical one. In heavy masonry arches, such as in a modern railway viaduct, a slight variation in the direction of the joints is of importance, for a wrong stress is liable to be set up in some part of the stone and a possible failure may result.

The true method of finding the arch joints is shown in Fig. 2, where lines are drawn from the focal points to the under side (intrados) of the arch. The angle between these lines is bisected as shown, giving a line which is scientifically termed a "normal" to the curve, and is the true direction for the arch joint.

But I mentioned earlier a mechanical method of drawing an ellipse which I have used for large and small work, and a description of the method must serve to bring these remarks to a close. Fig. 3 shows an elliptical arch of a certain span and rise. The springing line is A B, the center line is C D. At one side of the center line a piece of scantling is nailed to the setting out floor or board. Another piece is nailed below the springing line, but just touching it. A rod is then cut equal in length to the *rise,* plus *half the span,* and a pencil fixed at one edge at a distance of the rise from one end. If this rod be then moved so that one end is always against the piece of stuff on the center line and the other against the piece on the springing line, a quarter of a true ellipse will be traced by the moving pencil. Each quarter of the ellipse can be drawn in a similar way, the guiding pieces being, of course, moved to the other side of the center and springing lines respectively where the whole ellipse is required. In the case of an arch, the upright piece only would require to be moved.

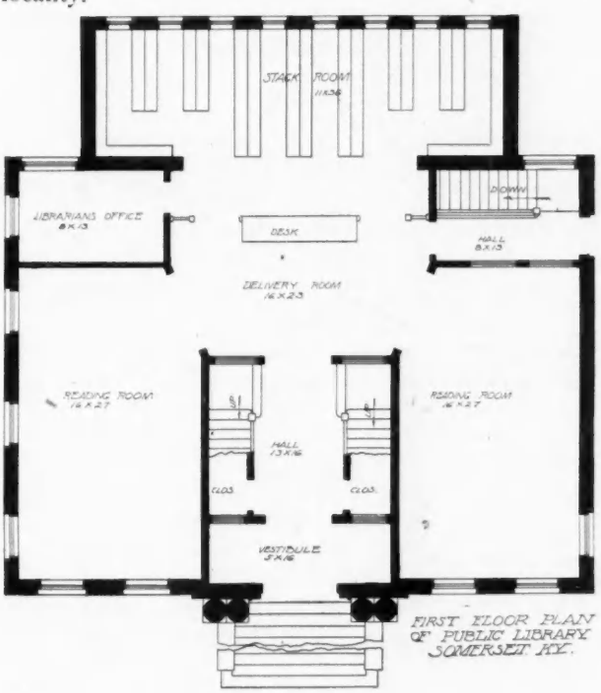
I have endeavored to emphasize two of Mr. Stoddard's points, with a re-statement of which I shall conclude: First, that an "oval" is *not* an ellipse; second, that no part of the curve of an ellipse is part of a circle.

A Model Library Building

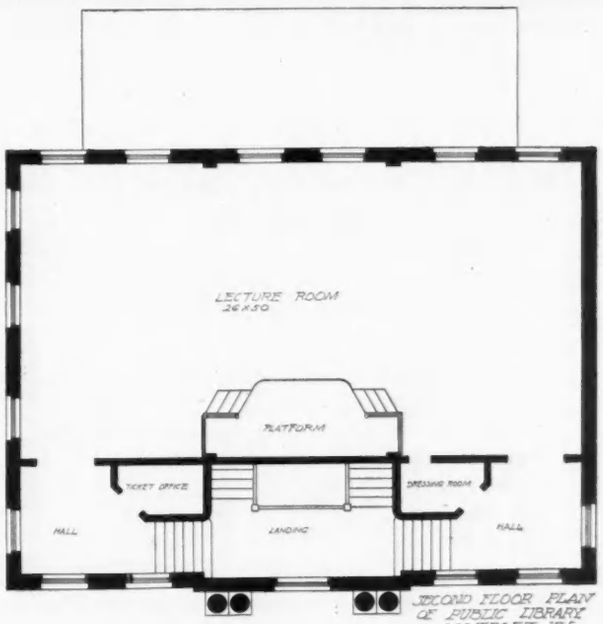
CONSTRUCTED UNDER SCHOOL MANAGEMENT AND THE RESULT IS HIGHLY COMMENDABLE—ARRANGEMENT OF THE ROOMS SUCH THAT NO CONFUSION RESULTS

THE library shown on page 443 was designed by G. W. Ashby and built in Somerset, Kentucky, and is one of the few libraries in the United States which was built under school management. The building is constructed of pressed brick and stone trimming. The entrance is very attractive and is made especially so by the four Ionic stone columns. This library is connected with the Somerset high school by forty-foot wings. The library and the high school are all heated by a new system of heating located in the high school building. It is the intention of the school board to make another extension on the left side of the present old school building, and when completed will make one entire building nearly 300 feet long. A gymnasium is located in the basement of the library and is equipped with lockers, shower baths and toilet rooms. The first floor is divided into the library proper and contains two reading rooms.

delivery room, stock room and librarian's office. The stacks for holding the books are all of metal, which are fireproof. The entire first floor is tile. The second floor is devoted to a lecture room, where meetings can be held and entertainments given. The entire site of these buildings is said to be one of the finest in the United States and is a credit to the entire locality.



FIRST FLOOR PLAN OF PUBLIC LIBRARY SOMERSET KY.



SECOND FLOOR PLAN OF PUBLIC LIBRARY SOMERSET KY

A New Waterproof Cement

A waterproof cement has been patented in Germany. A mixture of vegetable wax and caustic lime, in boiling water, is added to unground Portland cement clinker and all ground together. The inventor makes the claim that one-half inch coating of this cement placed on a brick wall will render it absolutely waterproof.

Two Practical Barns

ELEVATIONS AND FLOOR PLANS OF TWO BARNS WHICH ARE IN GREAT DEMAND—CAN BE USED FOR GENERAL PURPOSES

WE ARE illustrating on page 445 a small barn suitable for a suburban barn or residence barn, where the use of two or three vehicles and four horses are desired. This barn is compact in arrangement and contains no waste room. There is a large carriage room with large doors, so the team can be driven in and unhitched or turned around in the carriage room or can be used as a shelter in stormy weather for a team in harness. The carriage room also contains a carriage wash with floor drain, a storeroom for tools, brooms, etc.; a harness room, a case for robes, blankets, saddles, etc., and a stairway leading to the second floor, which contains the man's room and feed room for hay, grain and bedding.

The exterior is of a very attractive design and would be suitable for most any location or climate. It is of narrow siding and has a stained shingle roof. The ventilator on the roof gives the exterior a finishing touch and exhausts all the foul air out of the horse stable by means of a vent shaft, which starts near the stall floor and runs up to the lower slat windows of the ventilator.

A suggestion for painting this barn to bring out the design to advantage would be yellow siding, moss green roof and all trimmings, including sash and doors, painted white.

A Practical Barn

On small farms where general farming is done and requiring the shelter of a few cows, horses, chickens, hogs or sheep and the storage for grain and feed, it is very often most convenient to have a general barn giving shelter to all under one roof. Such a barn we hereby illustrate on page 446 which will accommodate ten cows, a wagon and implement room, with large doors at both ends admitting a load of hay, which can be hoisted through a trap door in ceiling and unloaded in the inside in stormy weather.

There are five horse stalls facing the wagon room, so the horses as well as the cows can be fed from this room. At one end are hopper bottomed feed bins with openings to mixing trough, also a box stall for the use of horses, bulls or sick stock.

The chicken house is large enough for the accommodation of fifty fowls, and there is a hog room which could be used for sheep or calves if hogs are not desired.

The second story has ample room for the storage of hay, feed, bedding, grain and light vehicles. This barn has been designed entirely for utility, as the exterior will show, being free from all ornamentation and architectural effect other than what is necessary to make a durable, substantial, convenient and economical farm barn.

The Way to Win

"'Say "Will" and then stick to it;
Yes, sir, that's the way to do it.
Nothin's ever won, I guess,
Worth the wishin' for unless
One is willin' fer to work—
Hain't no prizes fer a shirk,
Fer the Lord (er so they say)
Hates a quitter anyway.

"'Sposin' 'at a settin' hen
'D set a while an' then
Gallivant around until
All her eggs had got a chill;
S'pose she'd ever hatch a thing
Underneath her floppin' wing?
She won't do that way, and hence,
Hens, I say, have common sense.

"'Ez a boy I had to do
Lots of things I hated to.
Had to work an ol' concern,
Namely, the old dasher churn.
Didn't never dast to pause
In my path o' duty, cause
Knowed 'at if I stopped to dream,
Butter 'd all go back to cream.

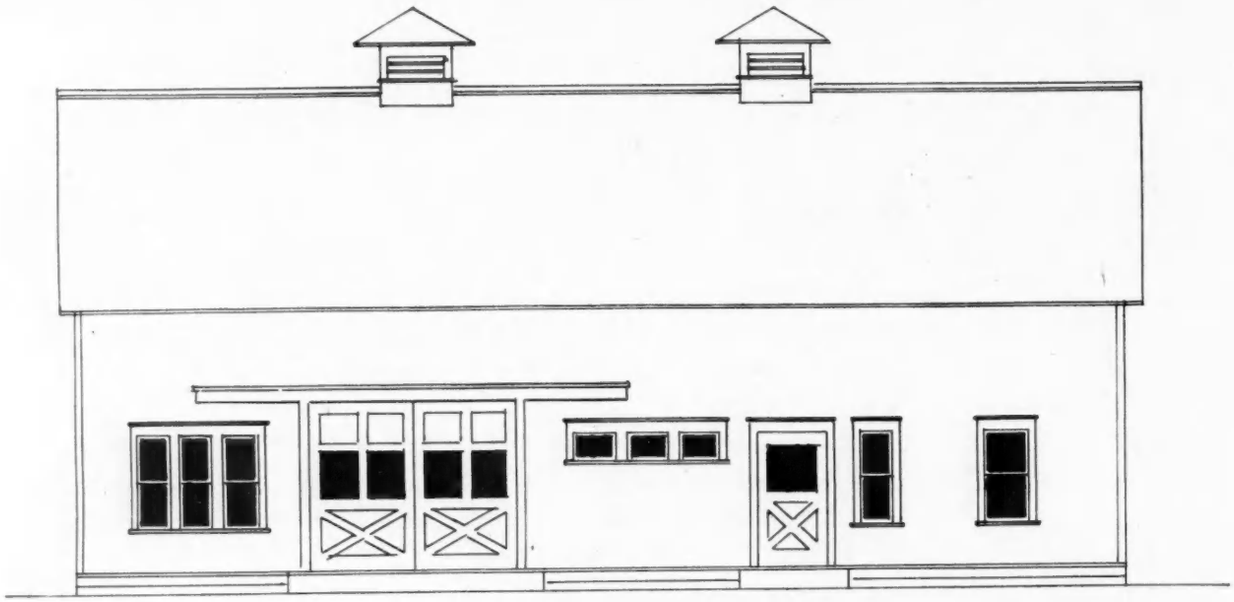
"'If a ship was 'lowed to go
Every way the winds 'd blow,
Wonder if 't would git erround
To a harbor safe and sound?
Guess it's best fer ship er man
To be guided by a plan.
Choose yer task, an' whisper still—
Win I must, an' win I will.'"

—The Commoner and Glassworker.

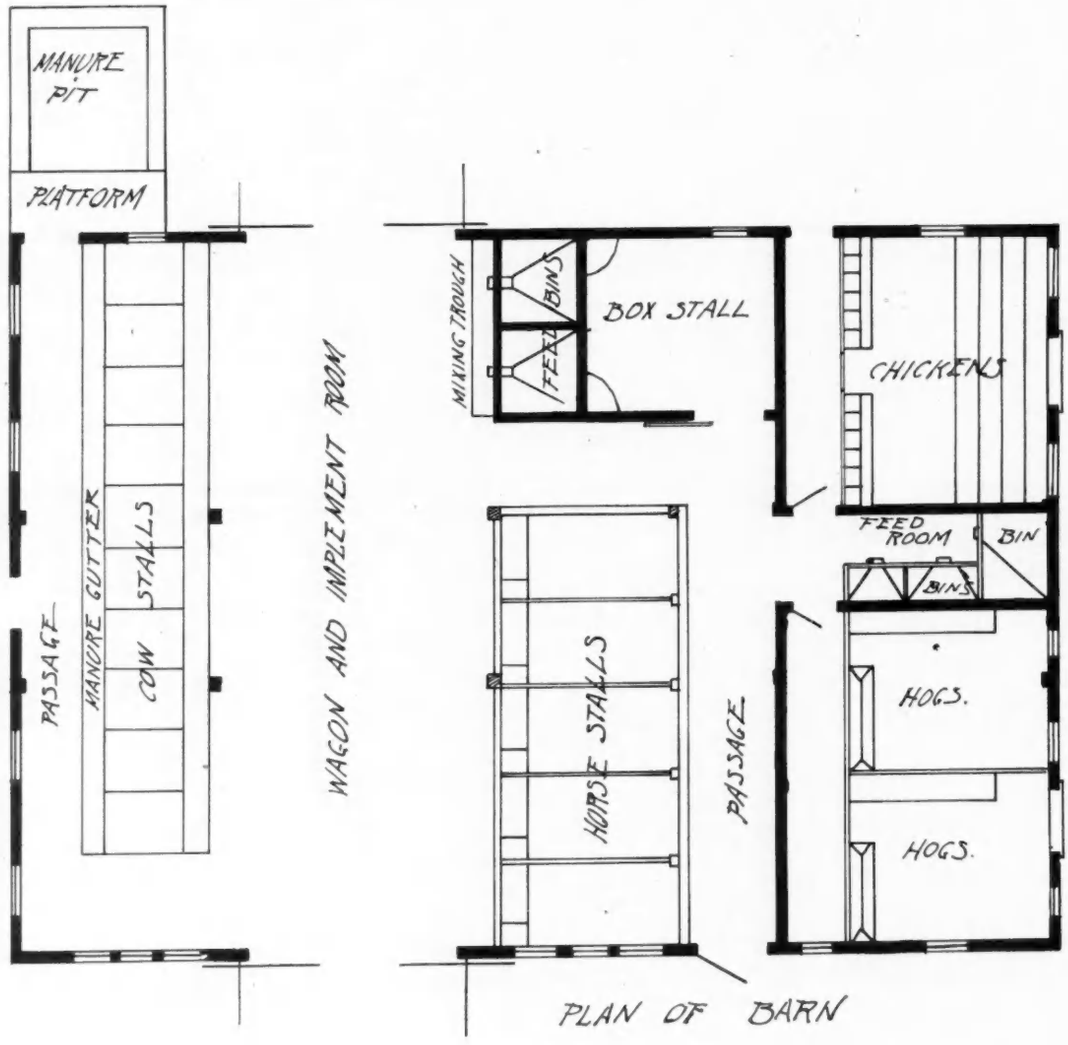
FRONT ELEVATION SIDE ELEVATION.

DESIGN FOR A SMALL BARN WITH FOUR STALLS

FIRST FLOOR PLAN SECOND FLOOR



ELEVATION OF BARN



PLAN OF BARN

Edward Hurst Brown.

Painting the New House

PROPER FINISH TO GIVE TO THE FLOORS AND HOW TO TAKE CARE OF THEM—VARIOUS METHODS DESCRIBED AND THE RELATIVE MERITS OF EACH

WITHIN the recollection of the writer, no one would have thought of finishing the floors of a dwelling house. It was taken for granted that they would be covered with carpet and that any painting or other finishing would be entirely unnecessary. But as people began to appreciate that carpets, which could not be frequently taken up and cleaned, were at best unsanitary things and gathering places for moths as well as microbes, a decided sentiment set in for the use of rugs and with these naturally came the demand for hardwood floors, or at least for floors which could be left bare, if occasion required. Twenty-five years ago, all that was attempted in our buildings of a semi-public character, such as stores, schools and the like, was to lay a floor of narrow widths of good, clear, hard pine or perhaps oak or maple, and plane it off smooth, leaving it without any finish, or at best giving it a coat of linseed oil. Such floors soon became dirty and worn, but the only remedy for such a condition was the scrubbing brush and a liberal application of soap and water. The first attempt at better flooring was the use of wood carpet, or thin parquetry flooring glued to a background of canvas and laid on top of the regular floor, each piece being sprigged down. This material became deservedly popular, and still remains so, for it gave the effect of the thicker parquetry floors that had long been used in Europe, while it did not require the services of a skilled floor layer, since all the fitting and arrangement of the pieces could be done at the factory. At first these floors were finished simply with one or more coats of shellac varnish, but unless protected, this material is injuriously affected by the water which is generally used in wiping up floors and in many cases the hardwood surfaces soon became bare of finish. The average housewife was not educated up to the care of a hardwood floor, although she began to recognize its good qualities. The writer well remembers his own astonishment at the beautifully polished floors in the European picture galleries and other public buildings which he visited on a first trip abroad some twenty-five years ago. Such floors were not left to take care of themselves, but were kept constantly polished by men who wore great sheepskin soled slippers, and would shuffle back and forth over the floor all day long, supporting their balance by means of a stick paddled on the lower end. The constant rubbing produced a mirror like surface, the material used being beeswax dissolved in turpentine, applied in very thin films. Similar polished floors of hardwood were also to be found in the dwellings and the hotels (small rugs only being used), almost everywhere on the Continent. The greatest objection to floors treated in this way is their extremely slippery character, making it difficult and even dangerous to walk upon them. Still, they are far ahead of carpeted floors in the matter of cleanliness, although requiring a much greater amount of attention. Fortunately, the French and Germans are not so troubled with the servant girl problem as we are in this country, or these floors would not be kept in this mirror like state by constant polishing. But the good points of hardwood floors are so evident that nowadays they are demanded by everybody, and the use of rugs has become so general that it has been necessary for our painters and paint manufacturers to devise some means for finishing floors that would stand hard service without the necessity for the constant polishing required by the soft wax finish formerly used on most European floors.

Preparation of the Floor

The first thing necessary in order to obtain a good job of floor finishing is to get a perfectly smooth surface. Until recently the only way to do this was the old, tedious and backbreaking method of planing and scraping, the latter being done, usually with the edge of a freshly cut piece of glass. When the cutting edge wears down, a fresh piece must be taken. Sandpaper, bent over a flat wooden block is also used to smooth the boards and cut down any roughnesses or raised grain. Steel wool is preferable for this purpose on account of the greater rapidity with which it cuts. While this method is still very generally practiced, modern invention has come to the aid of the floor finisher and has produced a planing machine that is pushed across the floor like a lawn mower. Of course, these are somewhat expensive, but the labor of floor planing is so great that they ought to prove economical. In New York, and probably in other large cities, where there are a great many office build-

ings and apartment houses constantly being put up, and which are all finished with hardwood floors, a machine of similar appearance to the above is used, but instead of being a planer, it is provided with a cylinder upon which a sheet of sandpaper is tightly stretched. This cylinder is rapidly revolved by means of an electric motor that is connected with an electric light fixture in the room by means of a long, flexible wire. This machine leaves the floor perfectly smooth, requiring only a thorough dusting before beginning to finish.

The first operation is filling the wood. Oak and other open grained woods require filling with a paste filler, and while many painters laugh at the idea of the use of a paste filler upon such woods as yellow pine and maple, experienced floor finishers say that a better job can be done by using paste filler as a surfacer. The object of using a filler, which should always be one in which finely ground silex is the mineral or pigment base, is to fill the pores with this hard material so as to make every part of the wood equally smooth, hard and wear resisting. The method of using it is to apply the filler to a strip, say six or eight boards wide and running the entire length of the room. By the time this strip has been completed, the filler will have probably set sufficiently to rub. It must not be rubbed before setting or it will be rubbed off the wood, nor must it be allowed to set too hard or it will be impossible to rub it at all, or even to scrape off the filler, since it gets so hard that it will take the edge off any plane or scraper. When this strip has set just enough, it must be well rubbed into the grain of the wood with burlaps, always rubbing across the grain of the wood. After the filler has been thoroughly rubbed, any surplus material must be carefully wiped off with a soft rag. Before anything further can be done, the filler must be given time to dry—not less than twenty-four hours and preferably two days.

If the natural color of the floor boards is not satisfactory, they should be stained before filling, and the filler should be colored with pigment ground in oil to bring it to the same color tone.

If there are cracks or nail holes in the floor, they must next be filled, in order to make a perfectly smooth and uniform surface. This filling may be done by using a pure whiting and linseed oil putty, tinted to match the floor boards; or it may be done better with a whiting and white lead putty made by mixing one part of white lead in oil with two or three parts of bolted whiting and enough coach varnish to make a stiff paste. This putty will resist moisture and when dry and hard, it may be sandpapered or rubbed. It should, of course, be tinted to match the wood, using coach color ground in japan for this purpose. For large cracks, an excellent putty can be made by soaking blotting paper in boiling water until it forms a pulp, then mixing it with glue dissolved in water. To this, bolted whiting is added in sufficient quantities to make a fairly stiff paste, and thoroughly kneaded. This paste must be pressed into the cracks and smoothed off with a spatula or putty knife. It is unshrinkable, and while well adapted for large cracks, is hardly suited for the narrow cracks usually met with in a new floor.

For those who do not care to make their own putty, we can recommend the prepared crack fillers, which are specially made for the purpose of preparing floors for finishing. Several of these are made, all of which are good, and the wood finisher, as a rule, will save both time and money by purchasing his crack filler ready made, and will secure equally good results.

Wax Finishing

By far the best material for finishing hardwood floors is wax, although this involves a little more trouble to keep in good condition. Nevertheless, it gives a smooth, satiny luster, without the glaring effect of new varnish and it is not marred by cracks caused by the print of the shoe heel, such as varnish is subject to. When wax grows dim, it can readily be polished again.

Some painters advocate the application of the wax directly upon the paste filler, but the best practice is to first give one or two thin coats of shellac varnish. Care should be taken to purchase a pure shellac, since a shellac that is adulterated with rosin is apt to soften up under hard wear or by the solvent action of the wax. Unfortunately this material is very largely adulterated, and much of the gum is brought to this country already sophisticated by the addition of shellac—the natives of the East Indies being no more honest in this respect than the people of this country. Where a slight darkening of the tone of the wood is no objection, orange or brown shellac is preferable to the bleached, since it is stronger. The shellac should be cut with grain alcohol and not with wood alcohol. The recent passage of the bill removing the tax from alcohol which has been denaturized will practically do away with the use of the inferior wood alcohol shellac after the first of next January, since that made with denatured alcohol will be cheaper. Owing to the recent advance in the price of the gum shellac, the cost will not be lower than that of a first-class oil and copal varnish, so it is not unlikely to take the place of the latter class of varnishes except in such cases as its use for floors and other places where a hard and quick drying undercoat is required. On a close grained wood where a paste filler has not been used—although as already stated it is better always to use one—either a thin coat of a first-class liquid filler or a coat of one part of raw linseed oil to which from five to ten parts of turpentine have been added, should be given before applying the shellac. The reason for this is that shellac, being a spirit varnish, dries very rapidly by the evaporation of the alcohol, leaving only a thin film of the hardened gum, and unless there is an undercoating of some kind, it is very difficult to apply the shellac so that it does not show laps. Even

then it requires a skilled workman to put on a smooth and even coat of shellac, and he is obliged to work with great rapidity, otherwise a mark will be left every time he takes up his brush. In shellacking a floor the plan of following down a space one or two boards wide should always be followed. The shellac coat should be put on before the oil or liquid filler coat is absolutely dry, and experience and good judgment are required to tell just when is the proper time to apply it.

After the shellac has become dry, the wax, in paste form, is applied with a rag, or a brush if it is soft enough, and after waiting a short time, is brought to a polish by means of a weighted brush or by rubbing with a cloth. The long handled weighted brush is, of course, more satisfactory, and this is also used to keep the floors in good condition, being rubbed back and forth over the surface whenever they become dull, until a polish is obtained. Only a very thin coat of wax is necessary, a very little more being occasionally added. Quite a number of specially prepared floor polishing waxes are on the market, and care should be taken to select a material of this kind that will give a hard polish and will not remain soft and sticky. It is the softness of the old-fashioned beeswax and turpentine that causes the almost endless labor needed to keep such a floor in perfect condition. Modern wax finishes are made by a combination of beeswax or paraffin wax with some of the fossil waxes, or from the latter alone, giving a much harder surface. In general, the wax which has the highest melting point is best for the manufacture of floor waxes because it is the hardest after application. Carnauba wax has a high melting point (185° F.) and may be used alone as a floor wax by melting it in a suitable kettle and thinning it with spirits of turpentine so that in cooling it has the consistency of soft tallow. In this condition it can be applied with a large brush. Two coats of wax on a new floor are better than one—the first coat being required to fill up and the second to give luster, although if sufficient polish is obtained by the first coat, the second will be found unnecessary. The preparation of wax finish is attended with so much risk from fire that it should be undertaken only over a water bath. Even then, it is wiser for the ordinary painter to buy the prepared wax than to undertake to make it.

Varnish Finish

A large number of so-called floor varnishes are on the market, nearly every varnish manufacturer making one. These varnishes are specially intended for the purpose for which they are sold, and as a rule are designed to harden over night, so that they may be applied in the evening and walked on the next day. The surface should be prepared in the same way as for wax finish and after the filler is bone dry, two or more coats of varnish should be applied. Where desired the varnish may be rubbed to a dead surface with pumice stone and kerosene, which is better than water for a flat surface with numerous cracks like a floor. Although the claim is made for all these floor finishes or varnishes that they are elastic and will not mar or show marks, but that they will wear for a long time without perceptible injury, the fact remains that practically every varnish will show heel marks and will mar white by use. When the surface becomes worn, the old varnish requires to be either scraped off or removed with a varnish remover before a new coat of varnish can be applied, while with wax, all that is necessary is to apply a little more wax and use the polishing brush to restore the surface to a good condition. When a waxed floor gets dirty and shabby, it can be cleaned down to the shellac with turpentine and re-waxed at a small cost. It is well to give a special caution against using a wax finish over a varnish coating, since the wax will soften up the varnish and cause trouble.

Oil Finish

A very satisfactory finish for rooms that have hard wear, such as school rooms, stores and semi-public or public buildings is to first fill the floors and then give them two thin coats of shellac, as described under wax finishing, and then to apply a very thin coat of paraffine oil or of a rubbing and polishing oil with a brush or a rag, thoroughly wiping off any surplus which may remain on the surface. This oiling should be repeated every few days, according to the amount of wear that the floor gets. The oiling can be done as readily as a floor can be wiped up with a moistened rag, and the subsequent wiping is done very quickly. The floor can be kept in good condition almost indefinitely by this means; it will look well, and, what is of special importance in a floor of this character, it does not get so slippery that it cannot be walked upon with comfort. This same treatment is specially adapted for kitchen floors, dining rooms and other floors in private houses that are subject to hard wear. It is also well adapted to the cheaper floors, such as yellow pine or spruce, and very satisfactory results will be obtained if a little care is used. If mud has been tracked on the floor, it should first be mopped up with water, and this should be allowed to dry before it is oiled. One advantage of the oiled floor is that it is ready for use as soon as the oiling is finished.

Some years ago a great many so-called dustless floor oils were used. These were chiefly mineral or machine oils, and proved very unsatisfactory because they collected dirt and became gummy. The reason for this, however, was that they were put directly on the bare wood, which consequently absorbed more oil than was necessary and the surface became greasy. These dustless floor oils were objected to because they gathered up the dirt and soiled the ladies' skirts, but the method of oiling just described covers the surface with the merest film of oil which does not sink into the wood, because the shellac prevents it from doing so, hence there is no greasy ac-

cumulation to gather dirt. The same method of oiling can be used over a varnished floor and will preserve it from marring.

Besides paraffine oil, crude petroleum may be used or any of the so-called polishing oils or furniture polishes. Such an oil can be made from machine oil, sweet oil and oil of lemon, and this is not only excellent for the purpose, but has an agreeable odor. Ordinarily, however, the householder will prefer to use some one of the various oils that are sold under fancy names for the special purpose of oiling floors, or under the name of rubbnig and polishing oil.

Painted Floors

A floor finish not in such general use as it deserves is the painted floor. This has the advantage of hiding inferior floor boards and being cheaper for that reason. There are a number of special floor paints put on the market for use on kitchen floors and other rooms having a good deal of wear. These paints are made so as to dry over night, and as a rule are fairly satisfactory for the special purpose for which they are intended. But there are many rooms of a better class for which these cheaper mixed paints are unsatisfactory. For these rooms the floor should be primed with pure white lead and linseed oil, tinted with a small percentage of lampblack—not more than two per cent. at the most, and followed by two coats of paint of the desired color. The last coat should be mixed with turpentine to dry flat, and when it is thoroughly dry, the floor may be given two coats of good floor varnish. This will give a good floor that may be kept in good condition for a long time by aid of the floor oil just described. Instead of finishing with a varnish coat, the last coat of paint may be left in full gloss, provided it can be given ample time for drying—say at least a week. This will give an excellent floor, so far as durability is concerned, but it will not have as good an appearance as a painted and varnished floor.

A painted floor can be made quite ornamental by the use of a stenciled border, which should be put on before the varnish coats. While any conventional design is suitable, the most appropriate are those which resemble mosaic work in their effects, or interlacing strapwork designs. When the colors are properly chosen, care being taken to avoid glaring contrasts, a painted and stenciled floor is fully as effective as a hardwood floor, and it possesses one distinct advantage in that it can be adapted to any decorative color scheme that is desired in the room.

A floor that is grained, especially one grained in oak, is one of the most durable finishes that can be given, requiring very little attention other than wiping up with a damp cloth or mop. If well done, it is fully as effective as a hardwood floor.

Care of Floors and Other Hardwood Finish

More floors are ruined from lack of proper care than from any other cause. Most people have very little idea of the method of cleaning a painted or varnished surface, and it is no uncommon thing for the housewife to have her woodwork scrubbed with a strong soap or with a soap powder or, what is still worse, with one of the scouring soaps, such as sapolio, and then wonder why it is that her painted and varnished surfaces do not last. She naturally lays the blame on the painter or on the material, whereas the fault lies with herself for employing cleaning agents which exert an active chemical or physical action to destroy paint and varnish. The ordinary household soaps and soap powders contain strong alkalies which are active paint and varnish solvents, while sapolio and other scouring soaps remove paint by friction. If soap must be used, then a mild or neutral soap should be chosen, but it is far better to clean a painted or varnished surface by means of warm water to which a small quantity of household ammonia has been added, say a tablespoonful to the pail of water. If the dirt can be removed by water alone, it is better not to use anything else, and to wipe the surface dry with a chamois skin.

Outside varnish is often damaged by neglect. Take a hardwood door for example. Dust gathers on the mouldings, the rain falls upon it and converts the dust into mud which is particularly destructive to varnish. If a carriage gets muddy it is washed off, but who thinks of washing the front door? Surely they deserve equal care.

Indestructible Dwelling

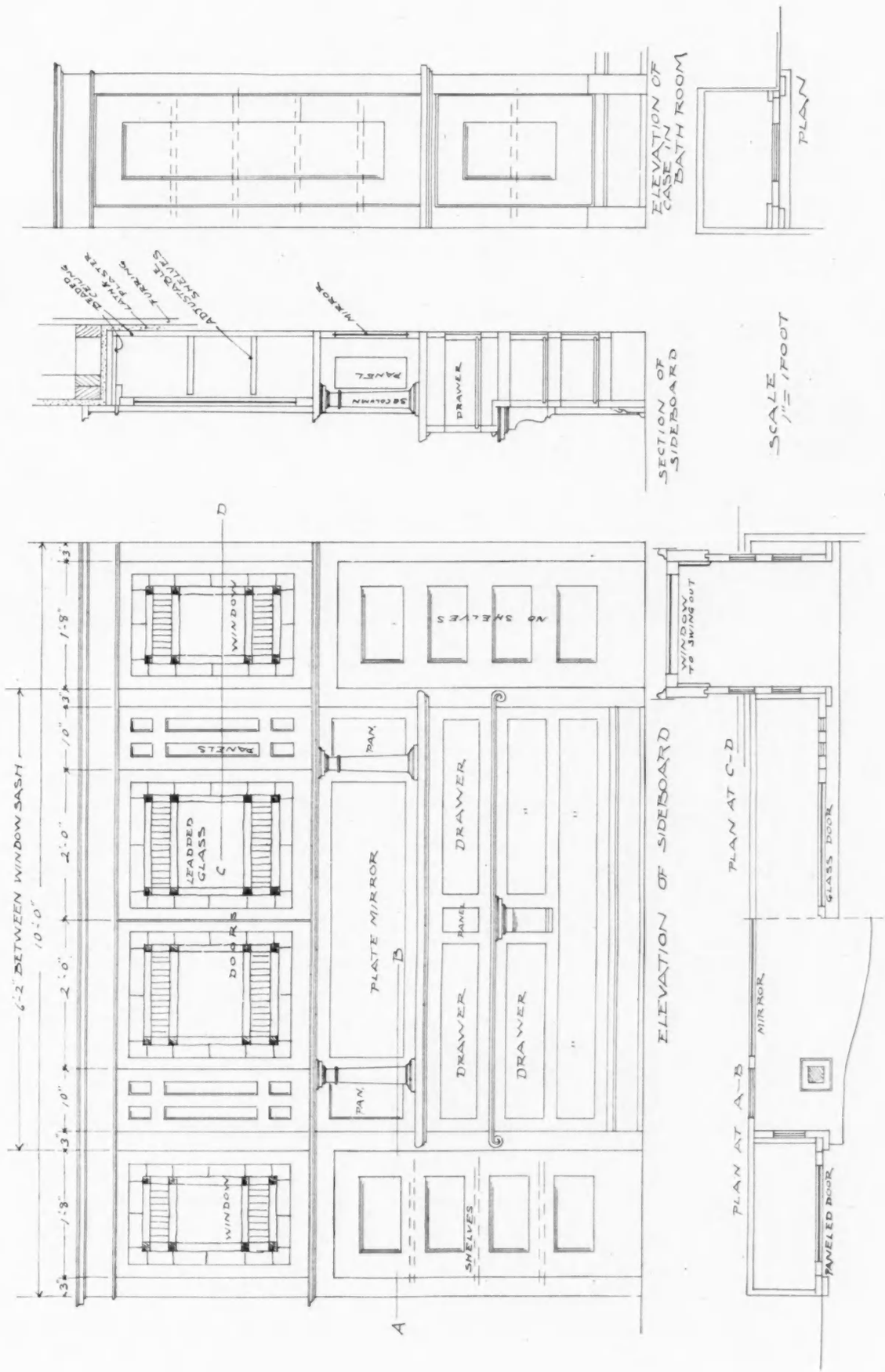
A house which is described as "the most remarkable dwelling in central New York and probably the most indestructible" has been built recently by John H. Osborn, of Auburn.

It appears that Mr. Osborn has been burned out twice and doesn't pine to add a third experience of the sort, so he has put up a re-enforced concrete house for which the boast is made that it "could not be burned up, nor probably blown up by anything but a very exceptional charge."

The upper walls consist of four inches of brick on the exterior, then eight inches of concrete building blocks, then a four-inch air space—heated in winter by a line of steam pipe—and a four-inch interior brick wall. The whole interior structure is supported on the concrete columns that rise from cellar to roof, supporting the floor platforms.

Each concrete column has its spinal core of twisted steel. Of the floors, not only the main beams and lateral cross beams are of steel concrete, but the floor areas themselves. Shafts three feet square carry steam, water and lighting pipes and various wires from cellar to attic.

The only combustible material consists of wooden window and door frames and the wainscoting of the dining room and lower floors.

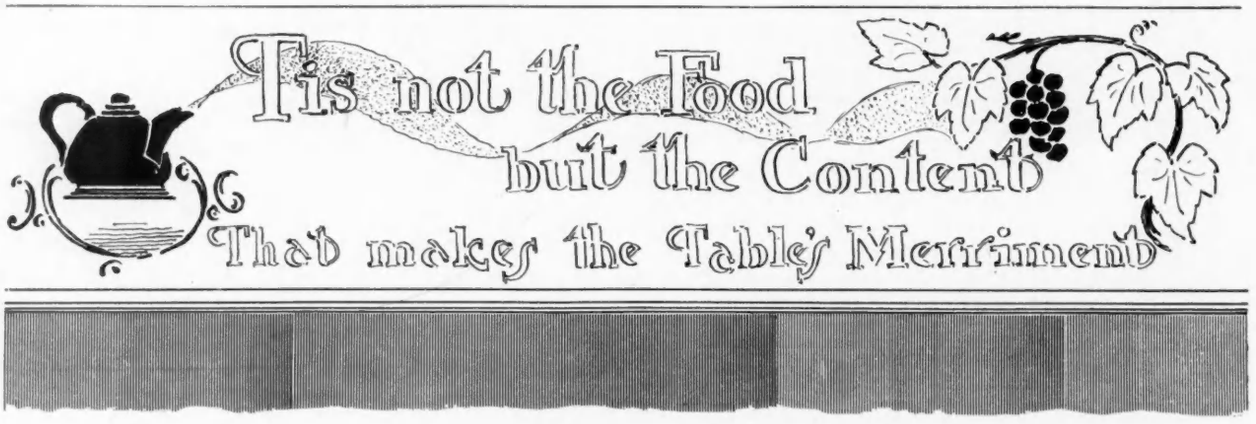

ELEVATION OF CASE IN BATH ROOM
PLAN
SECTION OF SIDEBOARD
SCALE 1"=1FOOT
ADJUSTABLE SHELVES
MIRROR
PANEL
DRAWER
ELEVATION OF SIDEBOARD
PLAN AT C-D
PLAN AT A-B
WINDOW TO SWING OUT
GLASS DOOR
MIRROR
PANELED DOOR
WINDOW
NO SHELVES
PANELS
LEADED GLASS
DOORS
PLATE MIRROR
DRAWER
PAN.
SHELVES
6'-2" BETWEEN WINDOW SASH
10'-0"
1'-8"
2'-0"
1'-3"

Inscriptions and Mottoes Used as Decorations

APPROPRIATE SAYINGS FOR THE DIFFERENT ROOMS IN THE HOUSE—DECORATIVE SCHEMES WHICH WOULD ADD TO THE APPEARANCE OF THE ROOMS

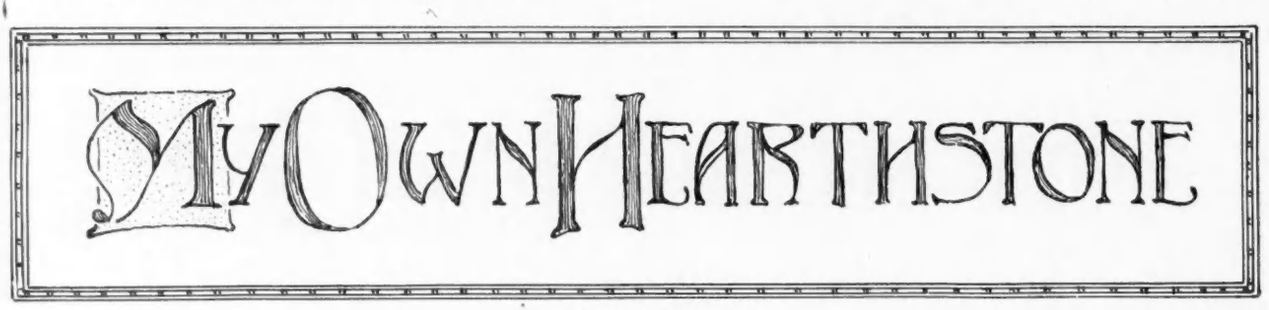
By Sidney Phillips

FROM almost the dawn of architecture inscriptions have been used for the decoration of buildings. The wonderful hieroglyphics that ornament the ruins of Egyptian temples and palaces are only inscriptions that record the doings of the kings and people of that ancient kingdom. Grecian and Roman temples were almost always decorated with inscriptions. But these were public buildings upon which it is but natural that men should inscribe the record of the cause for their erection or the names of the deities to whom they were dedicated. But in the ruins of Pompeii, where the record of the lives of the private citizens has been so marvelously preserved, we find that mottoes and inscriptions were very commonly employed as part of the decorative features of the houses. Here, for example, on the pavement of the entrance vestibule of one house, we find, wrought in marble mosaic, the figure of a dog, with the words "Cave Canem" (Beware of the dog) beneath it. Greetings to welcome the coming guest, or words of pious dedication or thanksgiving were also found similarly employed or inscribed upon the walls. In the Moorish palaces of Spain we find curious arabesque tracery, interlacing and intertwining, that appears meaningless to us, but to the Arabic scholar these scrolls reveal themselves as letters, and the walls are found to be covered everywhere with the inscription: "There is no God but God and Mohammed is his prophet." In the houses of the German and Swiss peasantry, we find many pious inscriptions carved or painted over doorways, under the eaves or over the fireplaces, and similar decorations are to be found in many of the old English houses. Japanese and Chinese houses are covered with inscriptions. Indeed, it seems fitting that a man should build into a house some sentiment that inspires his life or that expresses his satisfaction with his surroundings or the purpose of the apartment.

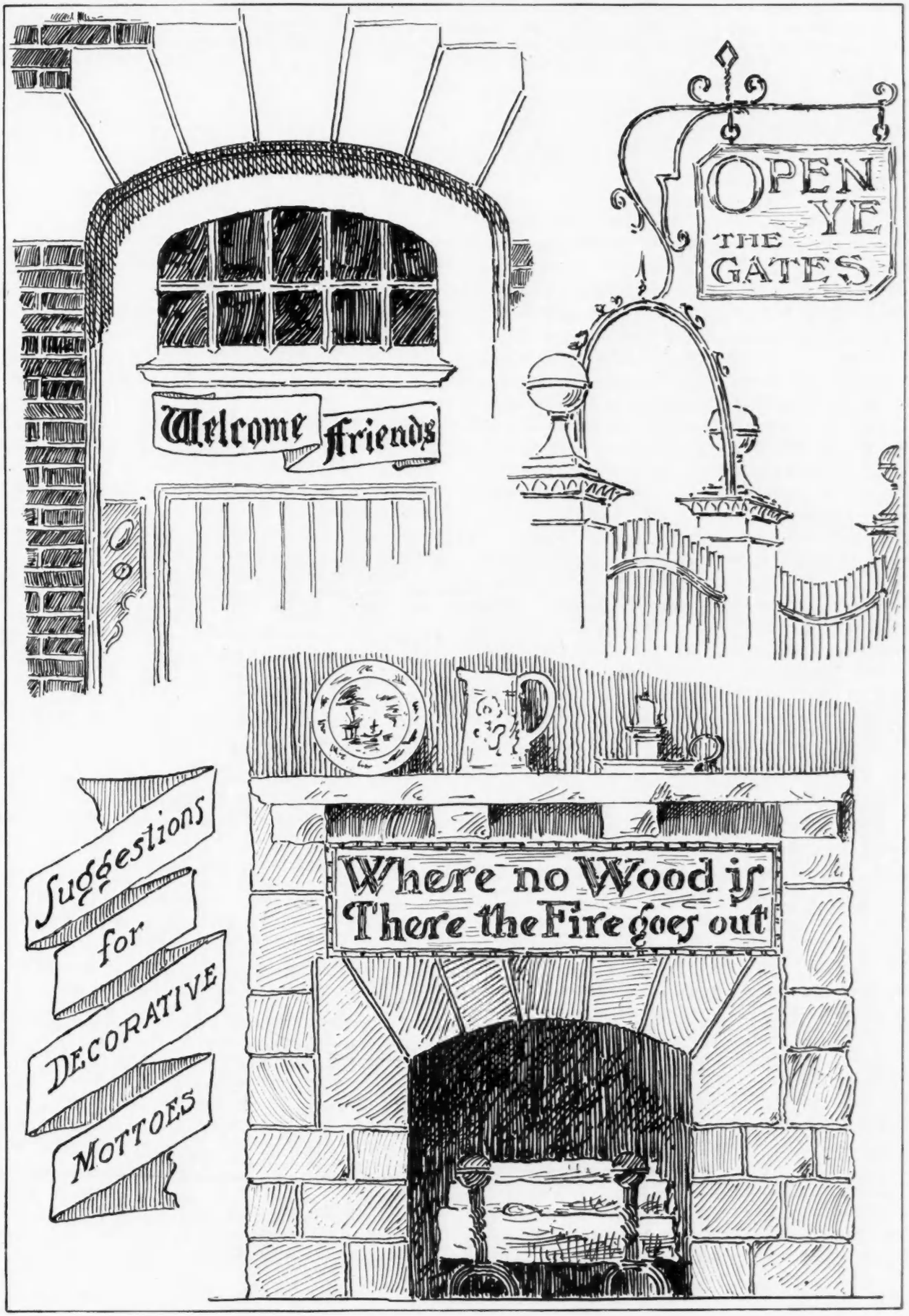


A Dining Room Frieze

Mottoes and inscriptions may be used everywhere, from the entrance gate to the wine cellar. In the old-fashioned inns they were always found, and they have been revived in the numerous restaurants that have been fitted up in imitation of quaint German rathskellars. They may be used to express a greeting on the front door or in the vestibule; may decorate the panel of a fireplace; ornament the walls of dining-room or library or be worked into the decorations of a den or smoking room. They may be carved, painted, gilded or burned into the surface of a wooden panel. This gives but a faint idea of the variety of treatment that can be given to inscriptions or mottoes. And sentiments of all kinds may be expressed:



Panel for a Mantel


Welcome Friends
OPEN YE THE GATES
Where no Wood is There the Fire goes out
Suggestions for DECORATIVE MOTTOES

Welcome, hospitality, pleasure in the possession of one's home or hearthstone; delight in the glow of the fire or in the enjoyment of tobacco. The sentiment may be grave or gay, pious or profane at the pleasure of the house owner.

The accompanying sketches show several suggestions for the use of mottoes or inscriptions that may prove of some service to our readers in inspiring ideas for their own houses or the houses that they are called upon to build. While, of course, the inscription should be expressive or the personal sentiment of the owner of the house, and will be much more interesting if it is, there are numberless sentiments that are appropriate to particular places and which could be utilized by the speculative builder in making the houses which he builds for sale more attractive, and by varying these mottoes in each one of a half dozen or more houses, he will give them an individuality in little things that is very attractive to the purchaser, and which takes away from the feeling that one's house is just like all the neighboring houses in its every detail.

Here is a suggestion for a swinging panel that might be hung over the main entrance gate to a country house, bearing a singularly appropriate Biblical inscription: "Open ye the gates." The board should be oak, thick enough to hang steadily, and either left to darken with age, with no other finish than a coat of raw linseed oil or a coat of burnt umber thinned with kerosene, or else it may be filled with a good paste filler and left without varnish. The letters should be slightly incised, or their outlines should be burned in, and then painted. The "O" and the word "Gates" may be colored a bright vermilion, using coach colors, and the other letters might be a bright blue.

"Welcome Friends" is an appropriate old English motto for the front door. In the sketch the intention is to have the scroll carved in low relief and the lettering incised and gilded.

In the rough stone fireplace, a sketch of which is shown, there is a panel of rough hewn oak, surrounded by a narrow ornamented fillet moulding, on which an inscription from Proverbs 26:20 has been carved, the letters being then stained a dark red. Many other appropriate inscriptions could be used on a similar tablet, as, for example, the one that is shown in the sketch for a mantel panel, where the words "My Own Hearthstone," burned into the surface of the oak and stained a bright red, show a quaint modern German style of lettering that is well adapted for decorative designs. In general the lettering should be quaint or unusual, the idea not being that of the sign, which must be so legible that he who runs may read, but the inscription that is to be decorative, as its primary character.

The sketch for a dining-room frieze shows how readily an appropriate sentiment may be worked into the decoration of a room, in this case a couplet from one of Robert Herrick's poems being taken as an example:

"'Tis not the food, but the content,
That makes the table's merriment."

The teapot, with the curling steam and the grapevine, with leaves and fruit, combine very well with the quaint lettering that might be gilded on an ivory or cream ground, or be painted in pale green on a light tan ground. The wall could be hung with a burlap in plain colors of some harmonious shade.

One of the greatest difficulties met with in this form of decoration is the selection of appropriate sentiments. There are some that have been worn threadbare by frequent repetition, and though undoubtedly good at first have now become so commonplace that one hesitates to use them. The writer has therefore selected a few rather uncommon ones, that are appropriate for the purpose and that are offered for the benefit of those who desire to use decorative mottoes and inscriptions. They range from grave to gay, and have been selected from the Bible, from Shakespeare, Robert Herrick and other authors.

For the front door or entrance gates, the following would be appropriate:

"I command that the gates should be shut."
"Lift up your heads, O ye gates."
"Pass over the door."
"I open my doors to the traveller."

The following would be appropriate either upon the outside of the house or just inside the entrance hall:

"Hail! calm acclivity, Salubrious Spot."
"A little house, whose humble roof
Is weather proof;
Under the sparres of which I lie
Both soft and drie."
"Wisdom hath builded her house."

For a country cottage or a mountain camp:

"All a loaf is better than no vacation."
"Here we rejoyce, because no Rent
We pay for our poore Tenement."
"Here, here I live with what my Board
Can with the smallest cost afford."

For the entrance hall:

"Now do be seated."
"All mankind loves a looking glass."

For a fireplace there are a great many appropriate mottoes. Here are some of them:

"Some little sticks of thorne or briar
Make me a fire,
Close by whose living coals I sit
And glow like it."
"Where glowing embers through the room
Teach light to counterfeit a gloom."
"A little Hearth best fits a little Fire."
"Set up a sign of fire."
"Glorify the Lord in the fire."
"'Tis home where'er the hearth is."
"Underneath all is the bright and ever springing fire."
"Unless the kettle boiling be,
Pouring on water spoils the tea."
"O ye Fire and Heat bless ye the Lord."
"While I was musing the fire burned."

(*Continued on page* 457.)

Something the Boys Can Make

COMPLETE DESCRIPTION OF HOW TO MAKE A CHEST-SEAT — KINDS OF WOOD TO USE AND PROPER FINISH TO GIVE TO IT

THE chest-seat, the description of which follows, was designed and made by a student in the Manual Training Department of Normal, Illinois, University. As its name implies it is a combination of chest and seat. It was made of poplar and is of simple construction.

All stock used is seven-eighths of an inch in thickness.

For the lid, square up a piece to a width of sixteen inches and a length of thirty-two inches. The edges and ends should be beveled on the top side one-quarter of an inch; or, if desired, both top and under side may be gauged with the pencil gauge to one-quarter of an inch and a round put on the edges and ends as shown in Fig. 1.

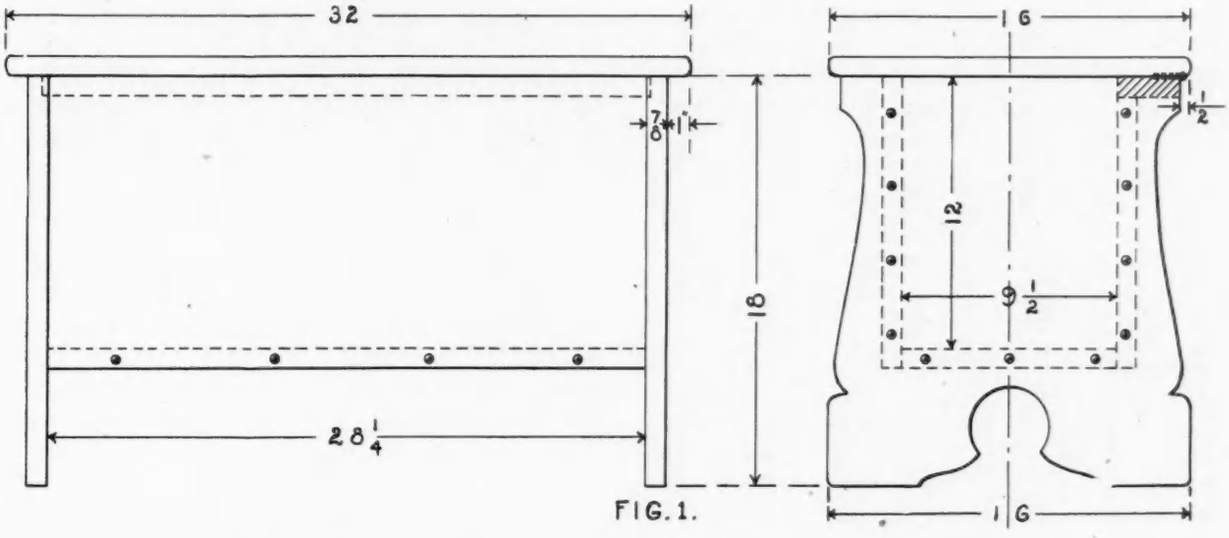


FIG. 1.

For the sides of the box, square up one piece of stock to twelve and seven-eighths by twenty-eight and one-fourth inches, and one piece to twelve inches by twenty-eight and one-fourth inches.

The bottom of the box should be made nine and one-half inches wide by twenty-eight and one-quarter inches long.

To support the hinges properly, a piece two and three-quarter inches by twenty-eight and five-eighths inches is required. This piece, it will be noticed, is made longer than the sides and the bottom of the box so that its ends may be let into the ends, or legs, to a depth of three-sixteenths of an inch each.

The legs are laid out by means of a template, or full-sized pattern of one-half of it.

On a large sheet of stiff paper, draw a straight line, a center line it is called, about twenty inches long. On this line mark two points eighteen inches apart. Draw lines at right-angles to the center line at these points. This can best be done by means of the drawing-board and instruments such as were described last month in this department. If these are not at hand, the steel square can be used, placing the blade along the center line and drawing along the tongue.

Measure out from the center line along one of the lines just drawn which represents the top of the leg a distance of seven and one-half inches and drop a vertical line about one and one-half inches.

On the lower horizontal line measure out eight inches and erect a vertical line about three and one-half inches long.

Sketch in the curved line, lightly at first. Do not be satisfied with the first line drawn but make enough to satisfy your taste, then trace heavily the one which seems best.

The circle at the bottom is made with the dividers, a one and three-fourths inch radius being used.

Cut out the form along these lines. This gives a pattern of but one-half of the leg and will necessitate drawing a center line upon the wood. A full pattern can be secured by folding the paper along its center

line and tracing the curved lines upon the second side. The tracing may be avoided by folding the paper so that the pencil lines shall be out, both sides being cut at once while in the folded position.

Place the pattern upon the stock which is to be used for the legs and mark around it.

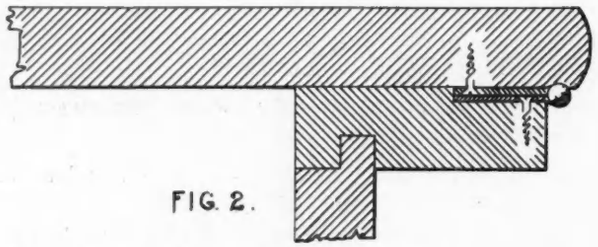


FIG. 2.

Cut the curves with the turning saw. Smooth them where possible with the spokeshave, otherwise with a wood rasp and steel scraper.

Lay off the recesses which are to receive the ends of the piece to which the hinges are to be fastened. Although gauging is not usually done across the grain of the wood, probably the easiest way here would be to set the gauge to seven-eighths of an inch and, holding the gauge block against the top end of the leg mark the inside surface to a distance of two and three-quarters inches from the edge. Again set the gauge to two and three-quarters inches and gauge from the

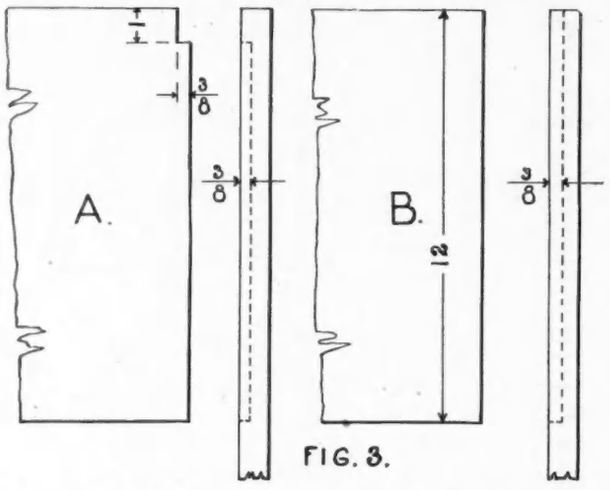


FIG. 3.

edges of the leg so as to indicate the length of the opening. Set the gauge to three-sixteenths of an inch and gauge on the top and edge of the leg so as to show the depth of the recess. Keep the gauge block against the inside surface of the leg. Be sure the marking is done so as to have the legs pair one with the other. Cut to the lines using chisel and mallet.

In assembling the parts, fasten the sides of the box to the bottom first, using round head blued screws. It will be necessary to drill through the sides to receive the screws but, as the wood specified is soft, it will not be necessary to make any holes in the edges of the bottom.

Plane off any uneveness at the joints; and, having first marked and bored the ends or legs, screw them to the box.

Next, fit and nail the hinge support in place, nailing through it into the box and legs.

The hinges may now be placed. Lay the lid in position and, with a knife, mark simultaneously on both lid and support at what is to be the location of one end of each hinge. Remove the lid. With one-half of the hinge as a template, mark along the ends using the point of the knife as a marker. Set the gauge the required distance and gauge between the knife lines. This distance will depend upon the size of the hinge. Measure the thickness of the hinge close to the butt and setting the gauge this distance, mark on the edge of the hinge support so as to show the depth of the opening which is to receive the hinge. Chisel carefully to these lines.

It will not be possible to gauge on the lid. As the hinges are not sunk into the wood at all but are

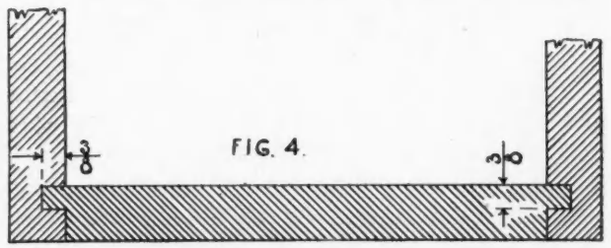


FIG. 4.

screwed on top of the surface, Fig. 2, no trouble will be experienced in locating them, providing the same and the correct measurements from the edge of the lid are taken for each hinge.

These measurements can be determined best by placing the lid in position and then marking.

Fasten the hinges in place, taking them apart if they are put together with loose pins.

A chain to keep the lid from opening too far should be fastened by one end to the inside of the box by the other end to the under side of the lid.

Stain or dye the wood with any dark color, and, when this is dry, polish with several coats of wax.

The construction just described is the simplest possible. For those boys who have had considerable experience and who possess sufficient skill a modification is suggested.

Make the sides and the bottom of the box of the same length as that of the piece which supports the

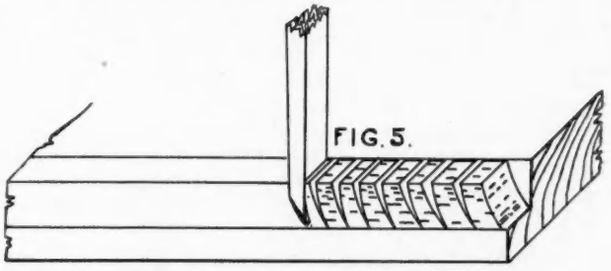


FIG. 5.

hinges, twenty-eight and five-eighths inches, so that their ends may be housed into the legs to a depth of three-sixteenths of an inch each, Fig. 3.

It will be well to cut the gains so as to make the pieces fit snugly. Better have the joints a little too

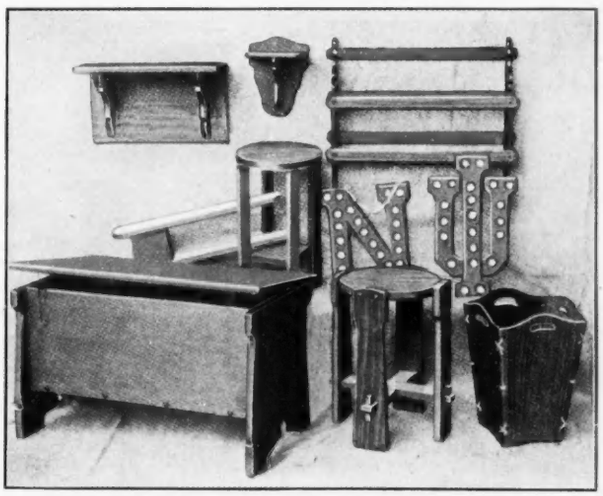
close than otherwise. If they fit too close plane across the grain, at the ends of the pieces, on the inside surfaces before fastening the parts together.

In joint A, Fig. 3, the gain is begun one inch below the top. One side of the box is therefore cut at the upper corner one inch down from the edge and three-sixteenths of an inch back from the end.

In joint B, Fig. 3, the gain runs to the top of the leg and the side is not cut at all.

Fig. 4 shows a joint suitable for connecting the sides to the bottom. Fig. 2 shows the same kind of a joint connecting the hinge support and one side of the box.

This joint is best made with a rabbeting plane, providing machinery is not at hand. Almost every shop



is supplied with a patent plane provided with a set of plane irons which can be used for a great variety of purposes. This plane should be used to cut the groove and also the tongue.

If such a plane is not to be had, the groove cutting and rabbeting can be done with the chisel and mallet. To lay out the grooves, set the gauge to one-half an inch and gauge from the edge which lies nearest the groove. Then set it to seven-eighths of an inch and gauge, keeping the block against the same edge as before. This gives a groove three-eighths of an inch wide. It should be chiseled to a depth slightly in excess of three-eighths of an inch.

For the tongue, set the gauge to three-eighths of an inch and gauge on the edge with the block against what is to be the top surface. Also, without resetting, gauge on the under surface, keeping the gauge block against the edge. This will insure a tongue of the same width as that of the groove.

The ends of the pieces which form the box should be joined to the legs with hot glue. Cabinetmaker's clamps should be used to hold the parts in place until the glue has had time to set. In this case, as in every case, where the end of the grain is to be glued, a preliminary coat, or sizing, should be applied and allowed to set slightly before the final coat is put on.

Fig. 5 shows the manner of cutting the rabbets which run parallel to the grain of the wood. Make a series of cuts with the chisel and mallet as shown; then trim to the lines cutting along one line entirely before beginning to cut along the other.

The description so far has presupposed that boards sixteen inches wide were to be had. If boards of that width are not convenient, narrower ones may have their edges carefully jointed together and be doweled and glued in the manner described in this department in the making of a table, December, 1905. They may preferably be matched with tongue and groove.

The lid whether made of one or two pieces should be reinforced with cross pieces or cleats. They can best be put on with tongue and groove as described in the making of the drawing board in last month's journal in this department. They should be put on before the board is squared up.

If possible, make the box of red cedar. A dark mahogany stain or dye followed by two coats of wax will give a beautiful effect if the lighter colors are preferred.

Inscriptions and Mottoes Used as Decorations

(*Continued from page* 454)

There are a great many appropriate mottoes for the dining-room, of which these are a few:

"Eat and be satisfied."
"Eat in plenty and be satisfied."
"Come eat of the bread and drink of the wine which I have mingled."

"Come and freely get
Good words or meat."
"Lord I confesse too, when I dine,
The pulse is thine."
"Prepare the table,
Eat, drink."

"God give thee of the dew of Heaven, and the fatness of the Earth and plenty of Corn and Wine."
"People eat most heartily of another man's meat."
"Call no man happy until he is fed."
"Eat, drink and be merry, for to-morrow we diet."
"Birds of a feather dine together."

Here are some for the library:

"A few Friends and many Books both true,
Both wise and both delightful true."
"Small treatises and smaller verses."
"Sound sleep by night, study and ease,
Together mixt; sweet recreation."

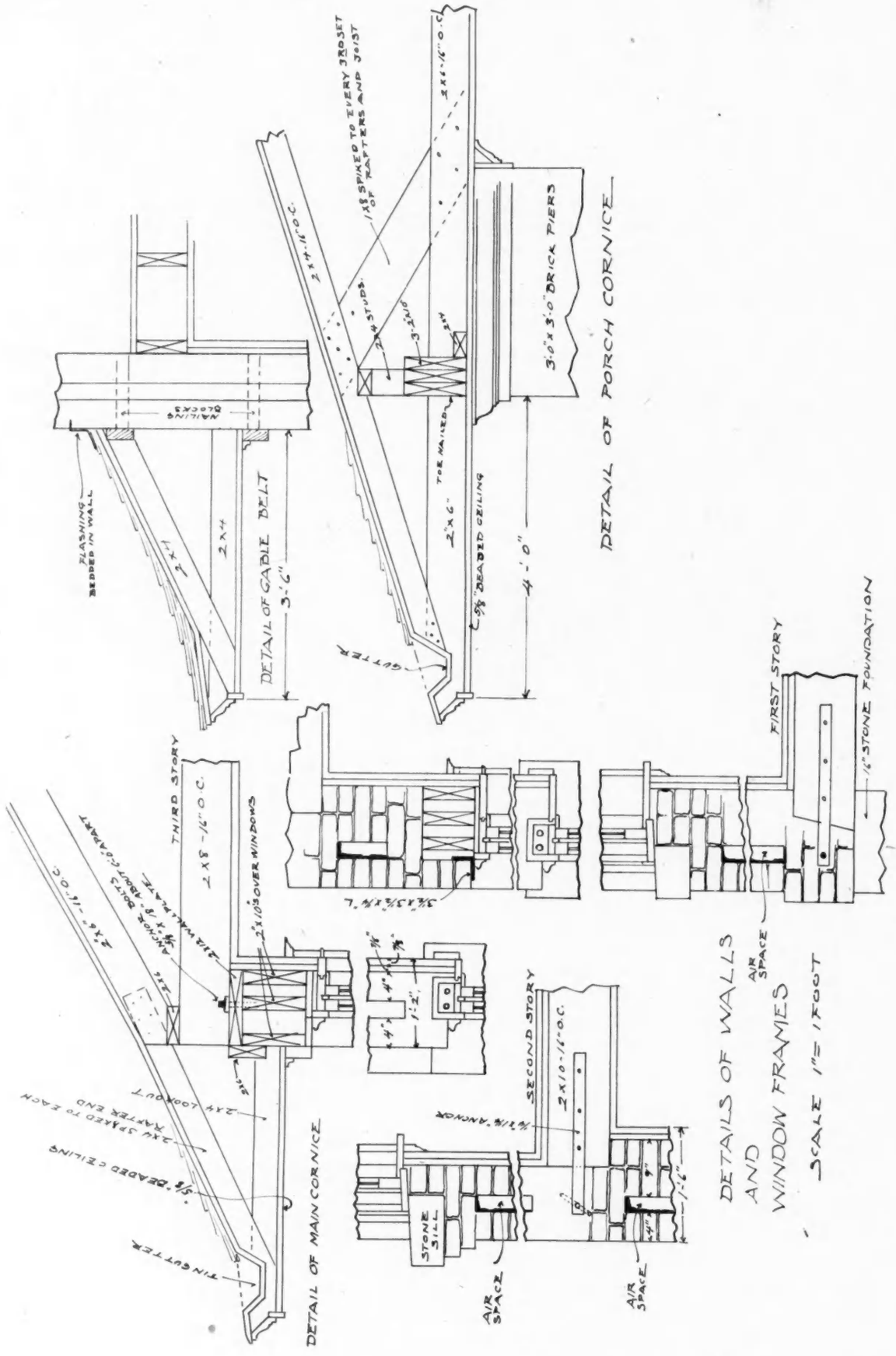
For the den or smoking room:

"All are not lobsters who fall into nets."
"Puff dull care away."

And here is one that might be put over a telephone booth. Many will sympathize with the paraphrase of Patrick Henry:

"Give me 'Central' or give me death."

Those who complain of life being a burden are always a burden to others.


DETAIL OF PORCH CORNICE
DETAIL OF GABLE BELT
DETAIL OF MAIN CORNICE
DETAILS OF WALLS AND WINDOW FRAMES
SCALE 1" = 1 FOOT
FIRST STORY
SECOND STORY
THIRD STORY
STONE SILL
AIR SPACE
TIN GUTTER
GUTTER
FLASHING BEDDED IN WALL
2 X 4 STUDS
2 X 6" TOE NAILED
3'-6"
4'-0"
3'-0" X 3'-0" BRICK PIERS
12" STONE FOUNDATION

Metal Working for Interior Decoration

ARTISTIC EFFECTS WHICH CAN BE PRODUCED WITH VARIOUS METALS—DECREASE IN COST PUTS THEM WITHIN REACH OF EVERYONE—WHERE USED TO BEST ADVANTAGE

By George E. Walsh

THE various metals in combination with wood and glass are used more extensively today than ever before by architects to produce artistic and finishing touches to the interior of our homes. The remarkable development of the metal trades in the past decade has placed at the disposal of the house designer and decorator a long list of useful and ornamental metal articles to select from, and year by year manufacturers are increasing their output in this direction. The average modern house of today has thrice the amount of metal ornaments that far more pretentious establishments could have had twenty years ago. The metal designs are the result of machines which turn them out at comparatively little cost. The tendency is to elaborate upon all the hardware features of the home so that they will blend harmoniously with the wood work. Thus we have handsome brass and burnished metal locks, door-knobs and hinges. These come in styles suitable to all classes of architecture.

Individuality in Decoration

In some of the handsome modern homes of country and city the hardware is all designed especially for the place by competent artists, and by securing individual patterns in this way there is no danger of duplication. Individuality in taste and decoration in the house is to be cultivated and encouraged. Wherever one can afford the extra outlay of money generally demanded for this, it should be the ambition of the owner to accomplish some definite results. It is not that one need always call in a high-priced architect to do the designing, but with a little reading and helpful influence from shops and stores it should be possible for one to cultivate individuality in decoration of a high order.

The decorator after all receives many of his hints from his fellow craftsmen, and from association of ideas. A hint is gathered here and there, and after due reflection and reading the mind gradually weaves out a system which can be truthfully called original. It is a modification of one system, and improvement upon another, which shows us the way to advance ideas in tasteful decoration. There is no better way for a householder anxious to improve or decorate a new home than to go visiting for professional purposes. First, let architects display their good and bad points in their new, unfinished, or at least unoccupied houses, and then study the shop and store windows and goods for new ideas. If one has any selective genius it will be found that not one of the numerous schemes will actually prove satisfactory in every detail. They will all contribute something of value, but not any one will be perfectly satisfactory.

The metal trades abound in wonderful productions for our homes, and many of these are of a character which can be chosen at once for use. Others suggest new ideas to us, and open up a new field of personal endeavor which we can follow with great pleasure. The wrought or Venetian iron work has probably been carried to an extreme in many of our homes. There are some houses where the home-made Venetian iron work is so very evident from hallway to bedroom that it proves nauseating. A good deal of this is crude in execution, and worse in design; but one can visit a high-class importing house, and find designs in this iron work which completely changes our ideas concerning it. There are designs which can be made useful and ornamental in any home. A little of this harmoniously blended with the surroundings of a hall, den, dining or bedroom is far from suggesting anything cheap and shoddy. It is the over-multiplication of designs which destroys the effect. The use of the Venetian iron work as a grille to separate two rooms, or a small alcove can be made extremely effective. But the pattern must be elaborate and well worked out, and it must yield perfect harmony with the wood work and furniture.

Use of Metal With Glass

The use of metal in connection with glass is justifiably popular, and while brass and bronze are the favorite metals for this work it is not impossible to achieve good results with wrought iron.

With red glass the Venetian iron ribbon has been employed for centuries to produce hall lights, but white ground and leaded glass produce just as harmonious results. Thus architects are making many hall lights of beautiful opalescent and iridescent glass globes in combination with black iron. The hall stair post is frequently finished off in this way, the ribbons of iron running up in elaborate curves and conventional designs. The glass panel in the inside or outside door is frequently strengthened and decorated by wrought iron work. The windows on the ground floor and basement are protected by wrought iron bent work, which can be ordered at the factory, or made at home if one has the necessary tools.

To utilize Venetian ribbon and bent iron work it is necessary to make a thorough study of it, and to be able to do something more than merely imitate a few crude designs. There is really an infinite variety of designs that can be made in this way; but to do this successfully one must be armed with the heavy plyers and cutters, and not the small tools which come with the cheap sets. The factories which make wrought iron ribbon and posts usually supply a much fuller variety of sizes for the novice to work with than re-

tail stores. Consequently it will pay one to visit such factories, if possible, and study some of the designs and ideas produced for different places. Frequently expensive artistic patterns are on exhibition, and one with a little creative or selective genius can go home and modify a thousand dollar design without much trouble.

Brass, bronze, bronzed steel, gun metal, copper and even gold and silver are now employed in a score of different ways in household decoration of doors, windows, stair-posts, dadoes, center pieces, and mantel-pieces. These different metals woven in with wood or glass always add a richness to the designs which produce most effective results. The modern hinges of front doors represent the widest sort of designs and patterns. The hardware stores present to the purchaser the stock designs, but the cost of having one's own patterns made up at the factories is not great. One may need hinges and door-knobs for a country house to harmonize with an old-fashioned Colonial door knocker, and to do this satisfactorily it may be necessary to have new designs made. It will pay one to go to this expense if the house is built to last. One does not build a home every day. To most of us it is a life event. We build only one, and in that we strive to weave our individuality and taste for future generations to study. Many a person has thus impressed his descendants with a clearer idea of his artistic genius than any of his day and generation ever dreamed he possessed. A prophet is not always honored in his country; neither is an artist always accepted at his true value. We have instances of New England home builders who never posed as artists, but in striving to build a home which expressed their individual tastes they contributed worthy inheritances to the artistic world.

Unfortunately for the home worker in metals many of those mentioned are too difficult to work, or too expensive to make it possible for us to handle to any great extent. Copper, brass and bronze are the easiest. These come down to us from remote times as the best metals for working into ornamental shape. Hammered brass is beautiful and useful, and it can be made up into various designs in the home workshop. Brass of the right quality and shape is not always easily obtained. Unless one is situated near a factory where odd pieces can be obtained it may be poor policy to purchase it for home work unless one is satisfied with the pleasure derived therefrom. Frequently, however old brass articles that are not even useful as valuable relics may be worked up into hammered brass door plates, mantel-piece decorations, or window ornaments. If this is possible there will come ample pleasure and profit from working the metal. One can truly show taste and individuality of no mean order in hammered brass or bronze. Desks, side-boards, and mantel-pieces all yield to decoration with this metal. One has also a long history of conventional designs to select from, and suggestions and hints for the artisan-workman have come down to us from classic times.

Gun metal and copper are likewise manipulated in the home workshop if one has the right tools. The gun metal is in thin enough sheets to permit the novice to bend and cut to suit the individual needs. The changing effects from very light to cloudy darkness which makes this metal popular can be used by the worker to produce desirable results. Where glass is employed in combination with the metal soft copper or prepared window lead can be used to fasten the brittle substance in position. With light metal hammers the copper or lead can be hammered against the plate or globe glass until it holds firmly in place. To do this it is necessary that holes and crevices should be left between the glass and the metal to serve as anchorages for the copper. All soft metal can be worked in this manner so that it will prove strong and firm.

The average person would hardly consider silver and gold as appropriate metals for decorating the house, but frequently they could find no better use. Fine tracery work with silver can be beaten into patterns suitable for fine cabinet work, and also for the face of side-boards and handsome furniture. Silver is thus employed for decorative purposes in factories where beautiful hand-made furniture is made. Silver frosting and silver lace worked on handsome picture frames produces exquisite effects. Silver lace and even gold lace are now made so fine and delicate that they resemble Mexican drawn-work in their tracery. This is sometimes inlaid on the front of tables and side-boards, or worked on the top of bronze and gun metal art objects.

While it is possible for one to find a few useful ways of employing gold and silver for interior decoration of the home and art objects, they would for the most part count little in any scheme of home metal decoration. The coarser metals are most generally used, and they serve the purpose equally well.

Working in metals is becoming easier every year for the amateur, for new inventions are simplifying the labor of manipulation so that more elaborate designs can be made at little expense. Small braziers and portable furnaces for melting and welding the metal together should be made a part of the home-shop equipment, and then with the tools necessary for manipulation various useful designs can be cut and hammered out of the solid sheets of metal. All this and taste, and while one is laboring with the tools handicraft work tends to develop an artistic touch and metals an unconscious growth of individual appreciation and selection is going on. There can be no perfect intimacy with art in its decorative phases without the disciplinarian work that comes through direct handling of the metals. No one can fully understand the delicate design and intricacy of delicate pattern work until the eye and hand have attempted to copy

them, or at least to make something similar. The education of the eye and hand simultaneously thus gives to us a new sense and proportion of art.

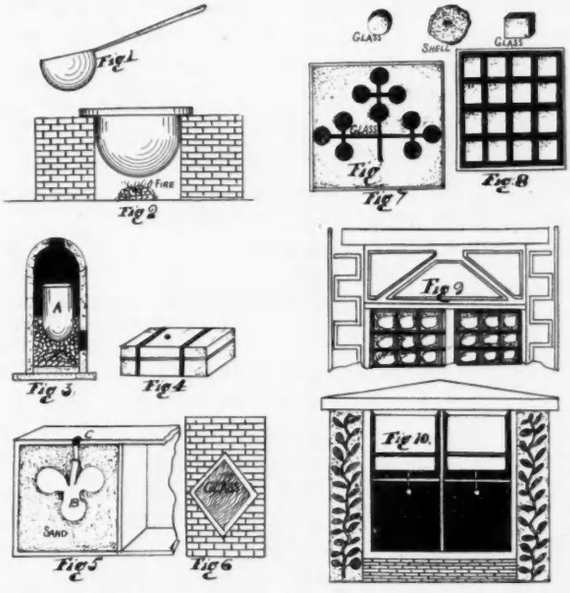
Individuality in the home must to some extent show the passing stages of popularity of certain features of art, and we cannot ignore the ephemeral any more than we can the lasting and permanent; but our own interpretation and modification of these ideas must largely reflect our taste and artistic sense of the beautiful. We can express our individual preferences for certain forms of art in various ways, and as we gradually build up our home in this way we create an atmosphere and environment which are distinctly our own. Our home surroundings are after all in this sense, but the outward expression of our inner life and mind.

Use of Glass in Building

METHODS OF USING GLASS IN COMBINATION WITH OTHER MATERIALS—WAYS OF MELTING GLASS IN FOREIGN COUNTRIES

By George H. Melrose

GLASS, like iron and steel, now forms an important factor in the woodworking industry. That is, glass in its various forms, tints and characters, is used in conjunction with the wood on a more extensive scale than in former years. In this article we will refer especially to the systems of using glass in woodworking as employed by the foreigner. Since my return from the Orient and the Philippine Islands, I have been asked questions concerning the employment of glass in the industries of these countries. The Filipino, Spanish, Chinese and the Japanese have some queer customs



of using glass with wood. There are sections in the Philippine Islands in which no glass is available and the natives use a transparent shell from the beaches for glass in windows. The Chinese do the same in many instances. But it is chiefly the ornamentation work in wood, with colored glass, that attracts the eye of the tourist in these countries.

The natives are in the habit of collecting old bottles of all kinds and melting them in a crucible of the nature shown in the illustration. Fig. 2 is a sectional drawing, and the plan of the device can be seen. The crucible is of metallic construction, imported from the foundries of Spain usually. The natives are not capable of making crucibles. The form of ladle used is shown in Fig. 1. Often, in order to get proper results the workmen are obliged to melt the glass on the same plan as is used in melting brass or kindred hard metal.

It would be too difficult and take too long to melt some kinds of glass in the open crucible, Fig. 2, and therefore the enclosed type of crucible, Fig. 3, is often employed. The crucible is enclosed in the brick and stone masonry chamber as shown. The crucible is marked *a* and it is constructed in a long cylindrical form so as to fit snugly in the chamber. The coke fire is made below, and as the crucible comes in contact with the hot coals, a very intense heat results.

Plate glass, crown glass and the like are not handled to any extent by the wood design decorators. They rely mostly upon the common bottle glass. However, broken plate glass is often used and mixed with the other kinds. Flint glass is sometimes made of carbonate of potash, red lead, litharge, sand, saltpetre, and oxide of manganese. From the base glass the workmen make the orange by adding iron ore; emerald green with copper scales; gold color with oxide of uranium; red with oxide of gold; blue with oxide of copper; purple with oxide of manganese.

After the glass composition is put into shape for the service intended, the casting molds are called into service. These molds, or flasks, are made so that casting of forms can be done in sand. Fig. 4 is the outward form of a flask used for this purpose. It was made in two parts. The shape of the pattern for casting is molded in either side and then the sides are closed and strapped or bolted and pouring begins. The process of pouring is shown in Fig. 5. The form of the pattern in the sand is indicated at *b*. The gate into which the molten glass is poured is signified *c*. There is a tunnel-shaped utensil used with which to pour through.

The soft substance flows through the tunnel to the gate, through the latter to the channel leading to the full form. The latter is filled and the flask is allowed to stand until the glass is cooled and

hardened. Then the flask is opened and the model can be removed and the flask utilized to mold another.

The workmen of the countries above mentioned use the different form of glass in very strange ways. In one instance I noticed a very large diamond-shaped piece of light blue glass made up into the side of a chimney as in Fig. 6. I asked the reason why, and was told that this piece of glass made it possible to examine the base of the chimney from the outside. I looked through the glass but saw only darkness. My host then obtained a lantern and sent his boy to the roof and lowered the lighted lantern to the base of the chimney. I was then able to look through the glass and see the interior. But the artisans of the Orient are not using the glass entirely for transparency purposes. They use much of the colored glass for purposes of ornamentation, both for interior and exterior decoration. The people delight in having attractive decorations in set-glass patterns over the fireplace or in the arches over the hallways. They also like to have the exterior walls of their homes chaptered off at intervals with settings of designs of the nature of the one exhibited in Fig. 7. This is made simply by shaping glass disks in sand molds, after which the disks are pressed into soft cement and permitted to dry there. Then the cement is tinted the desired color and the panel thus made is attached to some part of the house for ornamental purposes.

As before stated, transparent shells are collected along the ocean edge and these shells are ground and polished until they become quite thin and transparent enough to let the light through. Sometimes these shells are ground off into squares and inserted in solid wood frames as in Fig. 8. The natives of the Philippine Islands use many of the shells for making windows for homes. Then again glass squares are made up to fit into the little openings and cement or putty is employed for holding the same in place. More often, however, neither cement nor putty is employed, and the pieces are held in place by being adjusted in grooves tediously cut in the woodwork. Usually the wood employed is as hard as metal. There is an abundance of rich hardwoods in the tropics and this wood is commonly used by the window sash makers. Therefore the grooves cut for the disks are as a rule very strong. A window design made up with the transparent shell panels is exhibited in Fig. 9. The window sash is made so that the sash can be worked as sliding or hinged shutters. The sliding shutter is preferred. Very seldom is the frame so arranged that the sash is raised and lowered as in the American form of window. Pulleys and weights with sash cords are unknown except in the few places in which Americans have erected buildings on American plans.

Fig. 10 is given to illustrate the fantastic window frame idea of the person able to pay to have his decorative work done. The floral effect along the sides of the window is the result of bedding glass forms of leaves in order as shown in a cement composition.

The base or bed is made and then the cast shapes of the design are pressed into the bedding. Then the cement is allowed to harden and polishing follows, to gloss the surfaces of the glass. Then the cement surface is painted or gilded and the pattern is finished.

Architectural Criticism by a Country Editor

The following breezy description is from the Tribune, of Britt, Iowa:

"The architect changed the specifications on the new building on the corner in front of the Treganza furniture store, and instead of building it two stories high, they built it two stories long. He also changed from a solid brick to a veneered building. It is veneered with tar-paper with tin trimmings, in longitudinal rows. It was thought at first that it was intended for a branch mint, as the skylight is put in like that in an assay office, but the ceiling is hardly high enough for that and the gables are too pronounced. A nice row of such buildings would add materially to the aspect of the town and serve to carry out the idea of progressiveness now so popular. The beautiful glint of the tin ornaments in the sunshine makes it a thing of beauty and no doubt it will be a joy forever."

Concrete for Grade Separation

All railroads leading into the city of Chicago are required by law to elevate their tracks above the street crossings. This work must be done by January 1, 1907, on all tracks within the five-mile circle, and is calling for a large amount of concrete, both for abutments at the street crossings and also for the retaining walls along the line of tracks.

A typical concrete abutment is 7 feet, 6 inches wide at the bottom and 4 feet, 6 inches at the top, with a vertical height of 12 or 13 feet. These abutments vary in length from 75 to 100 feet, according to the number of tracks; and are usually built in two sections, so that one-half of the track may be elevated at a time and the work continued without interruption of traffic. The Grand Trunk Railroad is now letting the contract for abutments at twenty-five street crossings aggregating some 30,000 cubic yards of concrete.

Endeavoring to dodge work tires a great many men more than hard labor.

Painting Weatherbeaten Woodwork

To the Editor: Elsberry, Mo.

We have a customer who has an old farm house which has not been painted for about twenty years. The house is sided with white pine weather boarding of good grade, but is of course very rough and open, and it would take a great deal of paint and oil to fill the wood before the finishing coats can be applied. Now the question is (with us) what would be the best material to use for filling this siding. Our customer has suggested that we use willow ochre and linseed oil, but we do not thing ochre a good pigment and we do believe that any good paint should have a good foundation as well as the finishing coat, for the foundation of the paint is more essential than the last coat, according to our ideas. We wish you would please give us some information as to this class of work.

La Crosse Lumber Co.

Answer: In painting old, weatherbeaten woodwork, we would recommend that the wood should first be oiled with a mixture made up in the proportion of five gallons of pure raw linseed oil to one and three-quarters gallons of turpentine and about one pint of the best liquid driers. A very little pure white lead may be mixed with this oil, but only just enough to make a thin wash. The turpentine will evaporate and the oil will soak into the wood, drying dead and giving a good surface for priming on and effecting a material saving in quantity of paint needed for the subsequent coats. Comparatively little labor will be required for this coat of oil. The priming should be done with the best pure white lead and pure raw linseed oil, tinted with not over two per cent of lamp black. This will hide any discolorations of the surface and enable the second coat to cover them better. Ochre, on no account, should be used for priming. The so called priming ochres are largely adulterated with barytes, which is a mere makeweight, having no affinity for oil, and being used to reduce the percentage of oil needed to grind the paint and to add weight. Even the best French Ochre, which costs more than white lead, is not satisfactory for priming, because it has a tendency to cause any subsequent coat of paint to shell or scale off. If this scaling does not occur on the first painting, it will almost invariably do so the next time the building is painted. If a cheap material is needed for priming and the finishing paint is to be dark in color, the best material to use is Prince's mineral brown ground in pure linseed oil.

Edward Hurst Brown.

Testing Faulty Paint

Middletown, Ill.

To the Editor:

Please find enclosed sample of paint which was put on a dwelling house last October and which began to crack and peel off in spots during the winter and spring. The materials were bought for first-class goods. Used boiled linseed oil and white lead. Used a small quantity of Prussian Blue to bleach with, and a little turpentine for dryer.

What is your opinion of the faulty job?

Samuel Morris.

Answer: As nearly as we can tell from the small sample of paint scales submitted, the fault is not due to the lead being adulterated, since the scales are elastic, while an adulterated lead or a so called combination lead would have given brittle scales. The Prussian Blue would have no effect, therefore the fault was probably due either to the condition of the surface or to the oil. If the wood was damp when painted or if the work had been done over frost, or if dampness found its way to the wood back of the paint as from new plastering or a leaky gutter, this might account for the paint blistering, due to an effort of the enclosed moisture to escape when heated by the sun. Sometimes blisters are caused by the sap in unseasoned wood. If blistering is caused by moisture, it can very often be detected by pricking some of the blisters with a pin, when a small drop of water will ooze out. However, we are inclined to think in this case the fault was due to the oil. A pure kettle boiled linseed oil should not do this,

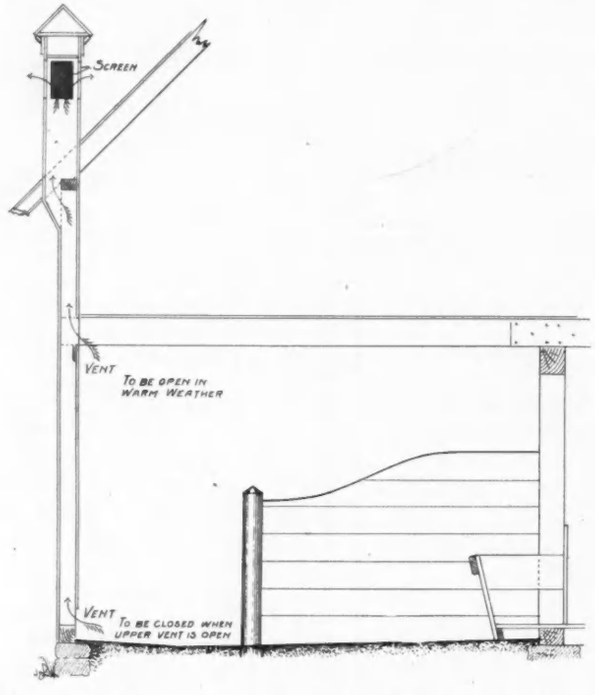
although it is not usually advisable to use boiled oil, since it is apt to harden on the surface before it thoroughly dries underneath and the paint skin will crack and shrivel like an alligator's hide; but a great deal of the so called boiled oil on the market is not really boiled but is merely loaded with an excess of driers to cause rapid oxidation. Under unfavorable conditions of weather or moisture, such an oil would almost surely cause trouble of this kind. Turpentine is also frequently adulterated with mineral oil, on account of its high price, and this may have been a contributary cause. Pure linseed oil is much to be preferred to boiled oil for mixing paint. EDWARD HURST BROWN.

Ventilating a Barn

To the Editor: Dewit, Neb.

Will you please give an illustration to ventilate a large barn without putting on the common roof ventilators, which are a nuisance in this part of the country on account of the sparrows and insects. FRANK LAKE.

Answer: The nuisance caused by the sparrows and insects could be almost entirely avoided by screening the openings of



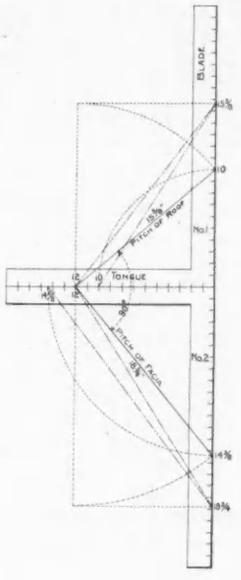
the ventilator just the same as for the windows in a residence. As for ventilation from the stable part, this may be accomplished as shown in the illustration, which is simply done by boarding up the space between two studdings, boxing out at the cornice to clear the plate and finished with turret effect on the roof with screened openings on all sides. The interior openings should be as shown provided with slide shutters. Would have one of these vent shafts about every eight feet or opposite every other stall. EDITOR.

Valley Cuts of Planceer

To the Editor: California, Mo.

Will you please give rule to get the valley cuts of the planceer and facia? ALBERT SMITH.

Answer: Just stop and think a minute and it will be seen that the cut of the planceer is identical with that for the sheathing board that rest just above. One fits to the angle of the underside of the valley while the other fits to the angle of the top side. The figures to use on the square for the angle across the face of the board are the same as those for the side cut of the corresponding jack, but the cuts are reversed on the square, or in other words, say the tongue gives the cut across the face of the board while the blade gives it across the back of the jacks. Now referring to the accompanying illustration we will suppose the roof has a rise of 10 inches as shown on square No. 1. The length of the pitch is 15⅝ and this taken on the blade and 12 on the tongue are the figures to use. The tongue giving the cut across the face of the board.



For the edge or miter, take 10 on the tongue and 15⅝ on the blade and the tongue will give the cut. Thus, it will be seen that these figures are obtained from the triangle bounded by 12-10 and 15⅝.

The dotted lines showing the movements or the transferring of these parts on the square. The corresponding facia is simply the same as the sheathing boards for an inverted roof resting at right angles from the upper one (provided the ends of the common rafters are cut square), and in the accompanying illustration intersects 14⅜ as shown on square No. 2. The operation is the same as that shown on square No. 1. In other words, if 14⅜ is used for the rise of the roof, then the figures shown on square No. 1 will give the cuts for the corresponding facia. When the rise is 12 inches or one-half pitch, then the figures on both squares are the same and 12 and 17 will give the facia and miter cuts for the roof boards, planceer, facia and the side cut of the jacks.

From this it will be seen that the cuts in question are the same as for hoppers of like pitch. There are a number of ways of illustrating this kind of work, all of which we will take up in the course of our regular articles on the "Steel Square," but it will be several months before we get around to it. A. W. WOODS.

Laying Out a Heptagon

To the Editor: Tioga, Texas.

Can you give me the correct method for laying out a heptagon? B. L. HENDERSON.

Answer: As to the question about a correct method for laying out a heptagon, or a polygon of seven sides, we refer to our article in the August number, and it will be seen that not only the figures for the heptagon are given, but for a number of other polygons and how they are determined. With this system, it is not necessary to lay out a diagram for any sized polygon. Now as for the figures given for the heptagon, they are 12 and 5.78 (5 19-24). Then 12 taken on the tongue of the square and 5 19-24 on the blade will give the miter. The blade giving the cut and by cutting seven pieces of any desired length of side, and when placed together they will form a true heptagon, or if a given inscribed diameter is wanted simply multiply 5.78 by the number of feet in the diameter, will give the length of the sides in inches. For example, say the diameter is 10 feet. Then $5.78 \times 10 = 57.80$ inches, or 4 feet, 9 19-24 inches. If a given circumscribed diameter is wanted, proceed in like manner, but use the decimal 5.21 instead of that given above. Of course, there are other ways of laying out the heptagon, but we consider this the best method, as it requires no draughting. However, by referring to Fig. 44, in the November

number is shown how to lay off a heptagon diagram in connection with the steel square, for either inscribed or circumscribed diameters. A. W. Woods.

How to Find the Length of Brace

To the Editor: Arlington, Ky.

Please explain in the Carpenter and Builder how to get the length and cut of the brace as shown in accompanying diagram. F. W. Hall.

Answer: The first illustration is as per Mr. Hall's sketch. The length is determined from the run and rise, same as for

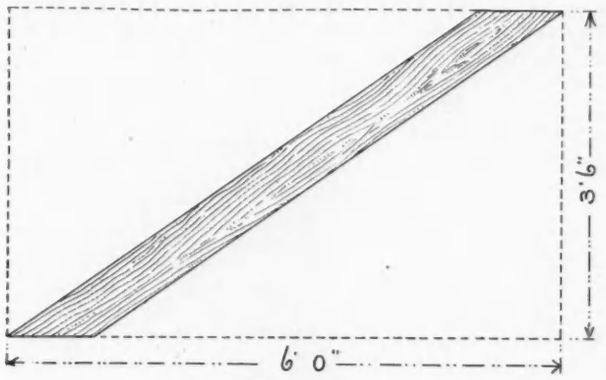


FIG. 1.

the ordinary brace, but the line of measurement instead of being along the edge of the timber (or a line parallel with it) is on a diagonal line across the face of the timber, as shown in Fig. 2. The run and rise taken to a scale on the

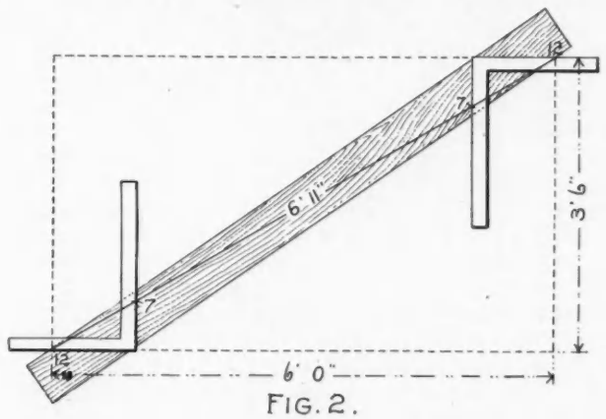


FIG. 2.

steel square and applied to this line, will give the cuts as shown. The tongue giving the cut for both ends. The figures used on the square can be anything that is in the ratio of those of the run and rise, as 6 and 3½, 12 and 7, 18 and 10½, etc. Editor.

Fitting a Hip Jack

To the Editor: Glenova, W. Va.

In the March number you say, cut across back of jack, commonly called side cut, is at an angle of 45 degrees and remains so regardless of the pitch given the roof. If so, how then are you going to fit a hip jack on side cut of 45 degrees when the cut is practically 12 and 17 cut on 17?

L. C. Ice.

Answer: Yes, the side cut of the jack is 12 and 17 cut on 17 and is the same as at A-B in Fig. 1. After this cut has been made cut off the peak end of the jack on a line parallel with the seat cut as C-D and it will be found that the side cut is at an angle of 45 degrees or A-D with the sides of the rafter as at C-D, though it took 12 and 17 to get it on the back of the rafter. What is true of this, is true of any other pitch, provided the building is square

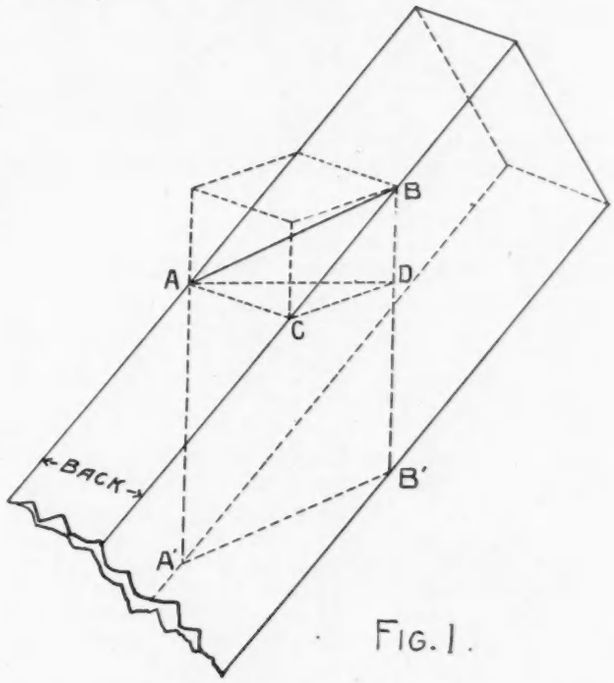


FIG. 1.

cornered. If it be an octagon roof, then the angle would be at 22½ degrees. If it be for a hexagon roof, the angle would be at 30 degrees with the sides, etc. Editor.

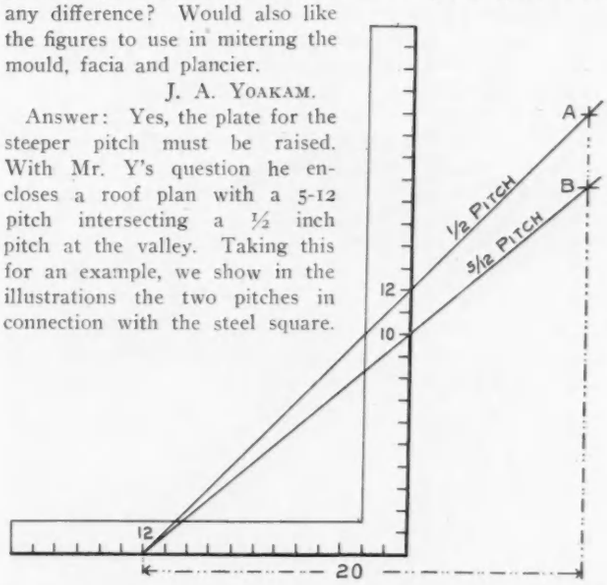
Miters For Uneven Pitches

To the Editor: Coquille, Oregon.

Will you please explain how to make the cornice member in the angle of unequal pitches? I have found the steeper pitch drops below the other. Will raising the plate make any difference? Would also like the figures to use in mitering the mould, facia and plancier.

J. A. Yoakam.

Answer: Yes, the plate for the steeper pitch must be raised. With Mr. Y's question he encloses a roof plan with a 5-12 pitch intersecting a ½ inch pitch at the valley. Taking this for an example, we show in the illustrations the two pitches in connection with the steel square.

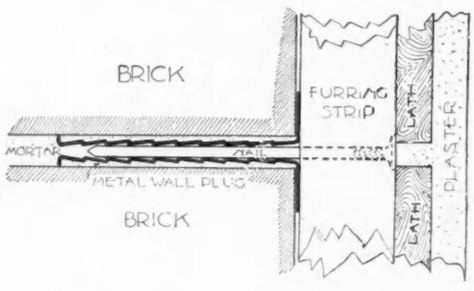


The answer is found in the difference of the rise in the width of the cornice. If the cornice be 20 inches wide, then the plate for the steeper pitch must be as from A to B higher than the plate for the lower pitch. The plancier for a roof of this kind should be level and finished with a return at the gable, consequently the miters for the several parts would all be at an angle of 45 degrees. A. W. Woods.

PRACTICAL TRADE APPLIANCES

The Rutty Steel Wall Plug

A very useful and essential device known as the "Rutty Wall Plug" is being placed on the market for sale, mostly to the builders of concrete structures. Anyone familiar with the methods of concrete construction readily recognizes the difficulty of attaching the interior finish, unless proper provision has been made for this, while the building was under construction—it being practically impossible to open the joints after the cement has once hardened.



Various methods have been tried for the purpose of securing a nailing base, mostly in the line of some kind of wooden block into the walls, as the same were being constructed, but these have always proven more or less unsatisfactory owing to the unavoidable loosening of the wood caused by swelling and shrinkage, also through the inevitable dry-rot which is so common; therefore, these practices are now generally condemned.

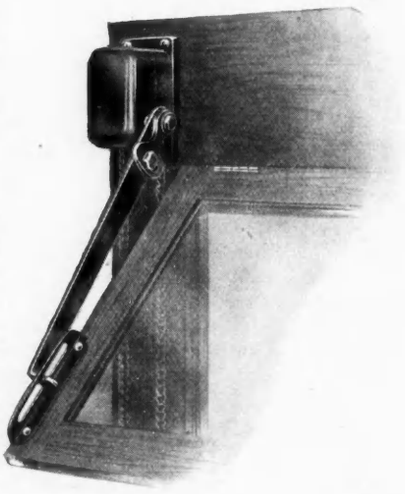
The accompanying illustration shows how all this difficulty is now being overcome, as this wall-plug is of heavy sheet steel, so formed that an opening is made sufficiently large for a 10-penny or larger nail to be inserted. When the building is constructed, the plug is placed in the mortar joints as the walls go up, and when the cement sets, the plug is absolutely immovable; the flexibility and form of the plug, however, admits a nail being driven into it without in any way disturbing the construction.

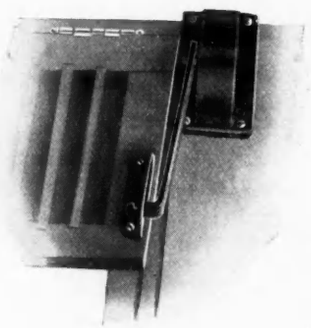
These wall plugs are thoroughly japanned, which effectually prevents corrosion, and therefore renders them indestructible.

They are being manufactured and placed upon the market by J. B. Prescott & Son, of Webster, Mass., and if you write them, mentioning the AMERICAN CARPENTER AND BUILDER, they will send you samples and catalogue, explaining full particulars.

Empire Blind and Transom Adjuster

For the benefit of our many readers we take pleasure in this issue in illustrating one of the cleverest devices that so far has been placed before the American people. This new device is the Empire Blind and Transom Adjuster. Since the first introduction of blinds and shutters upon buildings and especially since the extension of valuable and costly edifices there has been a growing demand for an appliance that should be unfailing in its operations for opening and closing a blind, shutter or transom quickly and conveniently from the inside. Property owners and particularly architects and builders have been unremitting in their efforts to discover a means whereby under all circumstances these advantages could be obtained. With this end in view there have been several devices placed on the market, some possessing degrees of merit, but not until the invention of the Empire Blind Adjuster has anything worthy of the name perfection been obtained. The advantages of this new and useful device as a blind adjuster and also transom adjuster are numerous, as is evidenced by the constant demand for them. It is easily attached to blind or shutter and as the attachment is operated from the inside of the building exclusively it is in a great measure burglar proof. The blind can be opened and closed or placed at any desired angle by simply drawing on the chains as shown in illustration called the "new way," when it is instantly and automatically locked, and all this can be accomplished without raising window or screen, or otherwise inconveniencing the occupants of the building. It is adapted to all classes and forms of windows, working to particular advantage on bay, mullion, corner and angle, yet requires no lubricating, and when once installed no further attention is required to keep it in order. The device prevents the blinds from blowing off the hinges, at the same time being easily detached for painting or other purposes. It does not interfere with curtains, shades or draperies. The adjuster is made from the best material obtainable and experts who have seen it in operation pronounce it the only blind

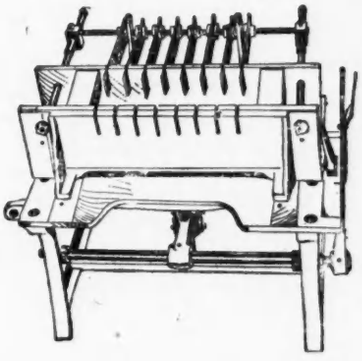




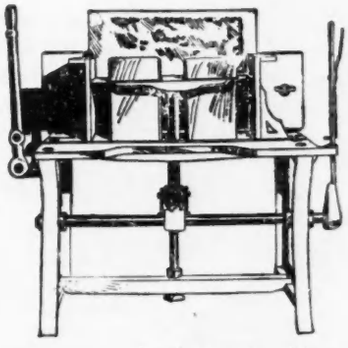
and transom adjuster ever placed before the public. We desire to state that the concern who are placing this interesting and useful device upon the market are Greene, Tweed & Co., of 109 Duane street, New York City, and they are sending out a very handsome catalogue of this blind and transom adjuster which contains full information, etc., and will mail it upon application if our readers will kindly mention the AMERICAN CARPENTER AND BUILDER when writing.

Reed Machines are in the Lead

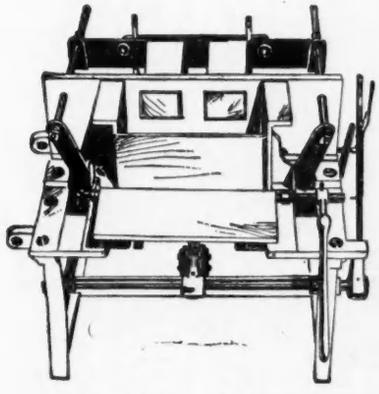
The Reed Cement, Brick and Block machines are adjustable. Face side, face down, brick and mixing concrete machines. These machines produce blocks and brick from a wetter mixture of material than any tamped machines. Three hundred and fifty to 600 blocks and 5,000 to 7,000 brick are produced in ten hours. Material is used wet enough so that the web of the manufactured block can be moved back and forth without injury to the block. All cement men will recommend the block made from as wet a mixture of material as can be handled.



The Reed machines fill the requirements. Blocks and brick are turned out of the mold box under pressure.



The box, which is made of wrought steel, is remarkable for its shallowness, its rigidity and simple construction. One end of the box, instead of being rivited, is fastened with a small set screw, and by taking out this screw the fans may be removed. The fans operate smoothly, lapping over each other and fitting the box snugly, leaving no open spaces for air to come through when closed.



It will pay our readers to investigate these machines before placing an order elsewhere. The Wichita Coal and Material Co. of Wichita, Kans., who handle the Reed machine, will be pleased to send full descriptive catalogue to any one who contemplates adding a brick or block machine to their plant or who intends to go into the brick or block making industry.

Endorsed by the Underwriters

The "Petz Corner Post and Transom Bar" has received the unqualified endorsement of many plate glass insurance companies, the latest heard from being the Casualty Insurance Company of America. The growth in popularity of this device is not remarkable, when you consider that it is conceded to be in every respect superior to old style pillars and posts, and to all-glass fronts.

The "Petz Corner Post and Transom Bar" is extra strong, holding the largest lights of glass safely and securely in position and has this supreme advantage, that in case of accident or breakage, the glass can be replaced without delay and at minimum expense for labor. There is no need to take out the back of the window as in the case of the old style frames, and in many instances the glass has been replaced without disturbing the window trim.

In addition to these facts the "Petz Corner Post and Bar" is so neat and takes up so little space, that it adds immeasurably to the attractiveness and pulling power of display windows.

The Detroit Show Case Co., Detroit, Mich., who make the "Petz Bar," are now issuing a neat little booklet in which are shown sectional views of the device and many illustrations of stores equipped with the Petz Bar. Those interested may receive a copy by writing to them and mentioning this paper.

One of the Heaviest

The new catalogue just issued by the Hayden Automatic Block Machine Co. of Columbus, O., is a comprehensive compilation of interesting matter for the concrete block maker. It is practically a text book, by the aid of which a beginner in the business should be able to successfully overcome the obstacles presented by inexperience. The Hayden machine is one that is in the "different" class. In the first place, it is perhaps the heaviest machine made, weighing 3,000 pounds. The Hayden people have established the claims of its being the strongest machine and one that is one-third greater in weight with its regular equipment than any other machine out. The Hayden Foundries have been known for 75 years as reliable institutions and their guarantee stands behind the machine.

Blocks that Stood Fire Test

Anyone doubting the fireproof qualities of cement blocks would change his views at once after viewing the Iowa Dairy Separator Co.'s paint shop at Waterloo, Iowa, after a recent fire there. The entire interior of the plant was burned out a short time since.

This fire was one of the hottest imaginable on account of the inflammable material contained therein. The building is the smallest of five or six concrete buildings used by the Iowa Dairy Separator Company, whose plant is situated nearly half a mile from the fire station. The fire occurred

during the night and the entire interior was a mass of flames before the fire was discovered, hence the walls had become very hot on the inside before any water was thrown on them, which was freely done. The fire wall through the center protected the far end. At 7 o'clock on the morning after the fire, work was commenced to clear the "ruins" and

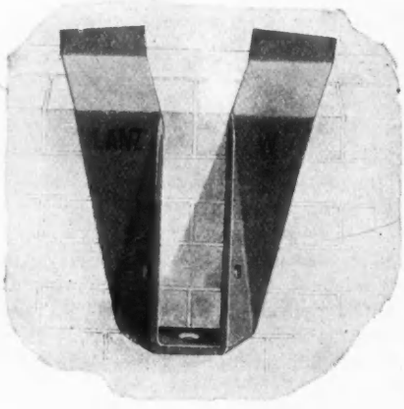
before night a new floor had been placed and the painters were at work before the roof or windows were replaced.

Had the outside walls been of wood, they would have been entirely consumed, on account of the fierceness of the fire and the good start it had before discovery. If they had been built from brick or stone throwing water on the hot walls would have rendered them unfit for use without rebuilding, whereas, having been built from cement blocks, the shop was rebuilt the second day.

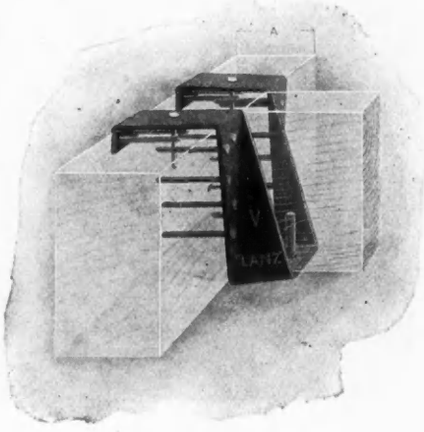
The blocks for this building were made on the Waterloo Concrete Brick and Block Machine Company's machine, whose advertisement is in this issue.

Lanz Steel Joist Hangers

The "Lanz" Steel Stirrups and Joist Hangers are simple in design, made of rolled bar steel of any desired thickness and strength, in eight standard designs and for sixty-six common sizes of joists. Each standard design suitable to the very condition found in floor or timber framing of most any construction in buildings, mills, brick, steel or concrete construction. Note the excellent points of these hangers. The steel is so formed in same and distributed that it has an even cross-sectional area all throughout; that is, the full strength of the initial bar is in the corners or bonds of the finished hanger; besides the body of the hanger lies in the direction of the fiber of the metal and therefore in the most favorable position to resist strain, while the side flanges, fitting snugly to the header, provide ample surfaces for spiking up the hanger and further increase the safety or support of the joist. The steel in the "Lanz" Hangers is distributed to the best advantage, giving the maximum strength of the corners and permitting the extra support of nails, spikes, etc.



Some of the more prominent products of the firm are the Lanz steel post caps and base plates. In these post caps the post is made continuously with through bolts at the ends of the posts. Self releasing girders are obtained with this post cap, as holes are provided in the bearings of same to register with pins 4 inches long, driven 3½ inches into the underside of the girders; that is, these headless pins, projecting through the bearings of the post cap, securely anchor the girders and facilitate the falling out of the burned through girders in case of destructive fire without disturbing the walls. The National Board of Fire Underwriters allow a reduction or rebate on the premiums if the self releasing system of girders is adopted. M. Lanz & Sons of Pittsburg, Pa., will be pleased to give our readers any special information desired.



New Sawing Machine

The accompanying illustration is of a new sawing machine which is being placed on the market by R. E. Kidder.

This machine is designed for ripping, cross-cutting, and in fact almost anything in the woodworking line, and is one of the most reasonable machines of its kind ever placed upon the market.

The parts are all nicely fitted and it is in every respect a high grade machine.

It has a counter-shaft attached, making a machine complete in itself. The counter-shaft has a T and L pulley 6x3½-inch face; driving pulley, 15x4-inch face, and should make 600 revolutions per minute.

These machines are made in three sizes. A catalog will be sent upon request by writing R. E. Kidder, 6 Hermon street, Worcester, Mass.

Extortion in Plumbers' Articles

Among the many articles that are being sold by mail these days are plumbers' supplies. And why not? People away from the large cities do not need to be told that they are held up on prices for articles and materials in the plumbing line. Whoever has had experience knows it. But there is really no excuse for submitting to extortion when buying plumbers' wares any more than when buying anything else.

Johnson's Crack Filler

"A Non-Shrinking Adhesive Compound for Filling Cracks Caused by Shrinkage."

The color of Johnson's Crack Filler changes after drying so that it will not show when used for maple and oak. For dark woods the necessary coloring matter may be added. A pound ordinarily covers thirty square feet. A putty knife is all that is necessary to apply it.

The next time you require a crack filler use Johnson's and you'll get the best results.

Photographic illustration showing ease of applying Johnson's Crack Filler.

This preparation is now conceded by expert painters and wood-finishers to be the finest in the world. It is a superior substitute for putty, as it will not shrink, is antiseptic and moth preventive.

It is made especially for filling in cracks between boards, nail and carpet-tack holes in old floors. It may also be used for rough and slivered surfaces.

Johnson's Crack Filler

is sold wherever paint is sold:
1 and 2 pound cans, per lb.... **35c**
5 pound cans, per lb..... **30c**
Ask your dealer and insist on getting the genuine **Johnson's Crack Filler.** Don't take any substitute.

Free Offer If you will give us on coupon herewith the name and address of your paint dealer we will send you FREE postpaid a copy of our new book "The Proper Treatment for Floors, Woodwork and Furniture"—regular 25 cent edition. This is the finest book of its kind ever published. It is written by an expert, illustrated from life and printed in six colors. Don't delay, send to day. Don't forget dealer's name.

S. C. JOHNSON & SON, Racine, Wis.
"The Wood-Finishing Authorities"

ACB7

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

Gentlemen:
My paint dealer's name is .....
his address is .....
.....
for which please send me FREE your new illustrated book "The Proper Treatment for Floors, Wood-Work and Furniture" your regular 25c edition.
Name..... Address.....

The trouble is that so many do not know what the method of escape is.

A concern in Chicago has taken advantage of conditions and is doing a remarkable business in selling plumber's supplies, not to plumbers or hardware dealers, but is retailing directly to canvassers or users of these materials and is making them wholesale prices. We refer to the firm of B. Karol, whose announcement we are carrying. In all cases the saving on goods bought from Mr. Karol is a considerable item. In many cases it amounts to 40 per cent of the cost of the goods.

And there is no reason why builders should not buy plumber's goods in this way. The Karol goods are standard. The catalogue pictures and descriptions tell you exactly what they are. They can be definitely ordered by name or number. They are not goods from the "house wrecker." Nothing second hand is dealt in. There is no chance for misunderstanding when you have the Karol catalogue in hand to order from.

Payment of freight of course is a bugaboo to many; but it is in reality a small item. Two, three or four dollars will carry quite a shipment of plumber's goods to any one within, say, 500 miles of Chicago. And when this is put in the balance against the saving in the Karol prices over the local dealers' prices it will be seen what an advantage there is in dealing with the Chicago house.

Classified Advertisements.

Advertisements under this heading will be inserted at the following rates:

One month	$0.45 per line
Three months	1.25 per line
Six months	2.25 per line
One year	4.25 per line

Count 10 words to the line. **Situations wanted one-half above rates.** Replies may be addressed in our care and will be promptly forwarded.

For Sale.

FOR SALE.—A sash and door factory and planing mill for sale. Run by excellent water power. Located in a prosperous Wisconsin town of 4,500 inhabitants. Address, Planing Mill, care of American Carpenter and Builder, Chicago.

WANTED men with money to invest in the concrete block and machinery business; have a two-piece system; also a power press of 100 tons pressure. Send $1.00 for blue prints. Chas. A. Meyers, 2202 Locust St., Toledo, Ohio.

Legal Advice.

$1. BEST LEGAL ADVICE on any subject. Strictly Confidential. Arguments and briefs for lawyers. Our book free. $1. Associated Lawyers Co., Old South Building, Boston, Mass.

PATENT secured or no fee: opinion free. Write about any legal business, including United States Supreme Court. E. W. R. Ewing, Attorney, Washington, D. C.

Salesmen Wanted.

SALESMEN wanted for our protection for men and women. $1.000 Policy pays $7.50 a week with $100 emergency benefit. Costs $2 a year. Handome seal wallet given free with each policy. Write today for renewal contracts with liberal commissions. The Guarantee Registry Co., Cleveland, Ohio.

Catalogues.

IF YOU WANT to buy a machine, engine, boiler, power equipment, electrical, steam, pneumatic or any other machinery—anything in the machine line—Tell Us what you want and we will see that you get full descriptions, prices, catalogs, etc. from all the first-class manufacturers in that line. We charge nothing for the service. Address, Modern Machinery Daily News Security Building, Suite 196, Chicago.

A FINE 24-page illustrated booklet of Brule County and map of So. Dakota, free. Farms and ranches in famous Missouri Valley, corn belt of South Dakota. Profits guaranteed. J. A. Stransky, Box 603, Pukwana, S. D.

IF INTENDING TO BUILD send stamp for our catalogue; has 27 plans of inexpensive, modern houses, with photos. Complete working plans and specifications from $1 up. The C. E. Eastman Co., Architects, Des Moines, Iowa. DO IT NOW.

WATCH TACOMA GROW. Population in 1880, 1098; in 1900, 37,714; January 1, 1906, 85,000. Send ten cents in postage for illustrated booklet descriptive of the Electric City of the Pacific Coast to Secretary Chamber of Commerce and Board of Trade, Tacoma, Washington.

Moth Destroyer.

HANDY MOTH PAPER destroys moth at all stages. A packet is usually enough for a home, for one season. Postpaid. 10 cents. Madigan, Powder Works, Selection 450. Clarksville, Iowa.

CHICAGO MILLWORK SUPPLY CO.

FROM MANUFACTURER DIRECT

239-245 W. 22nd St.

FROM MANUFACTURER DIRECT

CHICAGO, U. S. A.

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.

THIS CATALOGUE FREE

Send 10c. in coin or postage to cover actual cost of mailing.

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.

It's Easy

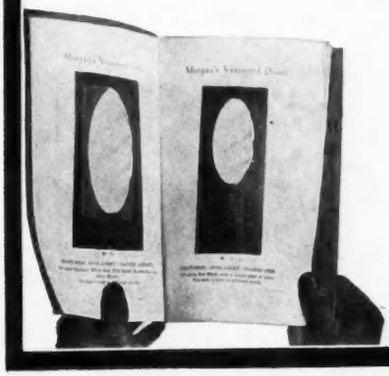
Simply fill in the coupon below, tear off and slip it into an envelope addressed to us. We will send you, *absolutely free,* a copy of our handsome book

"A Perfect Door"

It's a revelation in doors, and should be in the library of every Owner, Builder, Contractor and Architect. Do it *now—before you turn the page.*

Morgan Sash and Door Company, Dept. R,
Lumber District, Chicago.

Morgan Sash & Door Company, Dept. R,
Lumber District, Chicago.



Please send copy of this book to

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The name of my lumber dealer is

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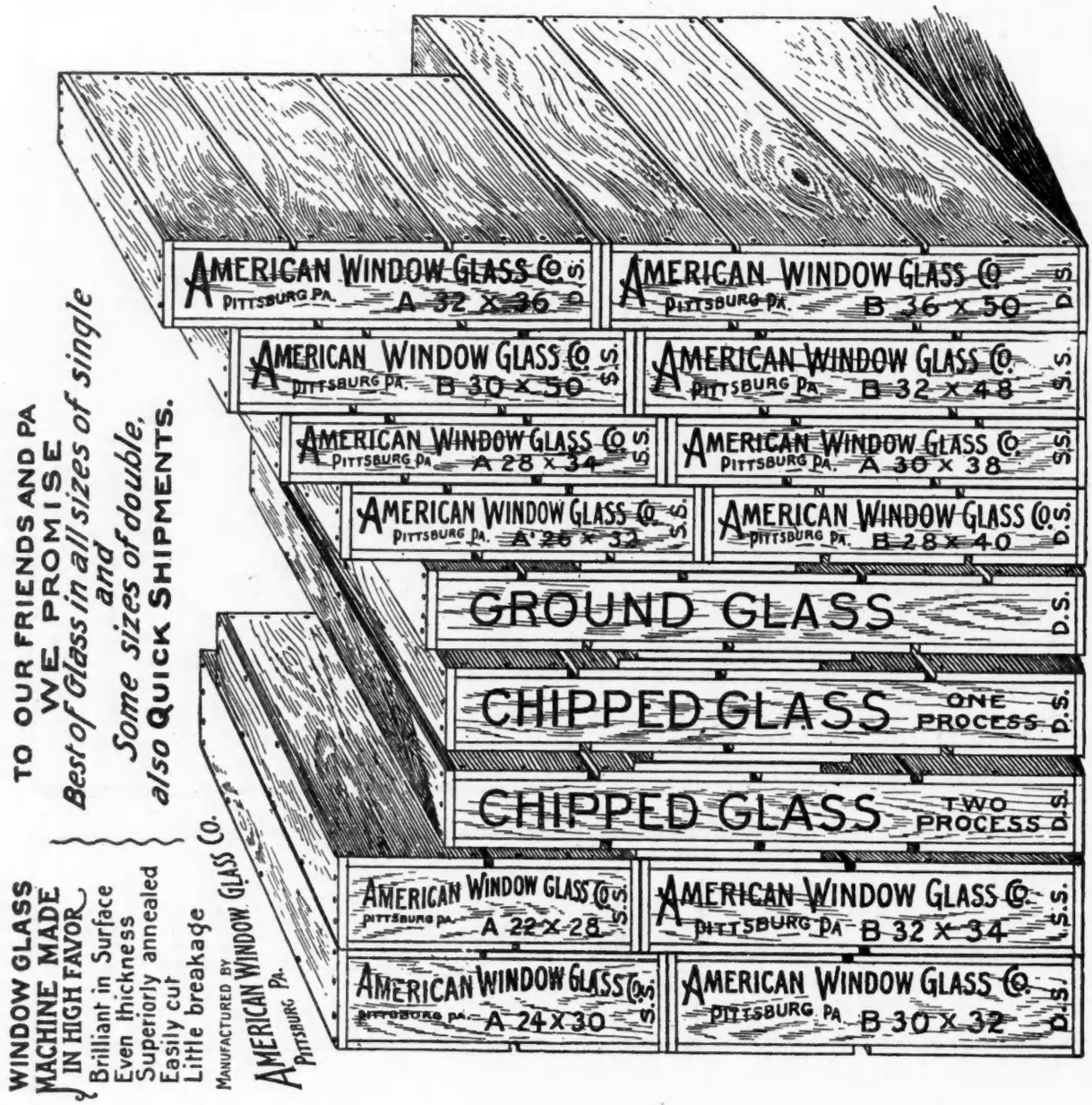
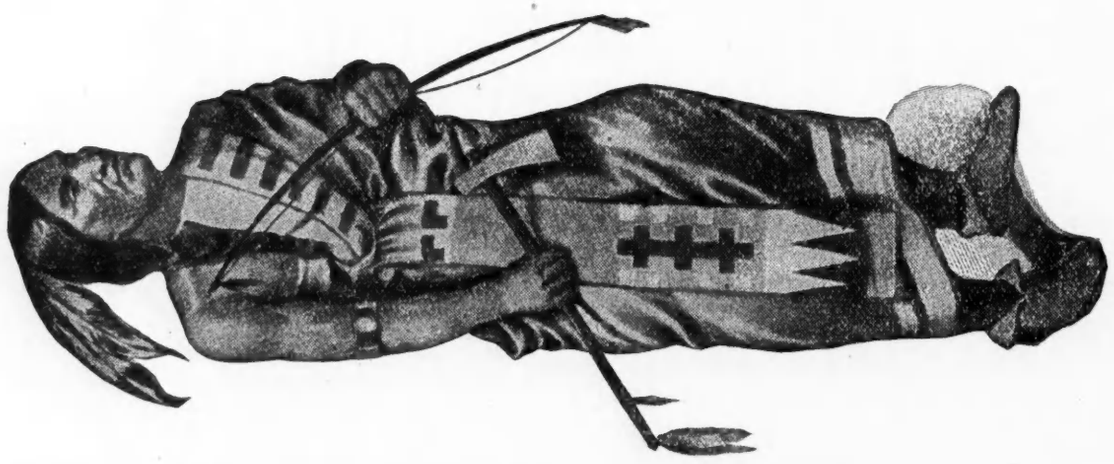

AMERICAN WINDOW GLASS Co. PITTSBURG PA. A 32 X 36 D.S.
AMERICAN WINDOW GLASS Co. PITTSBURG PA. B 36 X 50 D.S.
AMERICAN WINDOW GLASS Co. PITTSBURG PA. B 30 X 50 S.S.
AMERICAN WINDOW GLASS Co. PITTSBURG PA. B 32 X 48 S.S.
AMERICAN WINDOW GLASS Co. PITTSBURG PA. A 28 X 34 S.S.
AMERICAN WINDOW GLASS Co. PITTSBURG PA. A 30 X 38 S.S.
AMERICAN WINDOW GLASS Co. PITTSBURG PA. A 26 X 32 S.S.
AMERICAN WINDOW GLASS Co. PITTSBURG PA. B 28 X 40 D.S.
GROUND GLASS D.S.
CHIPPED GLASS ONE PROCESS D.S.
CHIPPED GLASS TWO PROCESS D.S.
AMERICAN WINDOW GLASS Co. PITTSBURG PA. A 22 X 28 S.S.
AMERICAN WINDOW GLASS Co. PITTSBURG PA. B 32 X 34 S.S.
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.



CONTENTS FOR JULY, 1906

INDEX TO ADVERTISEMENTS, JULY, 1906

NOTICE TO ADVERTISERS.

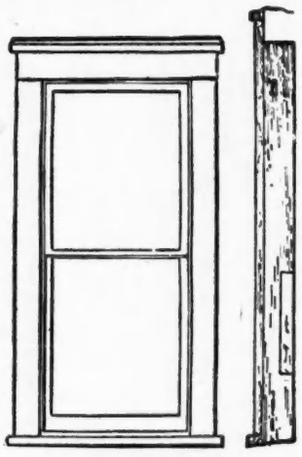
New copy, changes and corrections for advertisements must reach office of American Carpenter and Builder, 196 Fifth Ave., Chicago, not later than July 20 in order to insure insertion in the August number.

$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

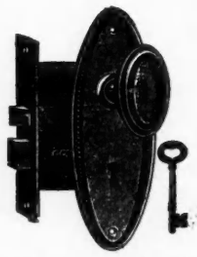
Door No. X.L., 5 Cross Panels
Soft Arkansas Yellow Pine
free from Check.

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.