AMERICAN CARPENTER AND BUILDER

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AMERICAN CARPENTER AND BUILDER

The Largest, Best and Most Practical Trade Journal in the World for the Carpenter and Builder

American Carpenter and Builder

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The AMERICAN CARPENTER AND BUILDER is issued promptly on the first of each month. It aims to furnish the latest, and the most practical and authoritative information on all matters relating to the carpentry and building trades. Short, practical *letters* and *articles* on subjects pertaining to the carpentry and building trades are *requested*, and prompt remittance made for all acceptable matter.

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IT IS better to walk around a circular saw several times than to reach over it once.

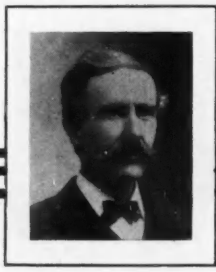
COMFORTABLE surroundings are a great factor with a carpenter in doing good work, until he gets to thinking more of his comfort than he does of his work, and then it is the carpenter and not the surroundings that need attention.

THE building outlook throughout the country is very promising and 1905 tends to establish a record in building operations. The reports from all over the country show great public improvements under way and many private concerns are enlarging their buildings showing confidence in the future prosperity of the country.

CEMENT construction and the manufacture of artificial stone continues to attract attention in all parts of the country. The demand for machines for the manufacture of cement blocks is growing, and new machines are being placed on the market almost daily. As an instance of the increasing demand for information on the subject may be cited the offer of $350 in prizes by the *Engineering News* for the best articles on the manufacture of concrete blocks. This will undoubtedly stimulate interest and should result in the accumulation of some valuable information.

UNLESS all signs fail, the present year will be the banner one in industrial prosperity in New York. There never has been anything to equal the activity that is now being manifested in all branches of constructive work. Plans for buildings already projected in Manhattan and The Bronx call for an expenditure nearly two and a half times as great as was contemplated during the corresponding months of last year. In Brooklyn the outlay during the first two months of the year more than doubles that of the same time in 1904, and this against figures that constituted a record for development in that borough.

MUCH attention is being paid to civic art improvement by the larger cities, and it is pleasing to note that many cities have already progressed from the passive to the active state and are expending great sums of money in grouping their public buildings and remodeling them. St. Paul is arranging great boulevards and plazas around its new capital and also contemplates the orderly arrangement of future municipal buildings; Chicago is making many changes and spending great sums of money in replanning the city, while Cleveland can be said to have been the pioneer in this work and to-day has its public buildings uniform, simple and harmonious.



Steel Square

ALFRED W. WOODS

The Steel Square and Its Possibilities

II. HOW THE DEGREE LINES FOR ANY MITER ARE OBTAINED, WITH EXAMPLES FOR SECURING THE MORE IMPORTANT ONES CAREFULLY DESCRIBED

IN OUR last article we said we would show the degree lines for any miter in connection with the steel square.

Referring to Figure 4, we show the steel square in connection with the semi-circle, with its center resting at 12 on the tongue, and the lines radiating from

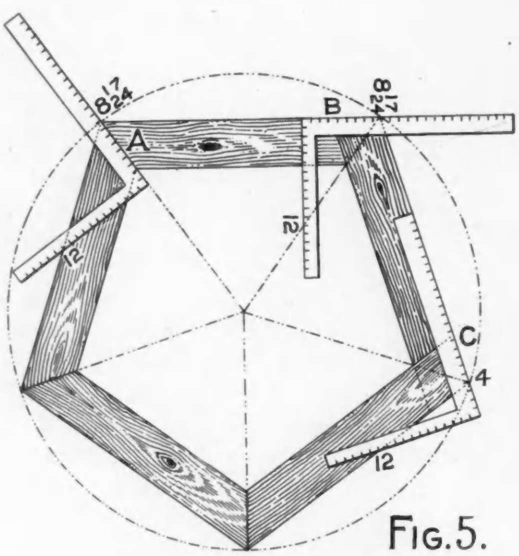


FIG. 5.

this point represent the degrees up to 45 and is as high as need go on the blade for any miter, because when the blade is set for a given degree, the tongue will give the complement degree, the sum of which is always 90 degrees. In other words, when the angle to the blade is 30 degrees, the reverse angle to the tongue is 60 degrees. The decimal numbers to the right of the blade represent the length of the tangents.

In other words, it is the length from the heel of the square up to the intersection of the degree line.

The decimal fractions are carried to the fourth decimal point and their equivalent values in common fractions may be found, to either the one-twenty-fourth or one-thirty-second part of an inch, by referring to the tables given in connection with Fig. 4.

This illustration covers the whole field of miters. It is the foundation and we will refer to it many times later on, especially when we get into roof and hopper work.

To find the miter for any regular polygon, divide 180 degrees by the number of sides in the desired polygon, and the quotient will be the degree to use on the steel square, and where this intersects the blade will give the figures to use on that member.

Example—Find the miter for the pentagon. $180 \div 5 = 36$. Now referring to Figure 4, we find that 36 degrees intersects the blade at 8.7185, and in the table of equivalents we find that the decimal fraction .7185 is equal to 17/24 of one inch. Then take 12 on the tongue and 8 17/24 on the blade, the latter will give the angle of the miter, as at "A," and by applying the same figures on the square to the angle as at

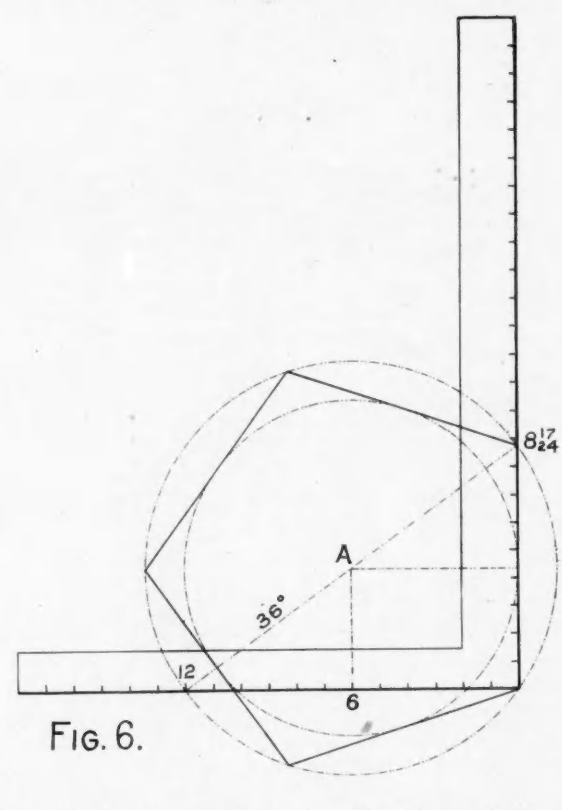


FIG. 6.

"B" will give the angle to lap, the blade giving the cut; or take 18 degrees, which is at 4 on the blade, and apply the square as shown, will give the same cut as at "C," and all shown in Figure 5. The 8 17/24 inches also gives the length of the sides of the pentagon when the inscribed diameter is one foot, as shown in Figure 6. By squaring up from 6 on the Figure 8. Here are two squares, placed with the tongues together, and lines drawn from 12 intersect the blades at 8 17/24 and continue on indefinitely. A line drawn anywhere between these lines, as from

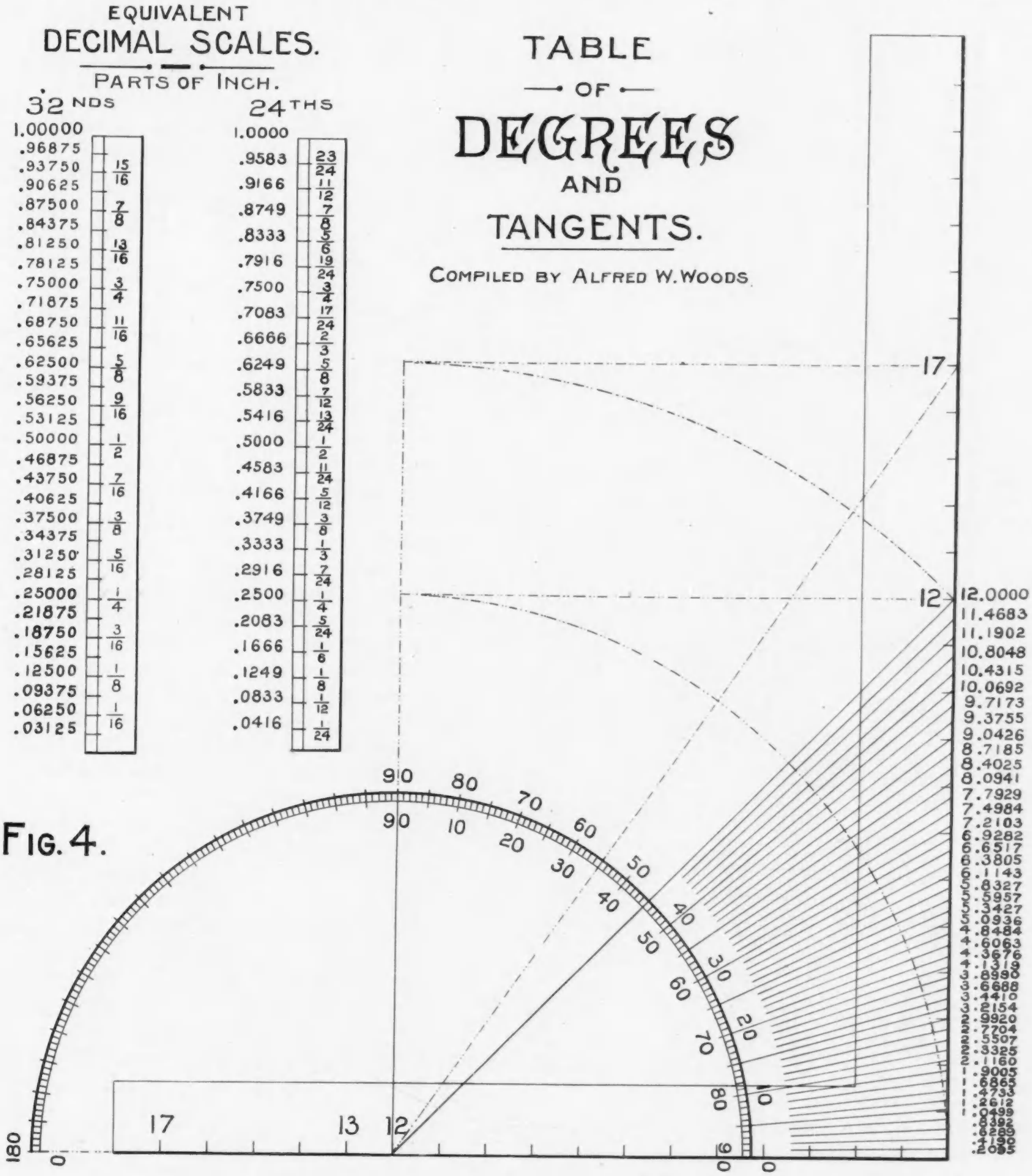


FIG. 4.

BLADE GIVES CUT UP TO 45° THEN IT CHANGES TO THE TONGUE UP TO 90°.

tongue, will locate the center at "A" for either inscribed or circumscribed diameter. If we let 8 17/24 act as a pivot, and swing the blade till it rests on the 36 degree line, as shown in Figure 7, it will be seen that the blade gives the miter.

Pentagons of any size may be drawn as shown in "A" to "B" and parallel with the blades, will equal the length of the sides of the pentagon, and the space bounded by A-B-C equals the area of one-fifth the pentagon. To find the contents, multiply A-E by C-E and this by 5 will equal the contents of the whole pentagon.

Now suppose we wish to make a pentagon with an inscribed diameter of twenty feet. First lay off the radius (ten feet) on the line C-E, and square out to the diagonal lines as at A-B, and this line will be the length of the desired sides. If a frame is wanted

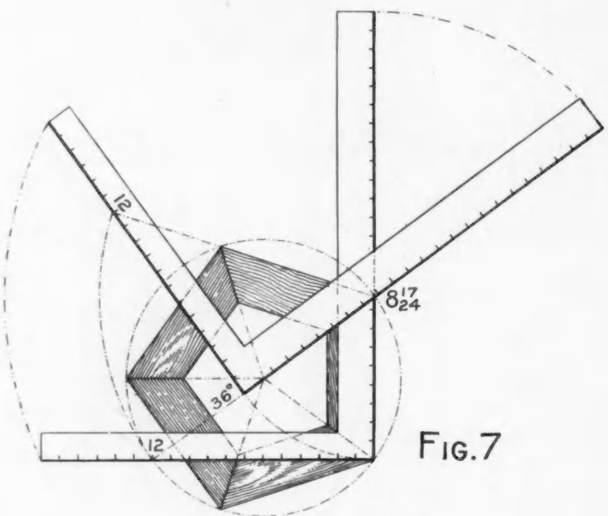


FIG. 7

with a circumscribed diameter of twenty feet, then the radius should be taken on one of the diagonal lines instead of on a line parallel with the tongues. However, to lay off a diagram of this kind would require

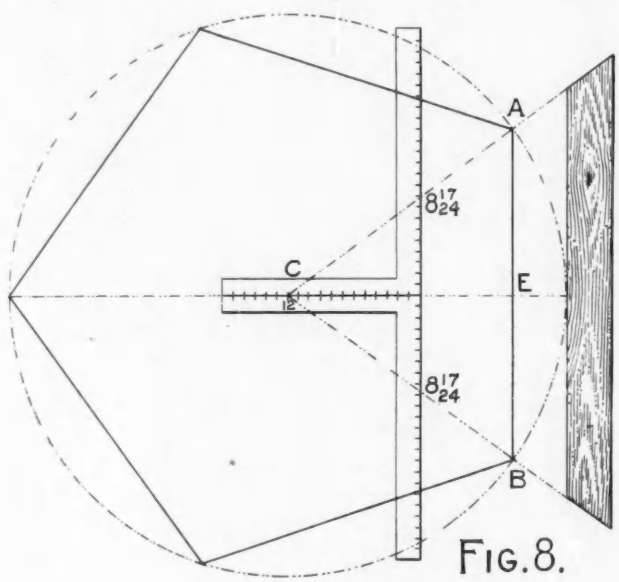


FIG. 8.

very accurate measurements, and while it can be done by scale as accurate as by any other method, it is better to multiply the desired diameter by the decimal number given and reduce to feet and inches as follows: $20 \times 8.7185 = 174.3700$ inches, or 14 feet 6⅜ inches will be the length of the sides. In multiplying care should be taken to point off as many places as there are in the number multiplied. In this case there are four, and after pointing off that number, the figures to the left (174) represent inches or 14′ 6″ and those to the right (.3700) represent that part of an inch. The ciphers have no value other than placing the decimal point, and by referring to the table of twelfths at Figure 4, we find it to be equal to ⅜ of an inch.

New York Building Regulations

Some of the interesting and instructive features of New York's new building regulations are as follows: Outside fire escapes shall be placed on every dwelling house occupied by or built to be occupied by three or more families above the first story; on all public buildings of three or more stories in height, and on office buildings five or more stories in height; the balconies to these fire escapes must not be less than three feet wide, stairs in all cases must be not less than eighteen inches wide, the openings for stairways in all balconies shall not be less than twenty inches wide and thirty-six inches long and have no covers, and the height of railing around balconies shall not be less than two feet and nine inches; no habitable room shall have a smaller air space than six hundred feet; every habitable room shall have a window opening directly upon the street, yard or court, such windows must be at least twelve square feet in area and each room except those opening on main halls must have a transom window so arranged as to produce a cross current of air; tenement houses not over four stories in height must have exterior light shafts of not less than fifteen square feet area in each shaft, and not more than two rooms in each apartment may open thereon; in every tenement-house connected with any public sewer, running water must be provided over a sink in each set of apartments; each lodging-house must be provided with an isolation room, located on the uppermost floor with an air space of not less than one thousand cubic feet, having a window opening on the street and a ridge ventilating skylight on the roof, the walls and floor must be rendered impermeable to liquids or gases, and it must be provided with a water-closet apartment having its partitions extended to ceiling and a window opening to the outer air; the height of ceilings when finished for living rooms in cellars or basements must be eight feet—on all other floors nine feet four inches; access to all rooms must be had without having to pass through a bedroom.

A New Material for Building Purposes

Uralite, a new building material, composed of asbestos fiber, silicate, bicarbonate of soda and chalk, which render it fireproof, has recently been invented by a Russian officer. Besides being fireproof, it has also been thoroughly tested and found to be practically water proof, thus making it of great value to the building world.

Waiting for the Mill Work. Find the Man Who Wants to Move In the First of June.

Building Construction—

J. A. F. CARDIFF

II. Laying the Foundations

BRICK AND STONE ARE MOST COMMONLY USED, BUT DURING THE PAST FEW YEARS CEMENT HAS BEEN IN GROWING DEMAND AND GIVES SATISFACTORY RESULTS

THE materials commonly used in the walls of buildings are brick and stone, and within the last few years cement blocks have been used to a great extent and with very satisfactory results. The locality in which the building is being erected and the purposes for which it is intended determines largely the material which is to be used. Thus in a district where stone is easily obtained, this material is naturally used; while in places where clay is abundant bricks are largely employed. Bricks are to be preferred to the stone in that they lend themselves more readily to regular arrangement and to a system of bonding.

Bonding is the arrangement of the bricks to overlap each other so that no continuous vertical joints occur either on the face or the inside of the wall. This is necessary as the mortar joints are the weakest part of a wall, and if the vertical joints were made continuous, the wall would tend to give way along these lines.

The thickness of mortar joints varies according to the quality of the brick used. Pressed brick, with edges straight and true, only requires a joint one-eighth of an inch thick; ordinary brick joints at from one-quarter to three-eighths of an inch; while common brick frequently have as much as five-eighths of an inch at the joint.

Stretchers are the bricks laid with their lengths in the direction of the length of the wall. Headers are the brick laid with their lengths across the wall. See Figure 1.

All bricks, to be laid in dry weather, should be wetted before being used, in order to wash off any dust and to prevent too rapid absorption of the moisture of the mortar. Whenever new brickwork is joined to old, the old work should be thoroughly wetted to insure proper adhesion. All foundation brickwork should be started well below the lowest frost line.

In the erection of brickwork, all the walls should rise at about the same rate; no part being carried more than three feet above the rest, or unequal settlement is likely to occur with the result that the wall soon shows signs of fracture. If it is not possible to carry all the walls up simultaneously, the portion first built should be "stepped back" rather than "toothed." See Figure 1.

Figure 1 shows the bond commonly used in brickwork, with headers every sixth course.

Figure 2 shows what is known as English bond. The plans show the method of laying the bricks in the two courses.

Figure 3 shows the arrangement of bricks to form the Flemish bond. In this and also the English bond, particular care should be taken to keep each vertical joint in any one course directly over the corresponding vertical joint in the course next, but one below. A neglect of this precaution detracts considerably from the appearance of the finished work.

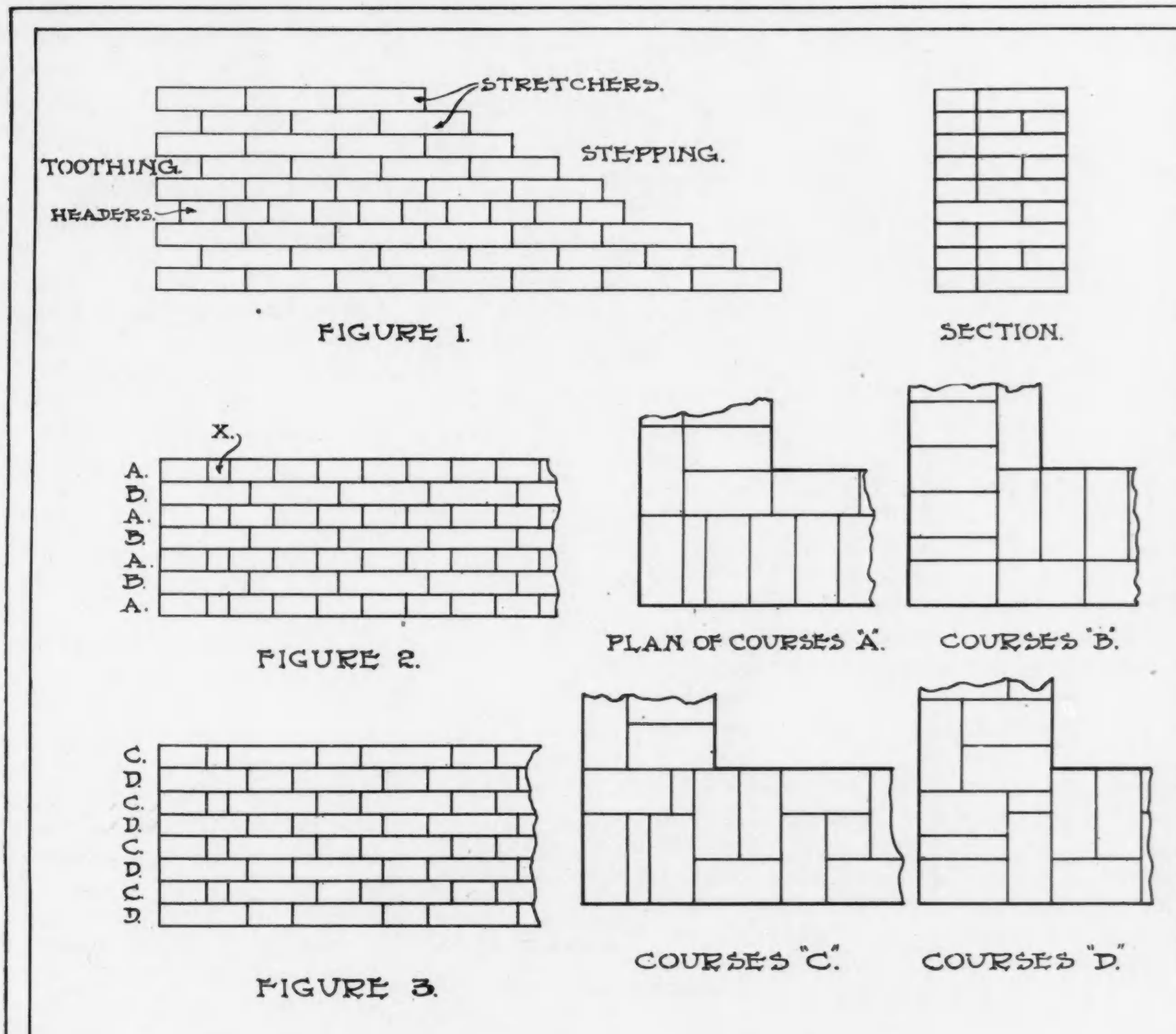
Figure 4 shows the construction of a hollow wall, which, with the same amount of material, is more stable than a solid wall and possesses many other advantages. It consists of two separate walls, with an airspace of four inches between them, tied together with bonding irons or "clips" every few feet. A wall of this kind prevents dampness from penetrating to the inside.

Figure 5 shows a damp-proof course, marked D P., which should never be omitted in important work. It consists of a layer of impervious material laid on the walls just above the ground and below the floor beams; its object being to prevent dampness from rising from the ground and getting into the building. Materials suitable for damp-proofing courses are: Asphalt, pitch, slate, damp-resisting paints and cements, or any material that does not allow moisture to pass through it.

In buildings having a cellar below the ground, this damp-proofing material is applied to the outside of the cellar walls from a little above the ground level, well down to the under side of the footing course. See Figure 6.

LIME, CEMENT AND MORTAR

This is a subject to which considerable space might well be devoted, but, as it is not the purpose of this series to go into the subject so deeply, only such information will be given as may be required in the or-



BUILDING CONSTRUCTION. J.A.F. CARDIFF, ARCHT.

dinary erection of cottages and the smaller buildings.

All lime should be freshly burned and thoroughly slacked.

All cement should be finely ground and free from lumps.

All sand should be clean, sharp, free from loam and salt, properly screened and washed.

Lime mortar is usually composed of three parts of sand to one of lime, but two parts of sand to one of lime makes a much better material.

Lime—Rosendale cement mortar is mixed one part of Rosendale cement, one part of lime and five parts of sand and should be well mixed before the water is added.

Lime—Portland cement mortar is mixed one part of Portland cement, one part of lime and six parts of sand. All should be well mixed before the water is added.

Rosendale cement mortar is mixed one part of Rosendale cement to two parts of sand.

Portland cement mortar is mixed one part of Portland cement to three of sand, for ordinary use, and for important work one part of Portland cement to two of sand, thoroughly mixed dry, adding only enough water to render mortar of good working consistency.

A little lime should be added to cement mortar to be used in freezing weather. The mortar should not be made up in greater quantities than required for the work on hand, and no excess that may have been left over night should be used in any way.

Uses of Inferior Woods

When there was an abundant supply of the best quality of timber it was the habit of lumbermen to neglect all but the best species. For instance, in Indiana and Ohio the white oak trees were cut and the red oaks were left. In the south only a few years ago the gum, which is now of considerable commercial importance, was left to rot in the woods. On the Pacific coast the western hemlock was not considered worth transporting from the forest to the mill. In consequence the supply of high class timbers has been seriously depleted, and the character of the forest has been changed by the reproduction of the inferior species which were left in possession; while the lumberman has had to extend his operations over a larger area in order to secure the necessary amount of timber. If these inferior species can be cut and marketed at a profit it will be possible in the future to lumber with far less detriment to the forest, and at the same time the available supply of timber will be greatly increased.

The introduction of western hemlock to the market as a building material has met with many obstacles. The hemlock of the east is far inferior to the western species as a building wood, and the prejudice existing against the eastern species is unjustly extended to that of the west. The latter is a hard, straight and even-grained wood, nearly white in color. It does not split readily, and is light and tough. These characteristics peculiarly fit it for manufacture into boxes. It is also a superior wood for all inside finishing, as it takes a high polish and has excellent wearing qualities. It can be rapidly kiln dried at high temperature without injury. Mechanical tests have shown it to possess about 70 per cent of the strength of red fir and to be suited for all except the heaviest structural demands. Large quantities of this timber are now sold under other names than its own. There is no just cause for the prejudice which necessitates this deception, and western hemlock should be handled under its right name. Many of the so-called inferior timbers can be more thoroughly and successfully treated with preservatives than can the more solid timbers. Happily, this is in a marked degree the case with the abundant loblolly pine, and this tree is certain to come into general and appreciated use.

Another phase of this work is in connection with the packing box industry. Very few people appreciate the amount of lumber that goes into the manufacture of packing boxes. Formerly the size of boxes for different purposes was based on the strength of white pine, which used to be the standard material employed. With the scarcity of white pine and its increased price, gum, cottonwood, loblolly pine and other woods have come into use for boxes. In many cases these woods are much heavier than white pine, so that there is an added expense for freight because of the extra weight of the boxes. It becomes, then, an important matter to ascertain to what extent the thickness of boxboards commonly used can be reduced without lessening the strength of the box below the necessary requirement. The Bureau of Forestry, in co-operation with the North Carolina Pine Association, is about to take up this problem, and by actual experiment with boxes of different sizes and of various kinds of lumber to determine the extent to which the prevailing thicknesses of boards can be diminished.

His Unusual Curiosity

A man who had had considerable business with plumbers, carpenters, brickmasons and artisans generally in the construction of a new home finally engaged a painter. His wife had been urging him to hurry the work on the house, and had planned a reception for its opening day.

"Yes, sir," said the painter. "I can promise to have your house finished in two weeks."

"Yes, but," said the owner anxiously, "that isn't the point."

"Then, what is?"

"I want to know how long it is going to take you."

Framing a House

I. P. HICKS

Constructing the Porch

AN IMPROVED METHOD OF FRAMING WHICH HAS DISTINCT ADVANTAGES OVER THE ORDINARY WAY—FRAMING A WINDOW AND HOW TO ARRIVE AT THE PROPER SIZE OF OPENING

FIGURE 1 shows the general construction and details in full of the framing and the various parts of an ordinary front porch. A special feature in the framing of this porch is the joists, which in most porches must also answer for the outside sills. In framing porches many carpenters and contractors frame the joists so that there is nothing but the narrow edge of a 2 by 6 or 2 by 8 that rests on the porch piers, and this small bearing, of course, must come all on the outside edge of the piers.

By the method which we refer to in our detail we take a 2 by 6 and a 2 by 8 and spike them together, as shown in the detail at A. This gives a full bearing on the pier, or very nearly so, and it will be found to make a much better job than the old custom of just having the narrow edge of the floor joists resting on the piers.

The facing shown at B should be from one-half to three-quarters of an inch wider than the floor joist, so that it will project a little below the pier. This gives a good place to secure the lattice work from the back side.

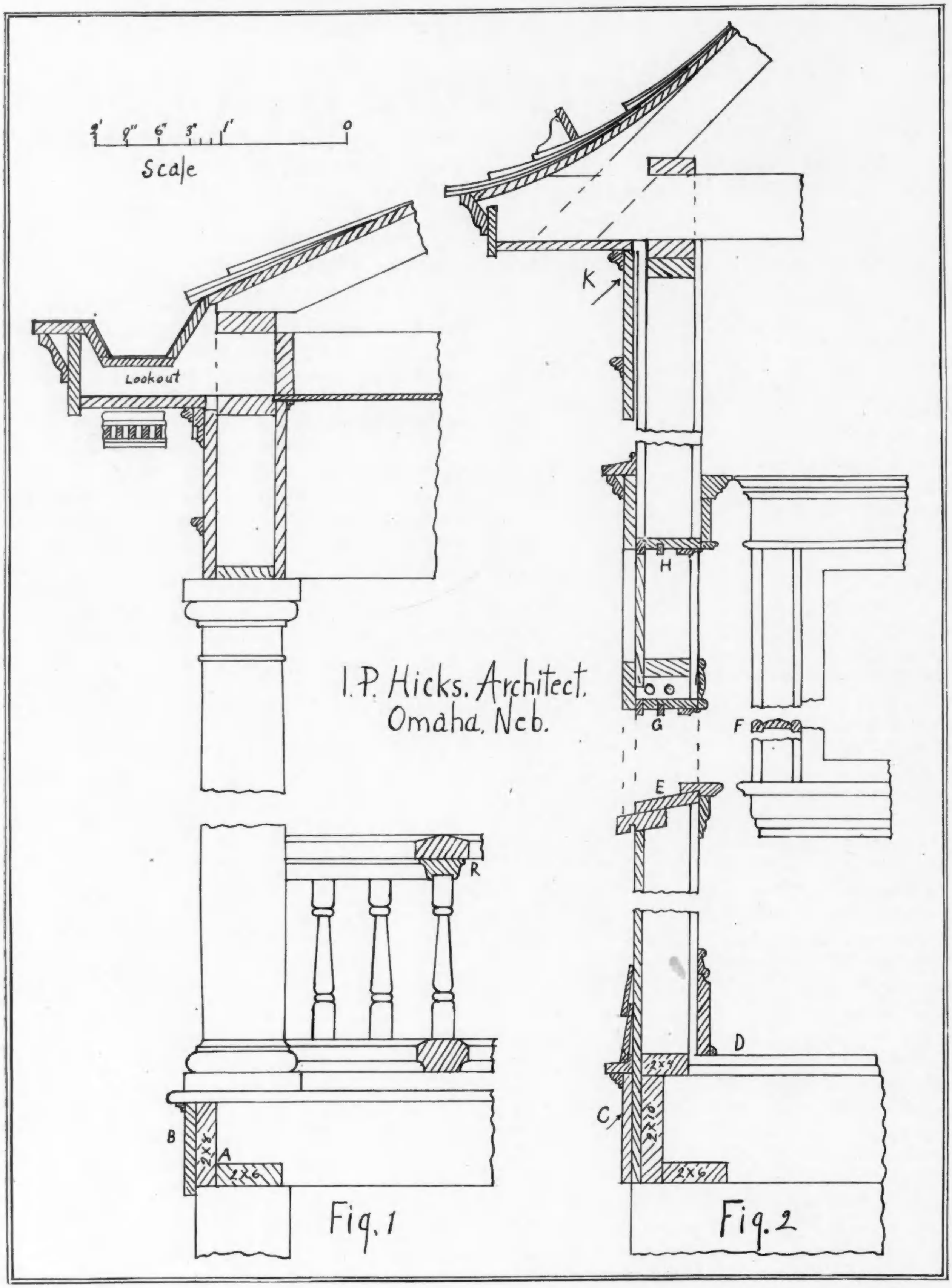
The top rail in the porch rail is made of two pieces, as shown at R. It is difficult to get a single piece rail large enough for this kind of a porch. Many of the built-up rails consist of from six to eight pieces, which make them more or less expensive. The rail as shown in the sketch is designed to work in between the small single rail and the large six and eight piece rails, and will be found a very easy rail to make, an inexpensive one, and at the same time a good, serviceable rail and one that will look well. The bottom rail of this porch can be made in one or two pieces as desired. If made from a 4 by 6 it could easily be made in one piece. The porch has a box frieze and cornice with a sunken gutter in cornice. The cornice has a wide frieze with a band mold and a bed and dental mold. A planceer, fascia, crown mold and cap piece completes the outline of the cornice.

The gutter is formed with three pieces, a bottom and two side pieces. The side pieces are put in sloping. No gutter should be formed with perpendicular sides, making square angles in the bottom, for they are always causing trouble by freezing and bursting. Sloping sides will allow the ice to expand without any danger of injuring the gutter.

Lookouts are nailed to the ceiling joists and allowed to project in front as far as required for the cornice and a plate spiked on top of the lookouts supports the rafters. This porch is designed for a shingle roof, but the framing of the roof is such that any pitch can be used, even to a very flat pitch for tin roof, or any kind of a flat roof it is desired to have can be applied to this construction, for the pitch can be varied to suit without in any way interfering with any other part of the design.

Fig. 2 represents a section of house framing from sill to cornice, showing the ordinary window construction. The sills in this are framed similar to the porch, but in addition have a 2 by 4 plate put on top, which laps over on the joists, as shown. The advantage of this kind of sill and framing is that it saves the time required to cut ganes in solid sills. This kind of a sill, made of a 2 by 6, 2 by 10 and a 2 by 4, requires a little more lumber than a solid 6 by 6 sill, and if well put together we consider it fully as good as the solid sill cut full of ganes for the joists. In some large cities there are building laws prohibiting this form of construction. We presume this is principally on account of making the walls more susceptable to the spreading of fire than for lack of strength. We have good reason to believe that sills made in this way, that is, well made, are fully as strong as the solid sill ordinarily put together. If the walls were bricked up inside to level with top of floor joists, then all danger of the spreading of fire is avoided, there is something to hold the building solid to the foundation wall, and the result cannot fail to be satisfactory in every particular.

At C in Figure 2 is shown the outside base water table and mold. At D the double floor, base, base mold and quarter round, the ordinary base finish of the average job. At E is shown a section through the sill of an ordinary window in a frame building, the sill, subsill, stool and apron. At F is shown a section of the casing. At G is shown a section through



the side jambs and casings, showing outside casing, blind stop, jamb, stops, inside casing, studding and weight box. At H is shown a section through the head, showing outside casing, cap and mold, jamb and stops, inside casing, cap trim, etc. Above this at K is shown the general construction of the cornice, etc. In this the ceiling joists extend out over the building as far as required to make the cornice. A plate on top of the ceiling joists supports the rafters. The roof is concaved at the bottom by nailing on circular pieces to the bottom ends of the rafters, as shown. A standing gutter is placed on the third course of shingles on the roof. This makes a very nice finish and one much used at the present time. The porch finish and main cornice, as here shown, will work in harmony on the same house, and are well adapted to houses of the hip roof class.

CUTTING WINDOW OPENINGS

There are many carpenters who cannot readily figure out the proper size to cut window openings. That is, how wide the space should be between studding and how high between headers. Windows are nearly always listed and sizes given glass measure, as 24 by 32, 2 light, which means that the window has two lights with glass twenty-four inches wide and thirty-two inches high. The width of the opening between studding should be ten inches wider than the width of glass, which, in this case, would be thirty-four inches between studding. The height between headers should be eleven inches more than the length of the two lights, thus two lights of thirty-two inches each will be sixty-four inches and eleven inches added to this will make seventy-five inches, or six feet and three inches. In regular two-light windows six inches is allowed for wood or sash in height, two inches top rail, one inch meeting rail and three inches for bottom rail. To this add one inch for top jamb, one inch for sub-sill, two inches for sill and one inch for play, which, all told, makes the eleven inches. If these figures are carefully followed no trouble in setting frames will ever occur. In large frames, such as cottage front frames, with glass 40 by 44 or approximately this size, allow eleven inches more than the width of the glass if the windows are to be hung with weights, because these windows will require extra large weights and consequently will require a little more room, but the average window will have plenty of room for weights when ten inches is allowed for the sash, jambs and weights.

Suggestions in Papering a House

In papering a house a number of things must be considered if good results are desired, among which is the general color effect of all the rooms and the color and tints of the paper with respect to the location of the room in the house. For the north room, for example, where the light is cold and strong, avoid pale papers in self tones. Choose rather those having much softness of tone as well as color warmth, such as old rose, rich yellows and terra cotta. For a northeast room, where the morning sun is at its strongest during the forenoon, avoid papers that have light and brilliant backgrounds, yellow especially as they add to the glare. French grays and delicate greens will subdue the intense floods of sunshine. The same holds good for east rooms. West rooms, always cool and shady during the forenoon and early afternoon hours, will bear any of the lovely white ground papers having floral designs, as well as other cheery bright designs in color, or the combination of two shades of light colors, such as pinks, blues, greens, salmon pinks, in exquisite designs. South rooms, warm and radiant with mellow afternoon sunlight, are so delightful in their winter and summer exposure, carry best the rich middle tones of blue, green, Venetian red and golden browns. This, in a general way, will serve as a guide, by making allowances for the various modifications necessary when the outside building situations interfere, such as trees, porches or hooded roofs. One of the most inviting suites of nine rooms in a corner apartment is simply furnished in this way: White enameled furniture is disposed in the bedrooms and dining room; mattings are on all the bedroom floors, with rugs to match the different colors of the wall papers, which have varied small floral designs; the dining room has the same white fitments, with an old rose satin paper in panels; a hardwood floor with a green velvet rug is seen in the dining room. Kitchen and bathroom walls should be papered with the best quality of tile paper, which will stand wiping off with a damp cloth from time to time. No amount of hot vapor will cause it to peel off, as the cheap kind is sure to do.

A Monster Log House

One of the most interesting and one might say wonderful buildings at the Lewis and Clark Exposition is the Forestry Building. It is 205 feet long and 108 feet wide, thus occupying an entire half block. Two miles of five and six foot fir logs, eight miles of poles and tons of cedar shingles were used in its construction. One of the base logs weighs thirty-two tons, and is fifty-two feet long and six feet in diameter. If this was cut into standard size flooring boards, one inch thick and three inches wide, and these were placed end to end, they would extend a distance of fourteen miles. While in a general way the building looks like a log house, the details of the structure distinguish it and give it a stateliness of appearance in keeping with the general architectural excellence of the exposition structures. The upper half of the building is constructed of cedar bark shingles, placed eighteen inches to the weather; the ends of the structure are gabled, and two balconies, one above the other, add to the appearance. While the building will exemplify in its construction the forest wealth of Oregon, the balconies and other parts of the building will display a complete exhibit of finished timber products, which will convince people of the greatness of the Pacific Northwest timber resources.

Cement Building Construction

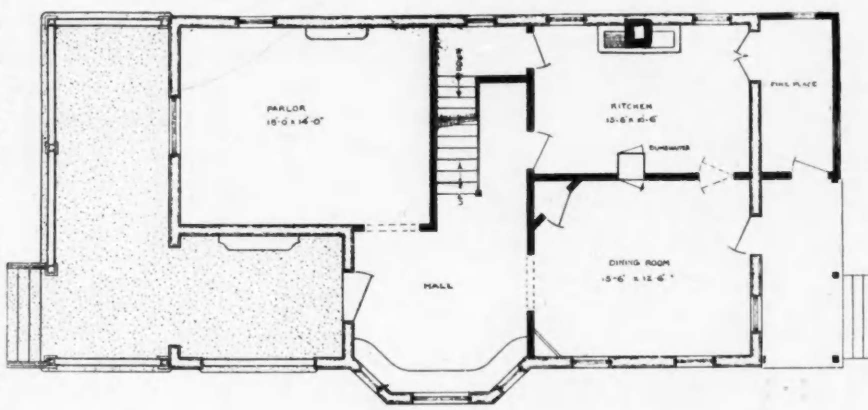
FRED W. HAGLOCH

Artificial Stone

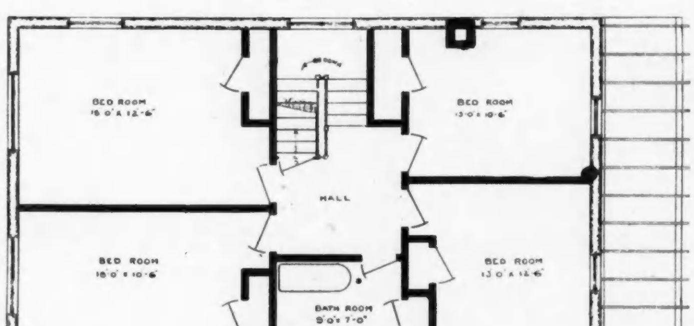
IMPORTANT CONDITIONS TO BE OBSERVED IN MIXING—A FORMULA THAT WILL PROVE SATISFACTORY IF CAREFULLY FOLLOWED—PLANS OF A CEMENT HOUSE

IN MAKING artificial stone, uniformity in strength, durability and color can only be obtained by using the exact same proportions of materials, the same method of mixing, the same system of curing (hardening) and as near as possible the same temperature. As all are striving to make the best article at the least possible cost, too much attention cannot be given to the condition of the sand used. If the cement is the very best and the sand is of even sized grains, the following formula will give the most satisfaction, but it may be improved by carefully studying and testing the materials at hand: Cement, one part; sand that will pass a one-eighth inch screen, one part; sand that will pass a one-quarter inch screen, two parts, and sand or fine gravel that will pass a three-fourths inch screen, two and one-half parts. This may not make as fine and smooth a surface as may be desired, but will make the strongest artificial stone possible.

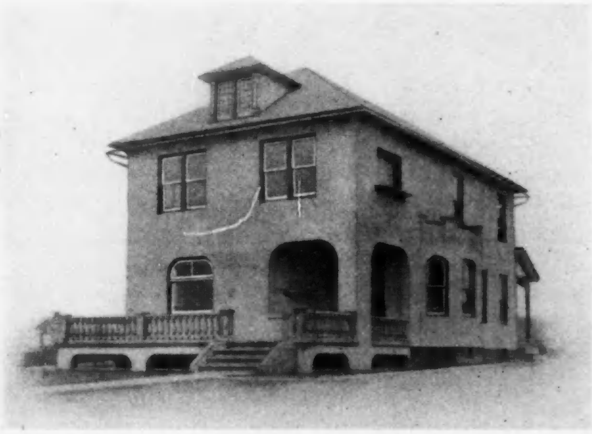
In mixing great care should be taken to thoroughly mix the sand and cement in its dry state until the entire mass is of one uniform color, without spots and streaks. This can best be done in a mortar box about six feet wide, fourteen feet long and ten inches high. After the mass has been thoroughly mixed, add water by sprinkling, as pouring is injurious to cement, as it creates an uneven setting, and again mix and continue to sprinkle until the mass is of a consistency that a handful compressed will leave a slight dampness on the palm of the hand. Continue to mix until the color is uniform, as streaks and spots indicate lack of mixing. Immediately tamp the composition in the molds or positions, after which it should not be disturbed in any way for at least twenty-four hours, but should be kept damp for six or eight days.



FIRST FLOOR PLAN



For curing artificial stone it must be remembered that air drafts and heat are injurious, a temperature of 65 to 80 degrees being ideal, and also that sunshine upon the blocks the first six or eight days will injure them. The method of quick hardening is entirely wrong, as a block hardened in two days will be weaker at the end of six months than one hardened more slowly. By the pouring process blocks are hardened more rapidly than by tamping as before described, and at the end of two months a poured block may show more strength than a tamped one, or the



color will not be uniform, and in six months the tamped block will excel the poured block in every way.

Before leaving this subject I wish to impress upon the reader a few very important facts which have been taught me by practice, and while some may not seem necessary I feel positive that much artificial stone used to-day would be better and stronger had the makers adhered more closely to these lines.

When operating in the open air, cover blocks with burlap or a light cloth to protect them from air drafts and sunlight.

Never use cement that has once set; that is, never redampen composition that has begun hardening, but if you chance to have such material let it harden thoroughly, and then break it, crush it, and use it as you would gravel or crushed stone in new work.

Never neglect sprinkling, as the very best stone I have ever made was sprayed so lightly that it resembled falling mist rather than sprinkling.

While artificial stone is in the plastic state it must be handled with care, as sudden jars, resting on uneven bed, or even slightly rocked has a tendency to crack the work in its most vital places.

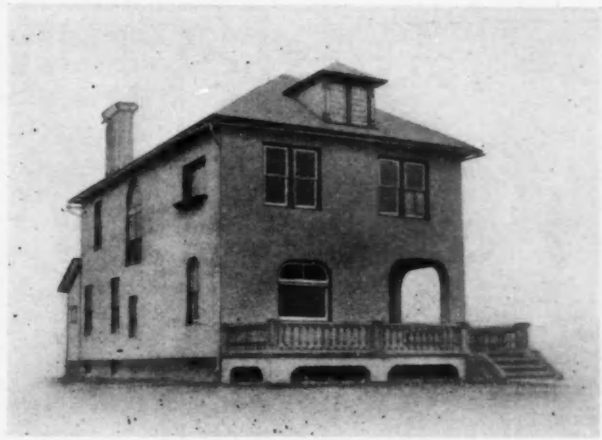
The best and the easiest way to mend defects in articial stone is to make the entire block over again, as patch work will sooner or later be easily seen.

Some cements are more waterproof than others, and two blocks made of the same proportions or of different cement may differ greatly in this respect; therefore, care in the selection of the cement has much to do with the waterproof quality of the finished work. Artificial stone may be made in any desired color, but only such colors that can be mixed with the cement in the dry state have been successful to my knowledge.

In my next article I will show how the product of a number of our natural stone quarries may be imitated.

PLANS OF A CEMENT HOUSE

The accompanying illustrations and plans are those of a residence built in Pennsylvania last year. This is a frame structure, covered with metal lathing and a coat of concrete. The entire cost of the building was $3,485. The writer is this year duplicating this building, excepting that the walls will be constructed of plain hollow concrete blocks, and the exterior will be covered with a coat of waterproof paint and faced with a one-eighth inch coat of concrete, consisting of one part LeFarge cement and two parts sand. This will make the cost of the building about $4,200 and



will in my opinion be absolutely water and fire proof. I know of no better system of wall construction in any material at any cost. It is, in fact, my ideal of a building wall, and I hope to be able to give the reader illustrations in a future number, showing how the building has been constructed.

Building Laws in London

The regulations for which the London county council is asking the sanction of parliament, limit the height of buildings to eighty feet unless consent of the council is secured, which is only given on satisfactory evidence of fire protection. Buildings of the warehouse class are limited to 250,000 cubic feet, unless divided by approved party walls; special regulations are to be made by the council for steel construction buildings. Where buildings are used for both trade and dwellings, the dwelling part must be separated by walls, partitions and floors of fire-resisting materials. Windows opening within thirty feet of an opposite wall must have fire-resisting glazing. Stoves and fireplaces must be set solid in brickwork and concrete, and all flues, except in dwellings, must be surrounded with brickwork at least eight and a half inches thick. Floors under stoves and ovens must be incombustible and not less than six inches thick.

Securing Woodwork to Artificial Stone

DIFFICULTIES OF NAILING FINISH TO CEMENT BUILDING BLOCKS AND WAYS TO OVERCOME THEM—COMPARATIVE COST OF FRAME AND CEMENT HOUSES

By I. P. Hicks

THE cement building block industry is fast becoming a great and growing business. Almost every issue of a trade journal brings to light some new machine for the manufacture of cement building blocks or some new use for the product.

Portland cement is one of the very best building materials that has ever been produced. It is fireproof, waterproof, strong and durable beyond all doubt when it is properly mixed and applied, and with the cheapness of it and the high price of lumber it is sure to be used in place of wood in many cases where it is practical to apply it.

For the outside walls of buildings it is a first-class article when manufactured into hollow concrete building blocks. These blocks are now being made to resemble natural stone. Rock face, smooth face, tooled face or any kind of face desired can be had at very small expense. The usefulness to which this material can be put is almost unlimited. Artistic designs of residences, stores, school houses, churches and all kinds of buildings can be executed in fine shape, giving the buildings the appearance of magnificent stone structures.

Is it durable? This is a question that will be asked over and over again by the doubting ones. There is no question as to its durability when the article is properly mixed and applied. No better proof need be asked for than a comparison of a good cement sidewalk with that of stone, and finding the cement walk wearing and lasting better than natural stone. Sidewalks get more wear and rougher usage than stone put into a building, and a cement block that would stand in a walk would stand in ordinary building construction. Of course there might be such a thing as putting too great a weight on a building block, but this would not be likely to happen in ordinary building, and in cases where there is great weight to support it can be distributed so that the weight will not all be concentrated in a few places about the building. The crushing strength of the cement block is fully the equal of ordinary brick work and no fear of crushing need be entertained. Blocks that crumble

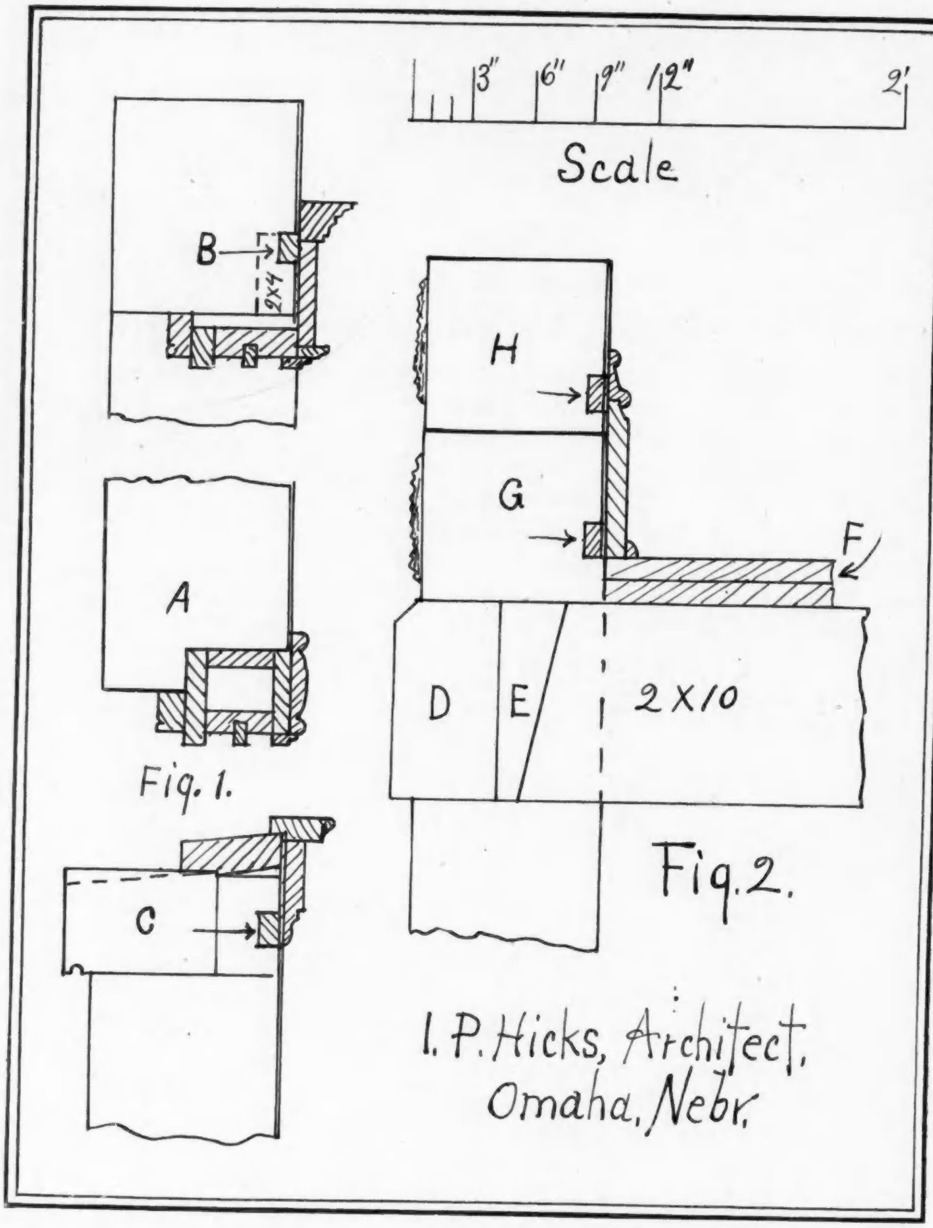


Fig. 1.

Fig. 2.

easily indicate that the proper quantity of cement has not been used in their manufacture. For good blocks not less than one part of cement to five parts of sand and broken stone should be used. The mixture should be what is known as a 5 to 1 mixture and should be thoroughly mixed.

In some parts of the country a cement stone block building can be put up quite as cheap as a frame building. First, there is the saving in paint, for the outside wall requires no painting. Second, the blocks are hollow, producing a dry wall without furring on the inside, and plaster can be applied directly to the blocks on the inside, thus saving the furring and the lathing. Third, the blocks being uniform in size, only a very thin coat of plaster is necessary. Fourth, all the frame work, sheathing and siding is saved. Taking all these items into consideration, the cement block house can be erected nearly or quite as cheap as the frame house.

The use of cement building blocks, where no furring is used, makes it necessary to provide some means of securing the woodwork or finish of a building, such as the window casings, baseboards, etc. It is not practical to nail the woodwork directly into the blocks, and it is doubtful if such a thing could be done. Woodwork can be nailed more or less to a brick wall, but not very successfully, and nailing finish to a cement stone block wall is something that few would care to try.

In our sketch (Fig. 1) we show a wall nine inches thick, which is about the least thickness that will admit a window frame in good shape. The jamb stone at A just comes about flush on the inside of the box frame, leaving just a little for the plaster. This makes it all right for nailing the side casings on the frame, leaving just a little of the casing to reach over on the main wall and completely covering the frame box. This makes the nailing for the side casings all right. With the head casing it is different. In this case there is nothing to nail the cap trim of the frame to except at the very lower edge. And in order to get a good job of finishing some means must be provided to nail the top edge.

As the stones are made in a mold it would be very easy to put a 1x2 inch strip in the right position in the mold to form a recess in the lintel stone, as shown at B, in which could be driven a 1x2 furring strip, which if put in tight would make sufficient nailing for top of cap. Again the furring strip could be molded right into the lintel when it was being made, and thus save the time of driving it in after the stone was laid. Again, the lintel stone could be molded with a recess on the lower inside edge just sufficient to take in a piece of a 2x4, which might perhaps be still better, as shown by dotted lines. The window sill shown at C might be backed with a smaller stone molded with a recess to receive a 1x2 furring strip to make a nailing place for the bottom of the apron to the window. The stool and top part of the apron could be readily nailed to the wooden sill of the window frame.

In Fig. 2 D represents a plain beveled-edge wide base course, the depth of which is the same as the joist used for the floor. E shows the backing stone, which should be made just the right size to fit in between the joists. The floor, which is double, is shown at F. Above are shown two courses of stone, G and H. These two courses are recessed at the proper height to receive furring strips to make nailing places for the base, top and bottom, as shown.

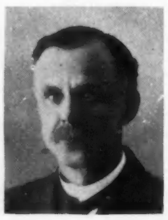
With furring strips driven into these recesses in the stone blocks, a continuous nailing strip is provided for the base, and one that ought to hold the woodwork securely in place. Woodwork can not be attached to stone walls unless there is some means provided for securing it, and it would seem that this is a practical and inexpensive way to provide for it. We believe it to be much better than driving in wooden plugs in the mortar joints, which hold but poorly at the best. If hollow cement blocks are to be used without furring the inside of the walls, as is customary in brick and stone buildings, then it becomes absolutely necessary to devise ways and means of securing the casings, base and other finish.

Our sketches show one way we would do it. Different jobs and different finish will necessitate different ways to secure nailing places for the finish and it should be the duty of the architect to make details in each case showing some practical plan by which the woodwork can be substantially secured to the building block walls. Different methods will present themselves from time to time, and we hope to establish some easy and practical methods adapted to this particular branch of the building trades.

A Skyscraper House of Worship

The first skyscraper house of worship is the million-dollar Broadway tabernacle in New York, which is now almost completed and has a seating capacity of over 5,000. In its construction are innovations which are in strange contrast to the old conventional ideas of church building. The tabernacle is ten stories high, and the height of the tower is 190 feet; it is served by two elevators; the parish house is in the tower, and the church is as practical as any hotel or business house. On the first floor is the social hall, seating 400 people, to be used for prayer meetings and summer services, while on the second floor is located the Sunday school hall, which seats 600. There are also spacious ladies' parlors, and mission societies, and young women's clubs have large rooms on the different floors.

The man that can do something better than anybody else can generally find plenty to do, no matter how dull business may be.



RESIDENCES

G. W. ASHBY WM. H. SCHROEDER

Houses for Small and Large Families

DESCRIPTIONS AND ILLUSTRATIONS OF TEN HOUSES RANGING IN COST FROM $500 TO $3,500, AND IN SIZE FROM THREE TO NINE ROOMS—SOME PLEASING FEATURES

THE ten houses shown this month ranging from a three-room $500 house, to an eight-room $3,500 house, present a variety that will appeal and meet the demands of all. The floor plans which accompany every illustration show the dimensions and positions of all the rooms, giving a good idea of the interior appearance of the house.

House No. 706 has been designed so it can be built on a narrow southwest corner lot, 30 by 100 feet. The outside dimensions of the house, exclusive of porches, are 22 by 33 feet, and the amount of servicable floor space is exceptional in a house of this size. The light and airy basement extends under the entire house, being seven feet in height from the cemented floor to the plastered ceiling. The first floor is suitably arranged, having a hall, living and dining rooms, kitchen, etc. The kitchen, though small, is so conveniently arranged that unnecessary steps are avoided, having a sink placed in the middle of a long sink table, and a receiving window opening into the dining room, through which dishes can be passed. The pantry is large and well equipped with shelves, cupboards, etc., while off from the dining-room is a large china closet with glass doors for display of china and glassware. The dining room is oblong and connected with the living room by large sliding doors, which, when open, almost make one large room out of both. A large plate glass window directly opposite the sliding doors ornaments the front of the living room, making it bright and cheery. One of the best features of this design is the fact that every room in the house, with the exception of the kitchen, has windows facing the south, and no living room has an outside wall directly exposed to the north. The three pleasant bedrooms on the second floor are well supplied with clothes closets and the doors and windows are so arranged that the furniture can be placed conveniently and advantageously. The exterior is of a very artistic design, having wide projecting cornices and horizontal belts, which aid the painter in displaying harmony of color. The cost of the house is estimated at from $2,400 to $2,800, including plumbing and furnace heat.

House No. 544 is an ideal and imposing home. The dimensions of the house, exclusive of porch, are 34½ by 35½ feet, being well proportioned. The cellar, which extends under the entire house, is suitable for a furnace or a hot water heating apparatus. The first floor is well arranged, having a parlor, dining room, kitchen and a large hall. The parlor, with its large mantel and nook in which a window seat can be built, makes it one of the pleasantest rooms in the house. It is connected with the dining room by means of large sliding doors, which can be replaced by heavy curtains if desired. The dining room is large and almost square, and very conveniently located. All the rooms in the house open directly into the hall, which is a very good feature. The second floor is divided into four bedrooms and a bath room. Each bedroom is well lighted and clothes closets are in most of them. The exterior is very artistic, the projecting cornices and massive chimney giving it a very home-like appearance, and the large porch also adds to that effect. The estimated cost of the house is about $3,500.

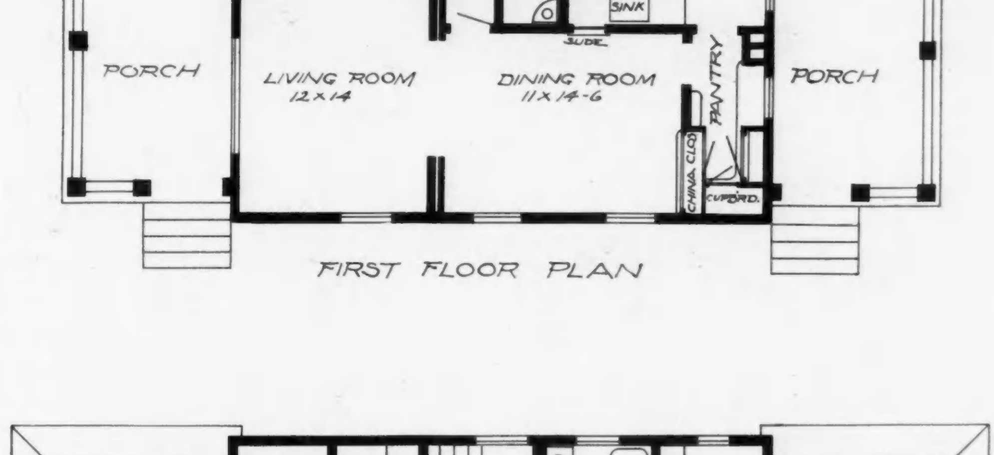
House No. 158 is an attractive, moderate-priced home and can be built on a fifty-foot lot. Some of the fine features of this home are the large, front hallway with a wide stairs leading to the upper floor, and the porch extending across the entire front of the house. The lower floor is well arranged, the rooms being nearly square and thereby making use of all the available space; there is a sliding door between the parlor and dining room, which enables one to form one large room in case of necessity. The upper floor is well furnished with three bedrooms, one being exceptionally large, having three large windows facing the front; they are all equipped with clothes closets, and all afford easy access to a large, airy bathroom. The cost of this house would be from $1,300 to $1,450, depending partly on the locality where it is to be built.

House No. 704 is finished on the outside partly with cement, and partly with wood, the upper part being cement. The outer appearance is also enriched by the large porch running along the side of the house. The living room is well lighted and has a large mantel, which adds very materially to the appearance of the room. The upper floor has four large bedrooms and

FRONT ELEVATION

706

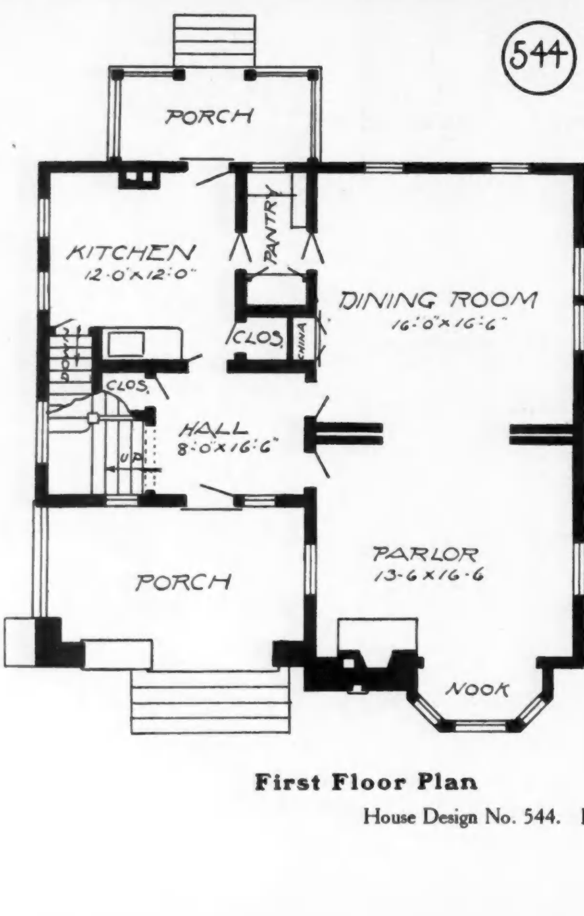
FIRST FLOOR PLAN



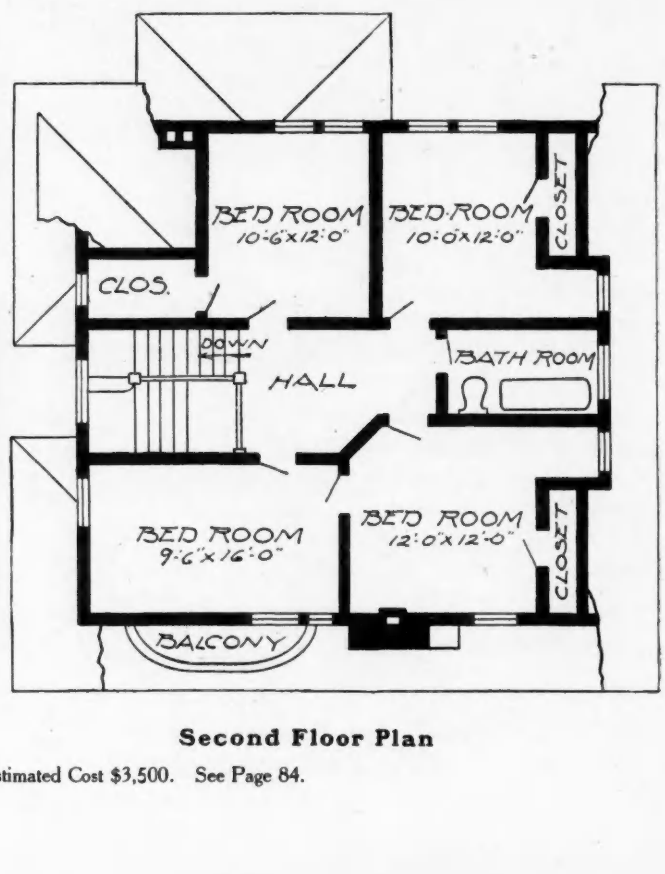
SECOND FLOOR PLAN

House Design No. 706. Estimated Cost $2,400. See Page 84.

544

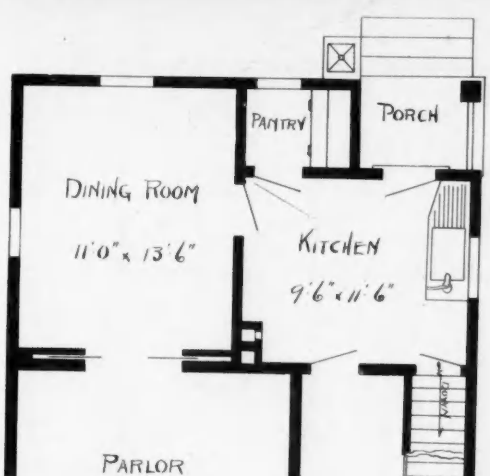


First Floor Plan



Second Floor Plan

House Design No. 544. Estimated Cost $3,500. See Page 84.



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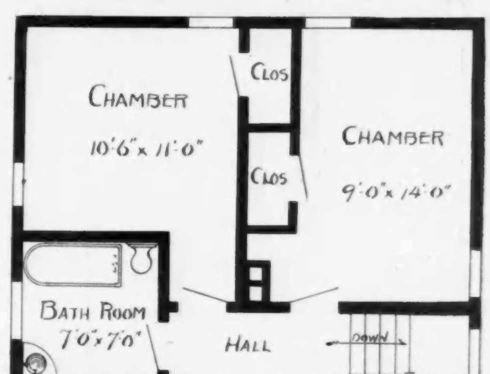
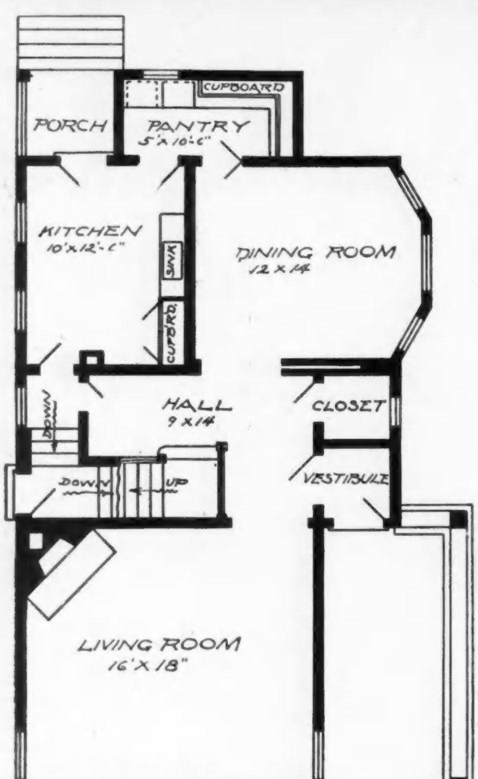


House Design No. 158. Estimated Cost $1,300 to $1,450. See Page 84.



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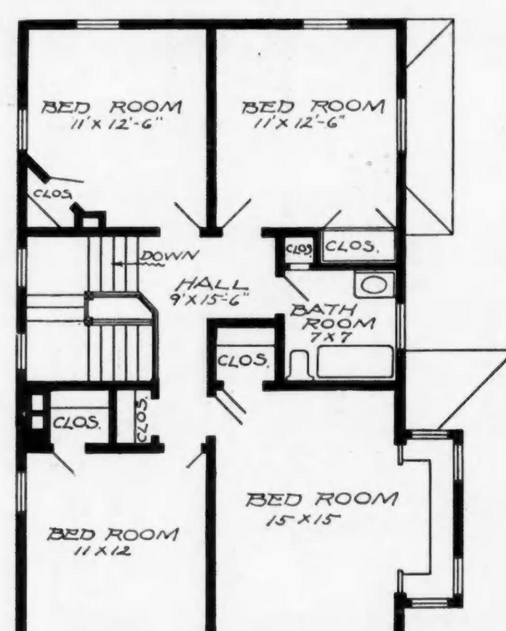
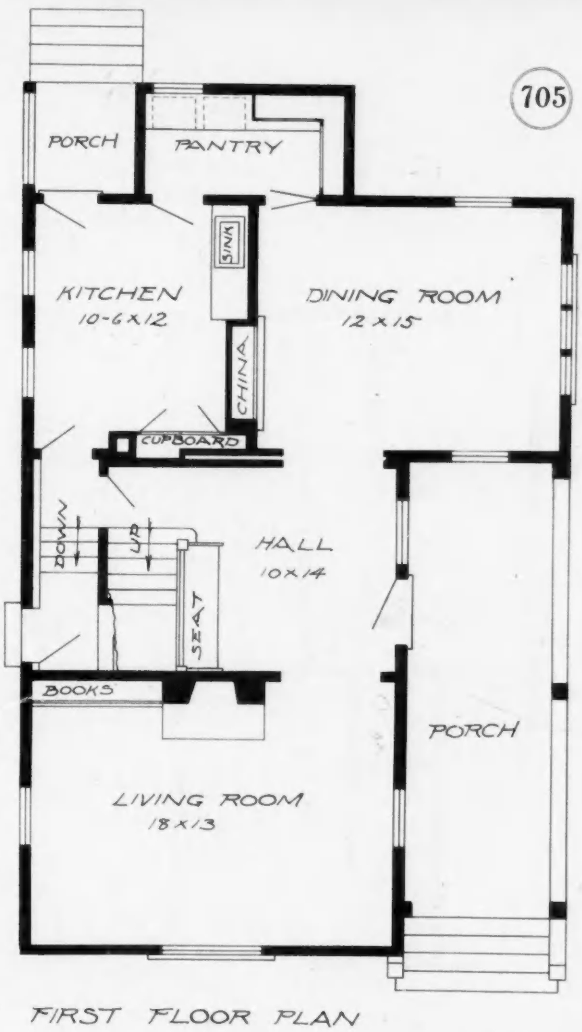
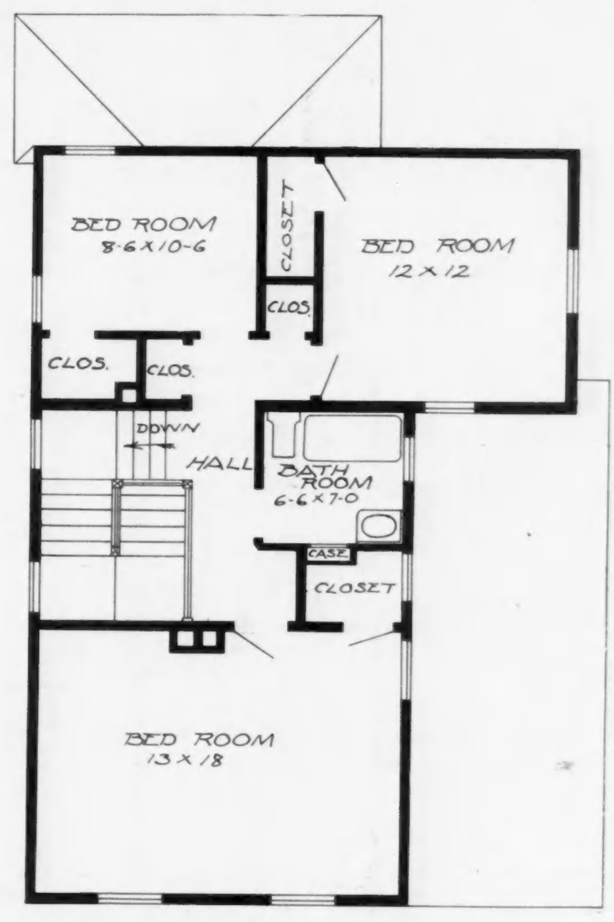


House Design No. 704. Estimated Cost $2,400. See Page 84.

705

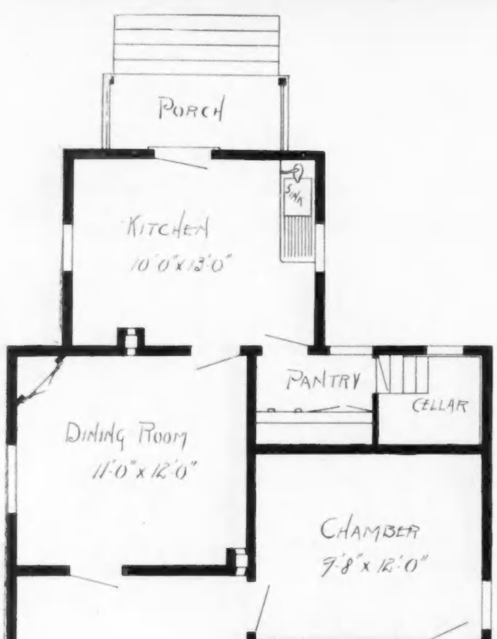


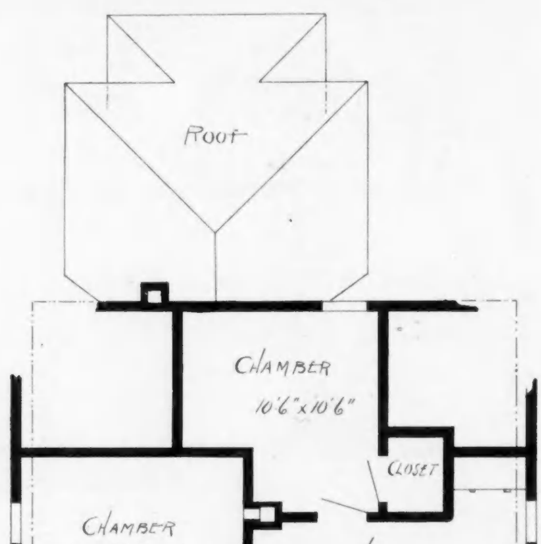
FIRST FLOOR PLAN



SECOND FLOOR PLAN

House Design No. 705. Estimated Cost $2,500. See Page 95.





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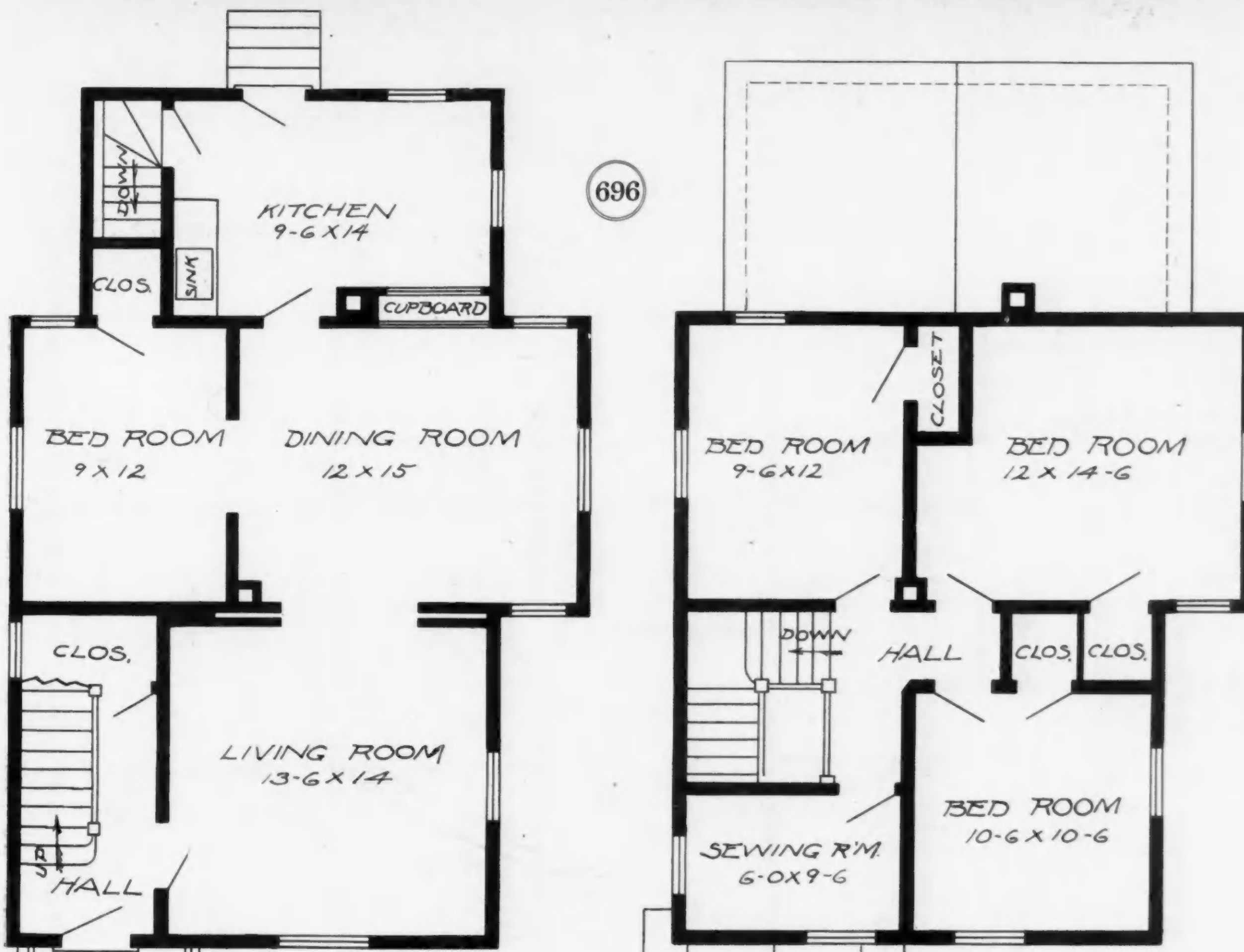
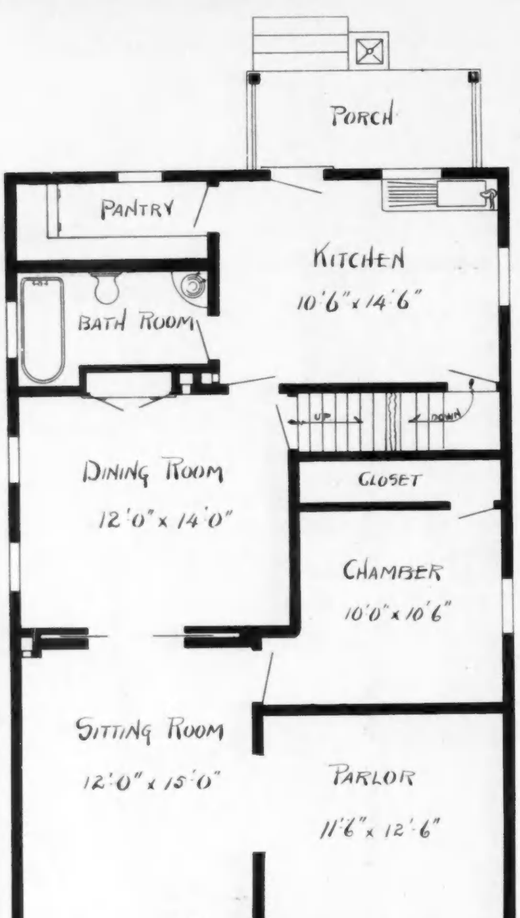
House Design No. 147. Estimated Cost $800 to $950. See Page 95.



House Design No. 696. Estimated Cost $1,200. See Page 95.



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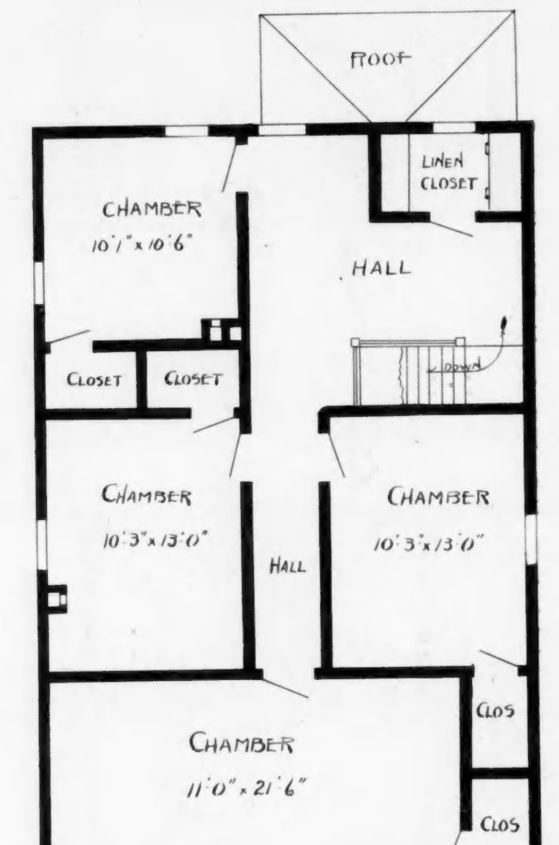
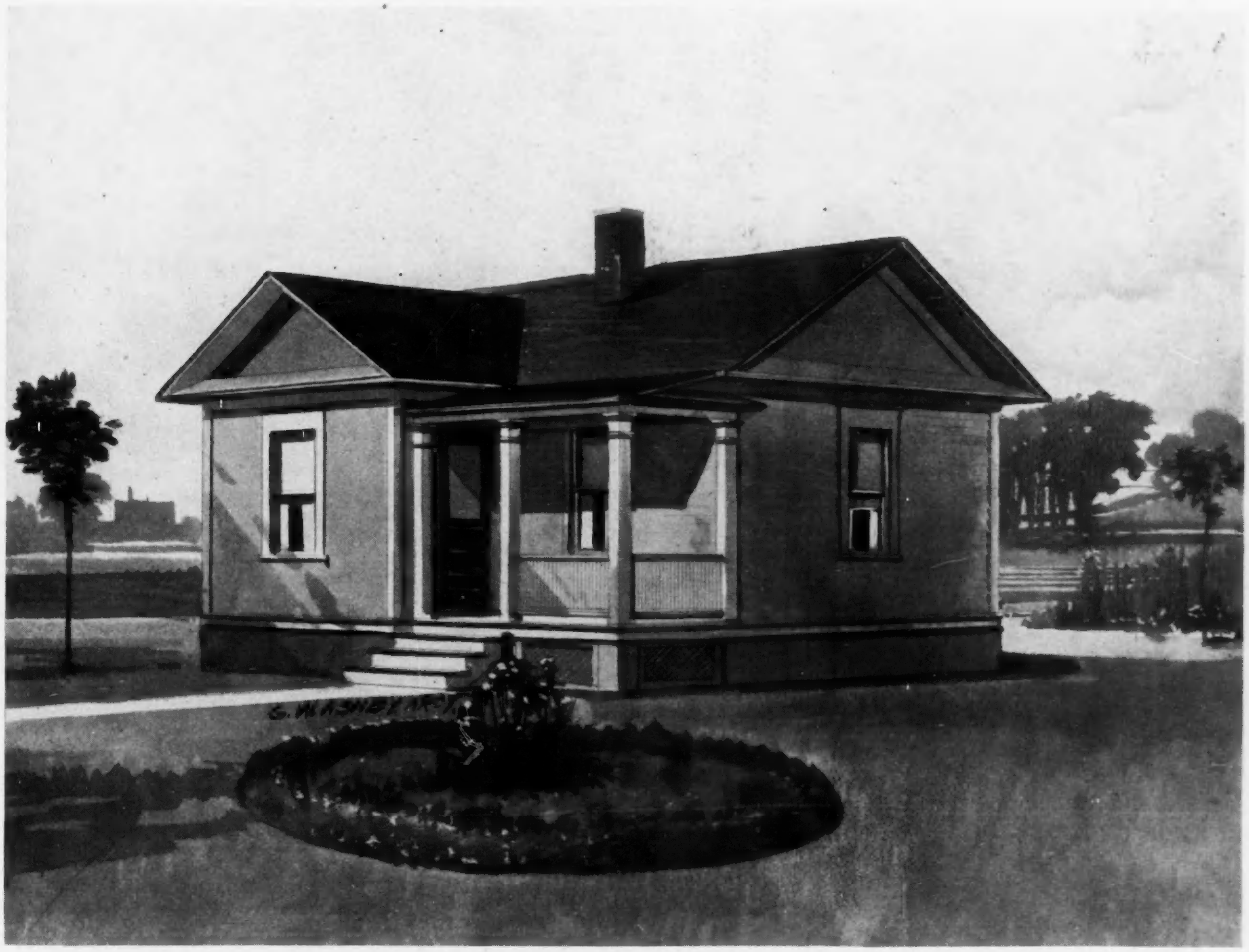
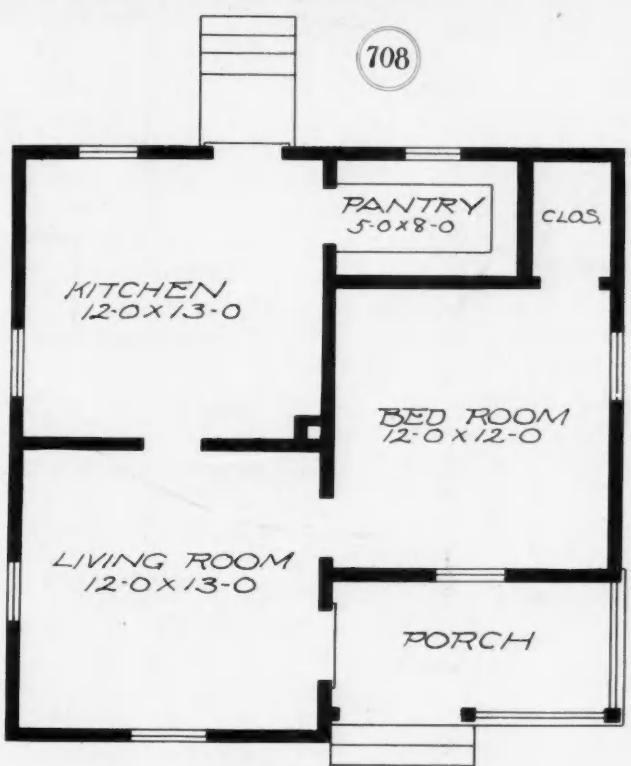


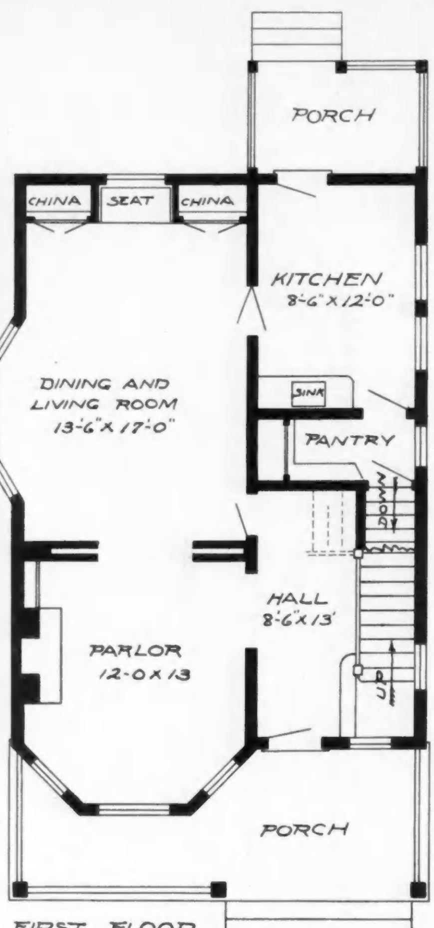
House Design No. 159. Estimated Cost $1,650 to $1,850. See Page 95.





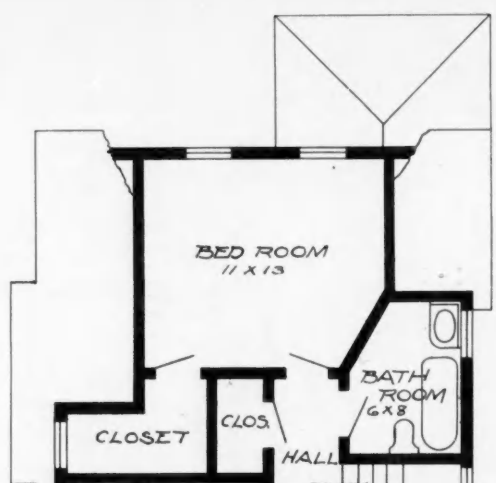
FIRST FLOOR PLAN

House Design No. 708. Estimated Cost $500. See Page 95.



FIRST FLOOR

707



SECOND FLOOR PLAN

House Design No. 707. Estimated Cost $1,200. See Page 95.

a bathroom; the bedrooms are well lighted, having not less than two windows each, and one has five. The large bedroom in front, with the fine window seat, can be converted into a children's room if desired, as it is large and very cheery. A good-sized family can dwell very comfortably in this home. The cost would be about $2,400.

House No. 705 is a pleasant home for a good-sized family. The cellar extends under the entire house and is well lighted and ventilated. The first floor has a large hall, kitchen, living and dining rooms nicely arranged. The living room is large and contains a mantel and a very suitable place for books. The dining room is very bright and cheerful, being lighted by five windows, while the kitchen is well equipped with a pantry, cupboard and a large sink. The second floor is taken up by three large airy bedrooms, each having a large and commodious clothes closet. The house is frame, with a stone or brick foundation, and can be built for about $2,500.

House No. 147 is a very cosy, attractive, yet very reasonably priced home. It is 26 by 42½ feet, making it large enough for a good-sized family. Considing the cost, which would be from $800 to $950, it is one of the best houses to be had for such a reasonable amount. The lower floor is well fitted up with large living rooms, and also a good-sized bedroom, which also has a clothes closet attached. The upper floor is fitted up into bedrooms, of which there are three, each well lighted and equipped with closets.

House No. 696 is a good home for a large family. The cellar extends under the entire house, is well lighted, and a furnace or hot water heating plant can be installed. The first floor is divided into a living room, dining room, bedroom and kitchen. The living and dining rooms are connected by large sliding doors, while off from the dining room is a well-lighted bedroom. The kitchen is well equipped with a cupboard and sink and affords easy access to the cellar. The stairway to the second floor is well located in the front hall, and leads to a large hall on the upper floor, which is divided into three bedrooms and a sewing room. The bedrooms are large and equipped with closets and the sewing room is bright and cheery. There is a large garret above the second floor where things can be stored. The estimated cost of this house is $1,200.

House No. 159 is a large nine-room house, 26 by 40 feet, and is designed for a large family. The sitting room and parlor on the first floor are divided by heavy curtains, while sliding doors divide the sitting and dining rooms. At one end of the sitting room is a large china closet, which enables one to present a good display of china and glassware. The kitchen is equipped with a large sink and adjoining pantry, with access to the bath room and cellar. The second floor, which is reached by the stairway off from the dining room, is divided into bedrooms. The front one is exceptionally large and cheery, and could be used as a children's room or library. The other bedrooms are all supplied with closets, and the large linen closet off from the hallway is a very desirable feature. The estimated cost of this house is from $1,650 to $1,850.

House No. 708 is a small three-room home, suitable for a family in a manufacturing district, or it can be used for a summer cottage. The rooms are large and well ventilated, each having windows on two sides, thereby causing a good circulation. Although the house is small, the large kitchen and pantry makes it an ideal summer home. The estimated cost of this house is $500.

House No. 707 is an elegant little home for a moderately sized family. It is built on the Colonial style, which, in conjunction with the porch extending across the front of the house, gives it a very attractive appearance. There is a cellar under the entire house, where either a furnace or hot water heating plant can be installed if desired. The parlor is equipped with a large mantel, which gives it a very home-like appearance, while sliding doors connect the parlor with the dining room, but heavy curtains can be substituted if desired. The upper floor has two large, airy bedrooms, well furnished with two clothes closets each and well lighted. The estimated cost of this house is $1,200.

Paper for Buildings and Pavements

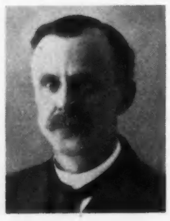
In the rebuilding of the King of Korea's palace, which was recently destroyed by fire, papier mache will be solely employed. To obtain a sufficient quantity for the purpose there has been engaged a staff of 1,000 Koreans, possessed of strong teeth for chewing up paper. At Savinoroska, in Russia, is a paper house. It has been built entirely of blocks of papier mache, even the foundations and roof being made of that material. So, too, are the chimneys, although the paper used in their construction was first mingled with a fireproof material. The house which is of considerable extent, and will, in the opinion of its architect, outlast such as are built of stone and brick, cost over $40,000. In certain towns of Russia, too, the experiment is now being made of utilizing paper for paving the roads and streets. In this case also blocks compressed to great solidity are employed, and are said to stand excellently the wear and tear of traffic. The cost, however, is at present too great to permit of anything like their universal adoption. For courtyards of mansions and similar purposes, where expenses need not be of much consideration, paper pavement, it is averred, will soon come into vogue.

Teacher—"Johnny, what would you do if another boy called you a storyteller?"

Johnny (aged six)—"To my face?"

Teacher—"Yes."

Johnny—"About how big a boy?"



SCHOOL HOUSES

G. W. ASHBY

Three Attractive Designs

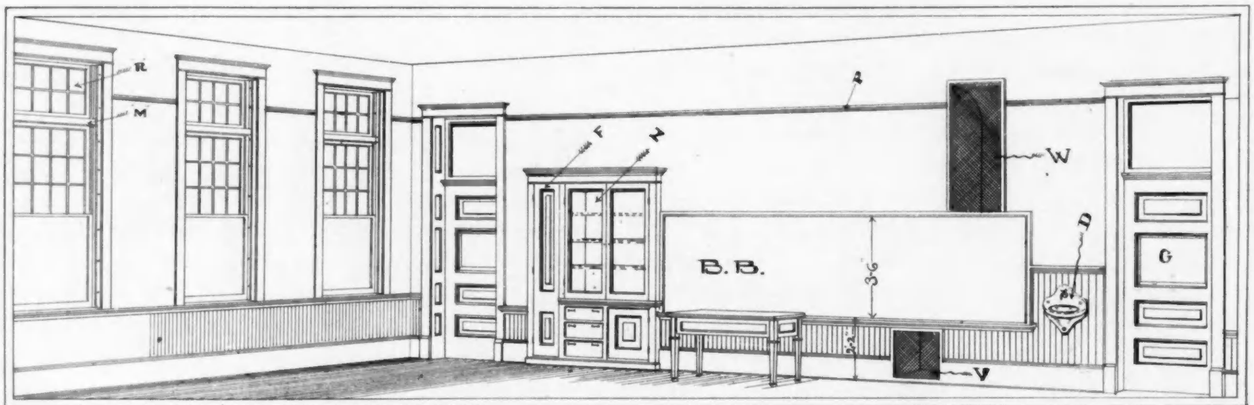
FRAME AND BRICK STRUCTURES VARYING IN COST FROM $500 TO $18.000—ONE WAS FINISHED AT MELROSE PARK, COOK COUNTY, ILL., LAST FALL

UNDER this head three schools varying from one to eight rooms are shown, meeting the demands of the small village as well as of the large city. The cost is in proportion to the size, although much depends on the interior finish desired.

Design No. 400 is a brick, four-room school with stone foundation. The brick used in the construction is what is known as dark red paving brick, and the roof is covered with moss green shingles. The basement is well equipped with boys' and girls' toilet and play rooms, as well as a boiler and fuel room. The inside finish is cypress and all doors opening in hall and vestibule are glazed with plate glass. This building was finished last fall in Melrose Park, Cook County, Ill., and has so satisfactorily filled all requirements that the architect has two more school houses under construction in the same district. This school house cost $13,000 complete.

Design No. 805 is a brick, eight-room school with stone foundation. The basement is equipped with boys' and girls' playrooms and toilet rooms and a large furnace and fuel room. The windows are al so located that the light will come from the back and left, which is the most hygienic. The rooms are all of the same size and well proportioned and the halls are supplied with wire partitions for coats and hats. The wire partitions are preferable, as they afford a better air circulation and also give the teacher a commanding view of the entire hall. A very good feature is the teachers' room off from the upper hall, which can also be used as the principal's office. The entire building is artistically finished, having an exceptionally fine entrance. The estimated cost of this building is $18,000.

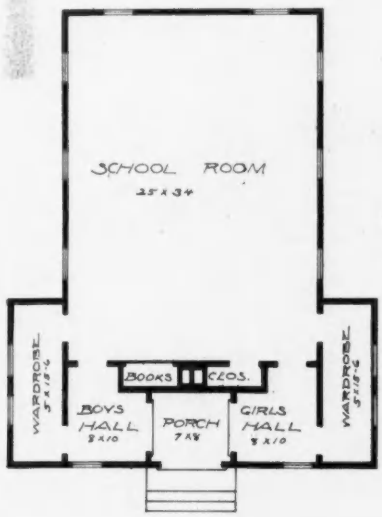
Design No. 100 is a one-room school house very suitable for a district school where the scarcity of pupils would not warrant a large outlay of money. The main room is 25 by 34 feet and would comfortably seat about fifty pupils. There are two distinct wardrobes, which will prevent confusion, as the boys will pass out one side while the girls go out the other. It is a frame building with a stone or brick foundation and would cost about $500, not including furniture.



INTERIOR FINISH IN SCHOOL HOUSES

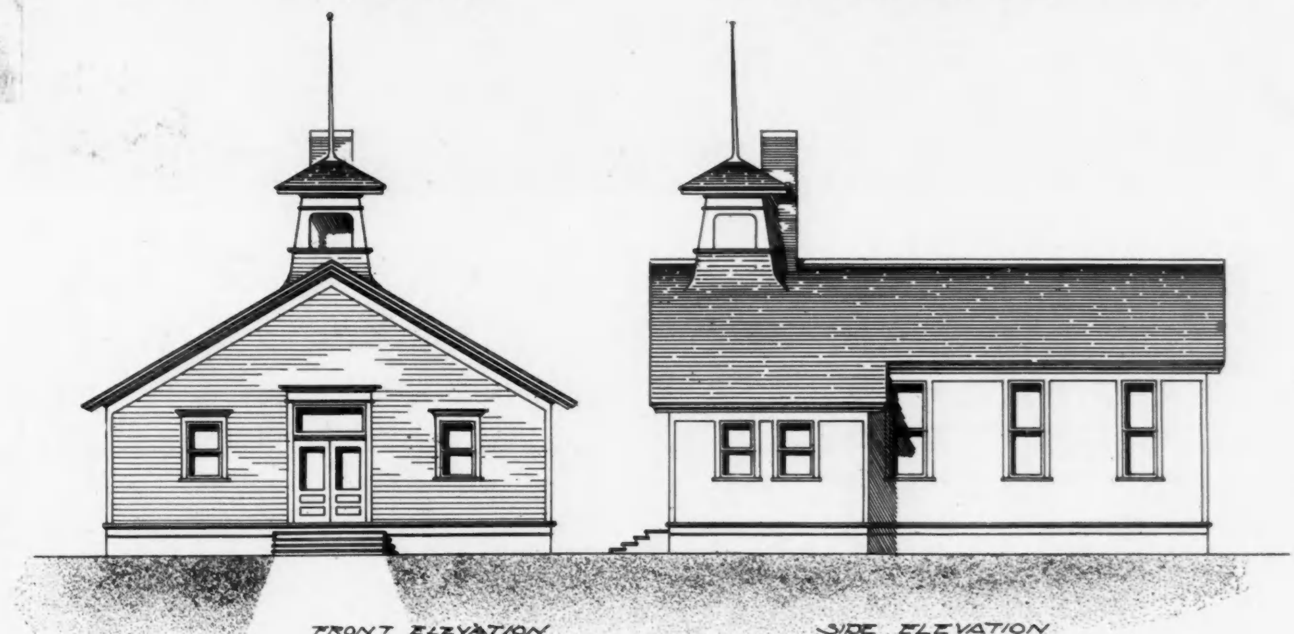
An important feature of interior finish in schoolhouses is the tinting of the walls, which can be so finished as to teach the children a love for the beautiful and also add to the attractiveness of the room. If the colors do not harmonize with the trim or each other it were better the wall were untinted. The colors in the room should be varied, the ceiling always having a lighter tint than the walls and frieze. Dark greens and cold tints should never be used, as the green subdues the light and cold tints are irritating to the eyes and are liable to cause nervousness. If the wood-work is painted it should blend with the color on the wall, which should be a light warm tint, depending partly on the location and light effect of the room.

The window shades should be of the best quality and mounted on spring rollers, and be of a color that will harmonize with the wall and wood-work, and slate and should extend across the front and right-hand wall of the school-room, care being taken that all joints in the slate board be smoothed off; chalk-rail should not be over two feet two inches from the floor in any low grade room. The blackboard rail



FLOOR PLAN OF A ONE ROOM SCHOOL HOUSE

EXTERIOR VIEW OF A ONE ROOM SCHOOL HOUSE



FRONT ELEVATION

SIDE ELEVATION

ELEVATIONS OF A ONE ROOM SCHOOL HOUSE

DESIGN · 100
FRAME 37'x45'

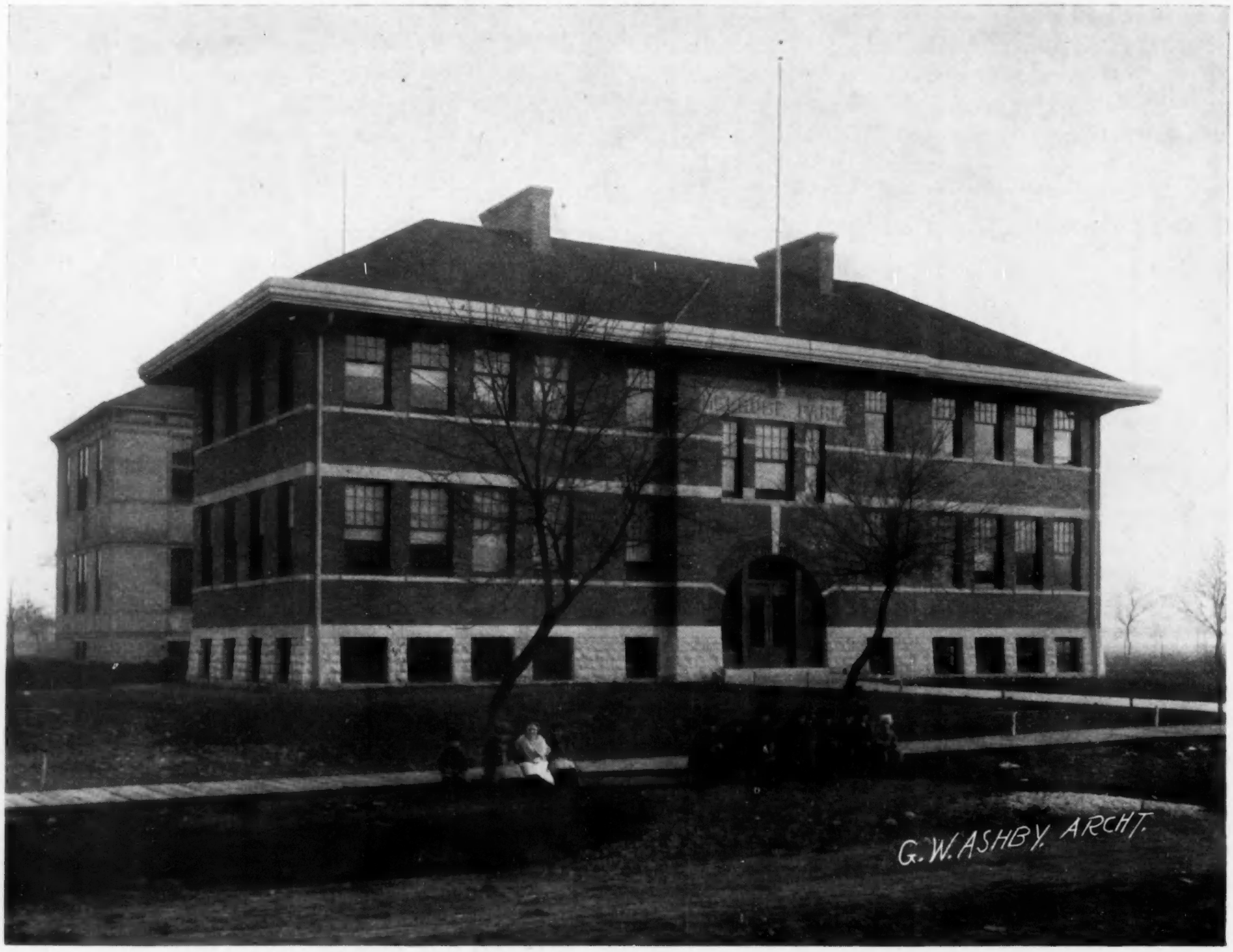
G.W. ASHBY. ARCHT.

hung at point M on transom rail; glass in transoms marked R should be Florentine glass. A picture rail should extend around every room at point P and the walls should be decorated with suitable pictures, furnished through the enterprise of the teacher and students if possible. The floors should be of hard, dry maple or beech wood; the flooring not to exceed two inches in width and should be well laid.

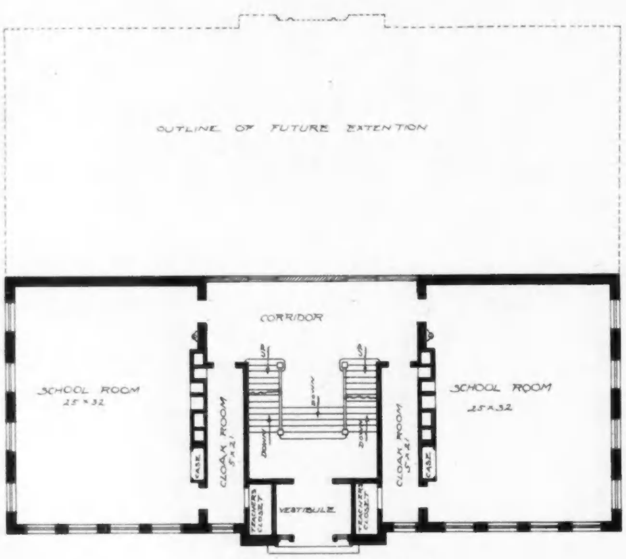
The blackboards, marked B B, should be of natural slate and should be put on with screws so that the broken slate can be easily removed.

Each school-room should have a bookcase, as shown at N, and a teacher's locker, as shown at F. A drinking fountain should be placed in each room at D, near door to hall.

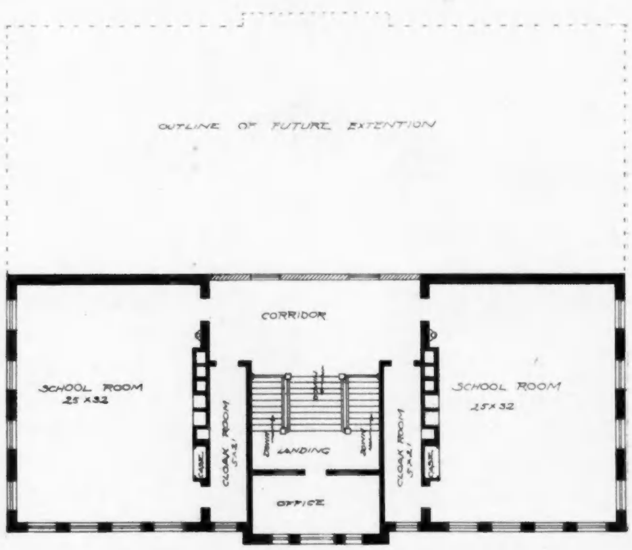
Where low-pressure steam is used the warm and cold fresh air, which is controlled by dampers, enters the room at W, while the foul air is taken out at V.



400

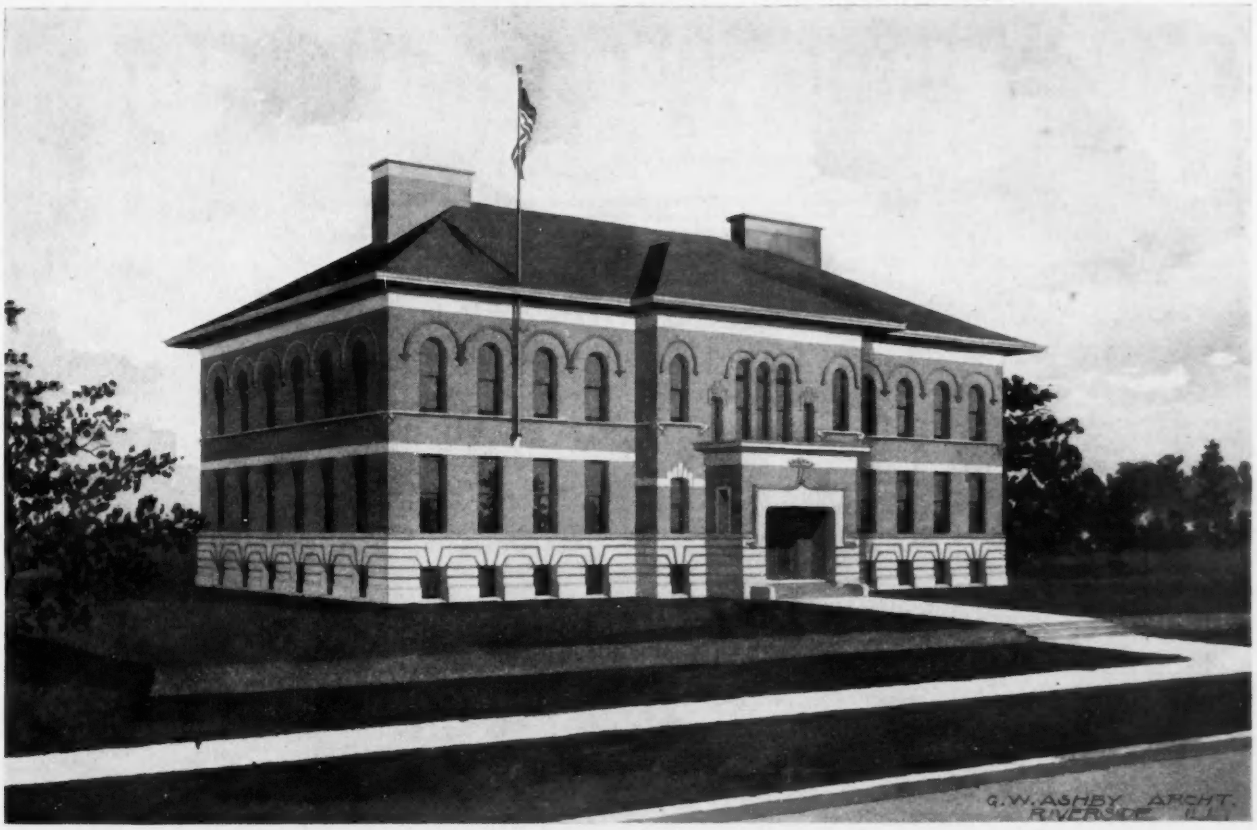


FIRST FLOOR PLAN OF
A FOUR ROOM SCHOOL HOUSE

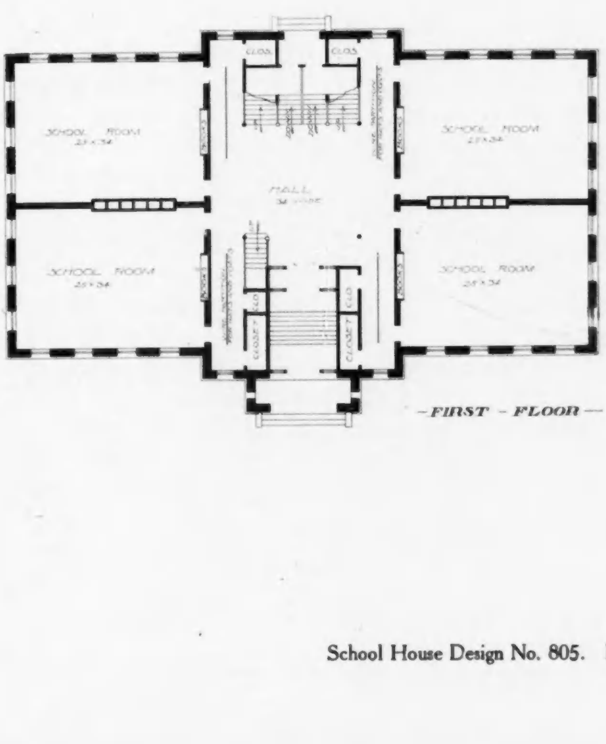


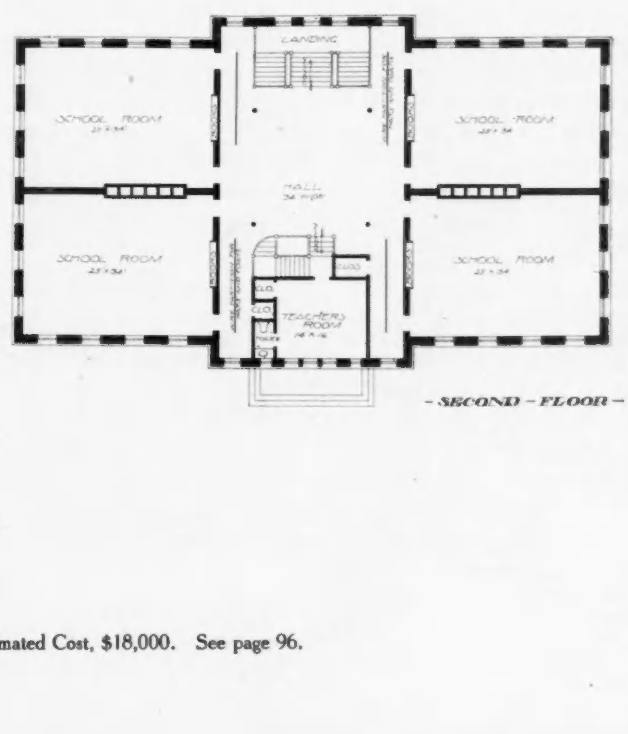
SECOND FLOOR PLAN OF
A FOUR ROOM SCHOOL HOUSE

School House Design No. 400. Estimated Cost $13,000. See Page 96.



805





School House Design No. 805. Estimated Cost, $18,000. See page 96.

Barns and Farm Buildings..

HENRY H. NIEMANN

A Model Chicken House

PARTICULARLY DESIGNED FOR THE COMFORT OF THE FOWLS AND TO INSURE THE GREATEST PROFIT TO THE OWNER—WINTER AND SUMMER NEEDS CAREFULLY CONSIDERED

THE chicken house illustrated herewith is designed to provide comfort for the fowls and to be profitable to the owner. It is built on a foundation of cedar posts, set on double plank, imbedded in the ground below frost level. The posts run up to about fourteen inches above the ground, where a box sill constructed of two 2 by 6's is thoroughly spiked to the top of the posts to receive the floor joist, which are 2 by 6, spaced sixteen inches on center. This elevates the building fourteen inches above the ground, preventing the rats from nesting under the floor and gives a free circulation of air under the building, keeping the floor perfectly dry and fresh.

During winter months planks are set against the posts, closing up the openings, and by packing straw or manure against these planks it makes a very warm building during the winter. The building should be built on the north side of the chicken yard so as to form a shelter against the cold north winds.

The wall of the south side of the building is four feet high, from the floor to the roof, and contains three windows, each having twelve lights of glass 8 by 10 inches. These windows are placed in a vertical position and near the floor, so that in the winter months when sunshine is most desirable in the building for health and warmth, the sun being lower in the heavens will throw the light far back into the building; while in summer, when shade is most desirable, the sun being higher up and the windows near the floor very little sunshine will be reflected on the floor, keeping the building cool. It is good practice to have these windows double glazed, which will make them cooler in summer and warmer in winter. Between the south windows are two summer doors, which in summer are swung up forming an awning and making the house cool and airy.

The north wall is six feet high from the floor to the roof, making it high enough for walking upright. This wall should be built perfectly storm proof and must contain but few openings; two small windows, large enough to give light to see into the nests and feeding trough, are sufficient.

The nests are constructed in two sections, as shown at N in the floor plan, Fig. 4, and in section Fig. 1. Each section is constructed in one piece, having a passage (P) in front of the nests, and partitions between the nests. The nest boxes can be pulled out separately from the walk, like drawers, for cleaning and refilling with bedding. Above the back of each nest box is a hinged door (D) for the removal of eggs. Each entire section is set on a stationary rack, and can be taken out of the building through a door (A) at the end of the section. The top of the nests are covered with a slanted roof to prevent the chickens from roosting on the nests.

The bottom of the nests are eighteen or twenty inches above the floor, to give more floor space to the chickens by allowing them to walk under them to the feed trough (B), which is set along a slot partition (C) constructed of plastering lath, spaced so the chickens can reach the food in the trough through the slat partition, thus preventing their getting into the food. These slats or lath are nailed vertical from the floor to the rack which supports the nests. Above the nests to the ceiling is a two-inch wire mesh partition (E), and between the two sections of nests is a door of the same material.

The ceiling is constructed of 1 by 6-inch boards, spaced about two inches apart. This ceiling is of no use in summer, but is very necessary in winter, when the triangular space (F) above the ceiling is filled with straw, which greatly adds to the warmth of the building, and the ceiling boards being spaced about two inches apart admits a free circulation of air through the straw and out of the slat ventilators (G) as indicated by the arrows in Fig. 1. Each end of the building is also provided with a vent stack (V) built of 10-inch boards, starting about six or eight inches above the floor and running up above the highest point of roof with a board on top to keep out rain, and provided with a regulating damper.

There are six roost poles (R) which are movable and placed above movable dropping boards (S). H is a dust bath, constructed of a box about 3 by 3 feet, and four inches deep.

A dull saw is not always a sign of a poor carpenter, for it may be due to hard work.

DESIGN OF A CHICKEN HOUSE

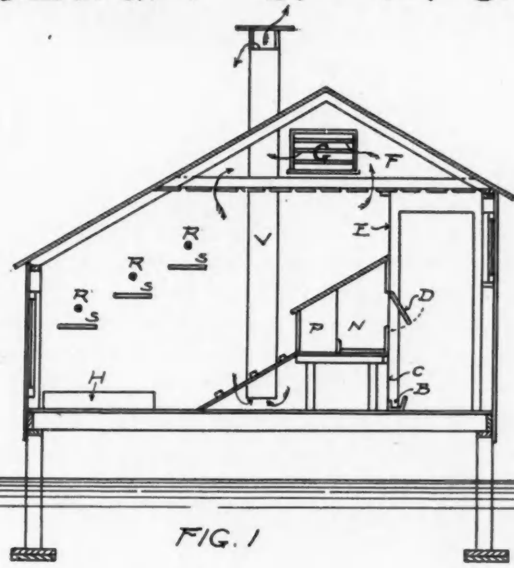


FIG. 1

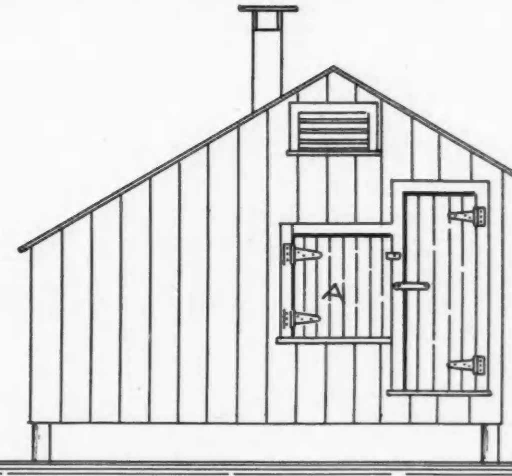


FIG. 2

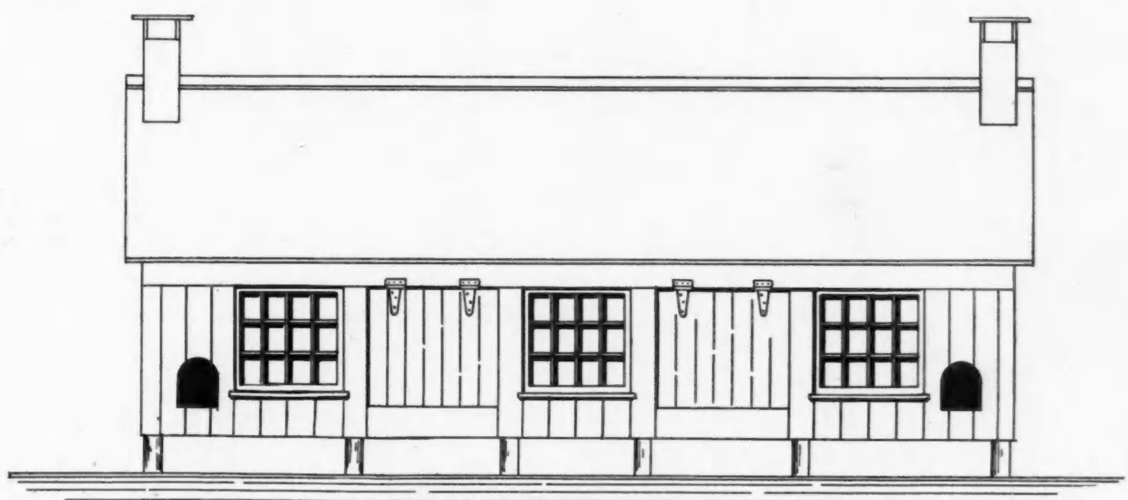


FIG. 3

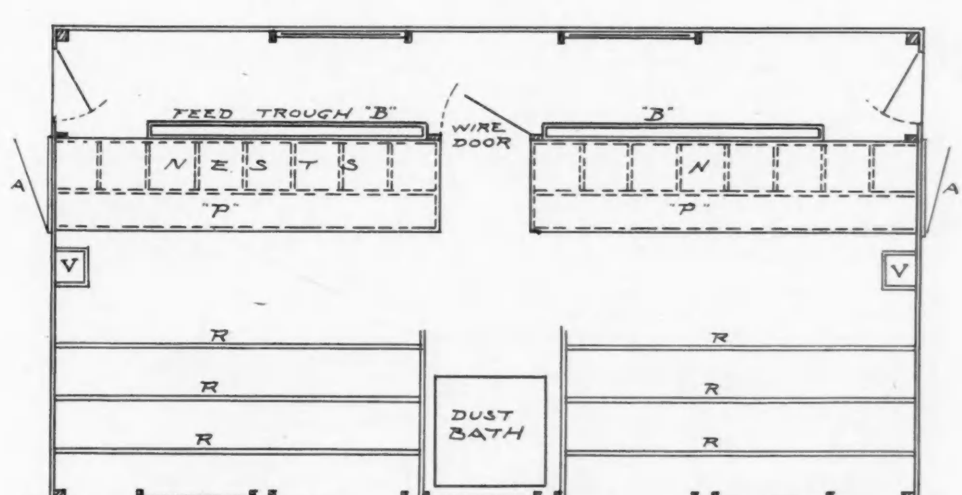
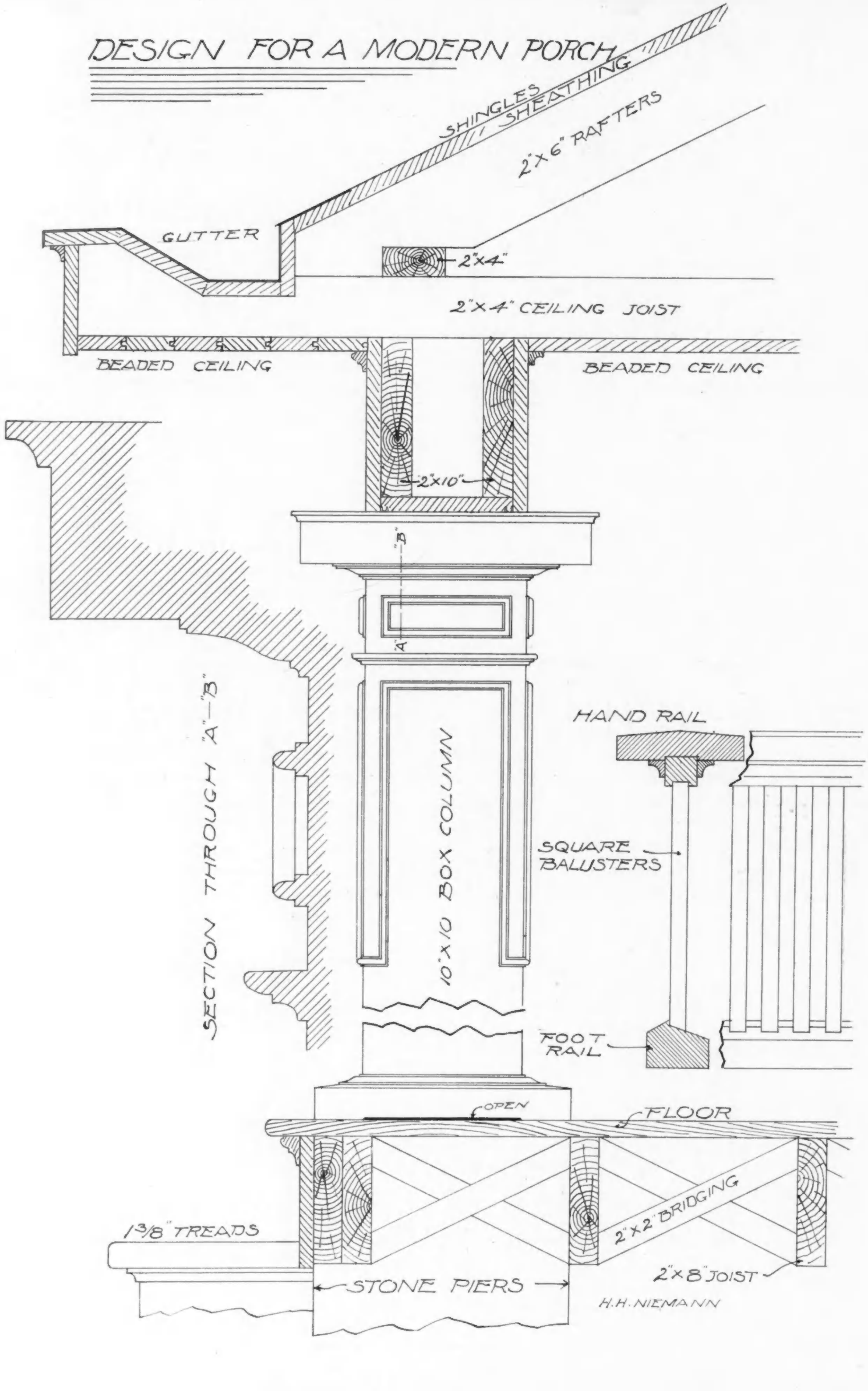


FIG. 4.

H. H. NIEMANN, DEL.


DESIGN FOR A MODERN PORCH
SHINGLES
SHEATHING
2"x6" RAFTERS
GUTTER
2"x4"
2"x4" CEILING JOIST
BEADED CEILING
BEADED CEILING
2"x10"
"A"
"B"
SECTION THROUGH "A"—"B"
10"x10 BOX COLUMN
HAND RAIL
SQUARE BALUSTERS
FOOT RAIL
OPEN
FLOOR
2"x2" BRIDGING
1 3/8" TREADS
STONE PIERS
2"x8" JOIST
H.H. NIEMANN

Construction of Silos

REASONS FOR MAKING THEM CYLINDRICAL IN SHAPE RATHER THAN SQUARE—IMPORTANT DETAILS TO BE OBSERVED TO OBTAIN THE BEST RESULTS

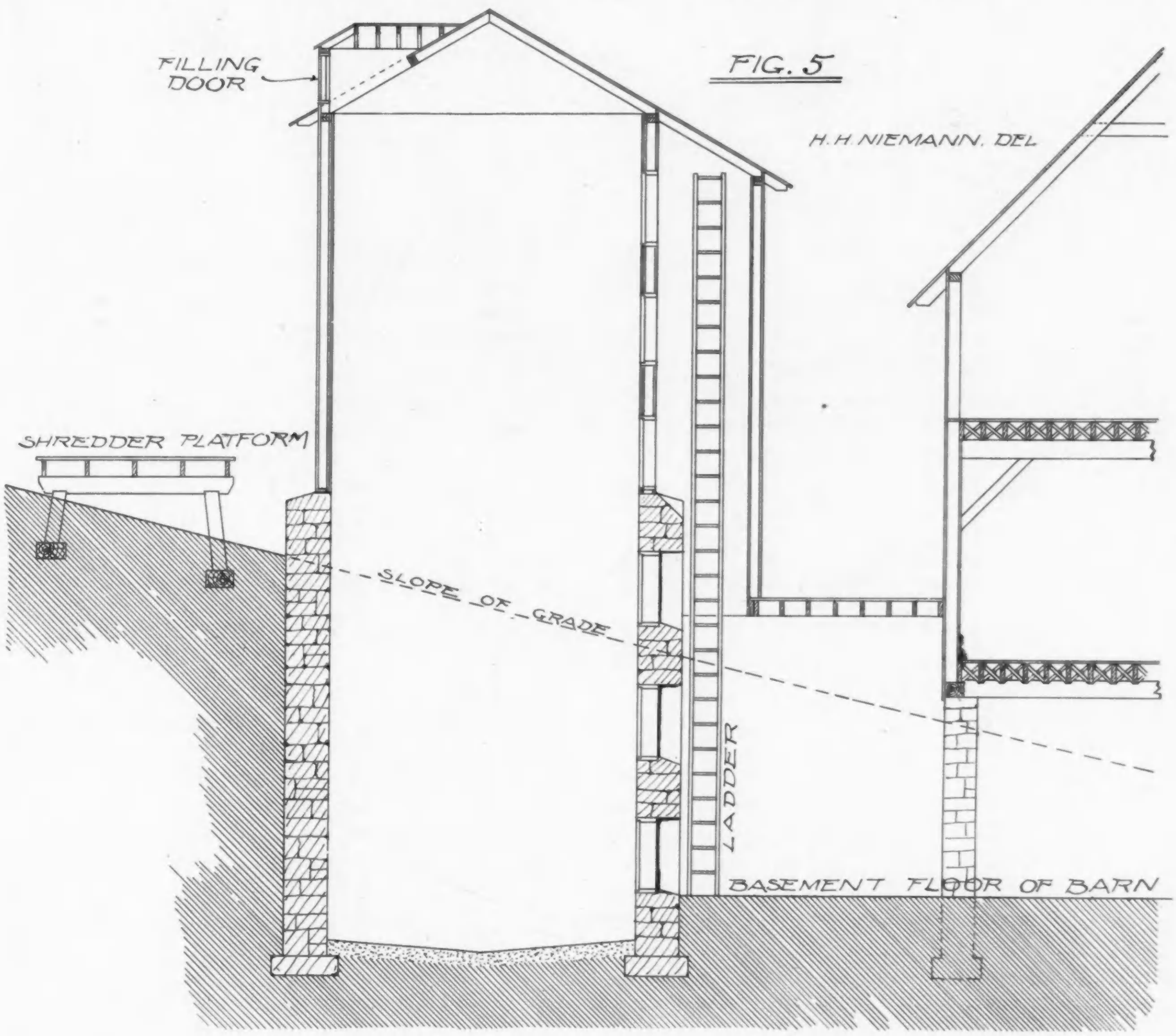
By Henry H. Niemann

BY THE exclusion of air from chopped or shredded good corn or clover they are preserved as silage. Hence the receptacle for preserving silage must be of perfectly air-tight construction. If air can find access to it, its spoiling will be certain, and the more readily air can gain access the quicker and greater will be the rate of its spoiling.

A greater amount of feed per cubic foot can be stored if the depth of silo is made as great as practicable, and because the strong lateral pressure gained by depth forces the silage against the walls more closely less air enters and consequently there is less loss than if the pressure on the silage were less, which would cause it to lie more loosely and allow the air to circulate through it.

The lateral pressure of corn silage when settling at the time of filling increases with the depth at the rate of about eleven pounds per square foot for each foot of depth. At a depth of five feet the outward pressure is fifty-five pounds per square foot; at a depth of forty feet the pressure is 440 pounds per square foot, etc.

Silos must therefore be built to safely withstand this great pressure without bulging. If the silo is to be of wood construction a rectangular construction must not be used, because the bulging of wooden rectangular silo walls allows air to come down the sides between the walls and the silage, which will cause it to spoil. For this reason the circular construction has been adopted as the most practical on account of obtaining from the horizontal boarding around the



structure, the direct tensile strength of the boards, which are nailed to the studding and running around the entire structure as hoops around a barrel.

Circular silos should be of a uniform diameter throughout their entire height, and if on account of the construction it cannot be made of a true cylindrical form, as shown in Figure 1, it may be made larger in diameter at the top than at the bottom, so that when the silage settles it will wedge itself tighter against the outside walls, as shown in Figure 2; but never should it be built like ordinary wood tanks, having a smaller diameter at the top than at the bottom, which will allow the silage to settle away from the wall, leaving an air space which causes it to spoil. (See Figure 3.)

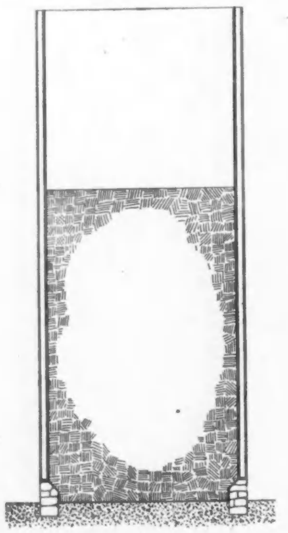


FIG. 1

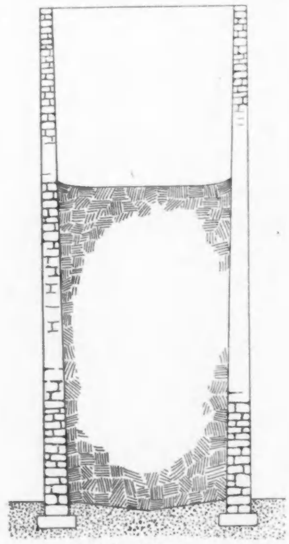


FIG. 2

The silos should extend into the ground as deeply as convenience in removing the materials will permit. If it is built outside of the barn, especially in cold climates, the foundations should extend at least three and one-half to four feet below the surface of the ground, as shown in Figure 4, and if this should be excavated it would add greatly to its capacity, but in all cases where the silage extends below the grade it should be well cemented and made water tight.

If the silo is built beside a barn situated on the slope of a hill, it is advisable to build it on the highest elevation, giving it a greater depth below the ground level, as shown in Fig. 5.

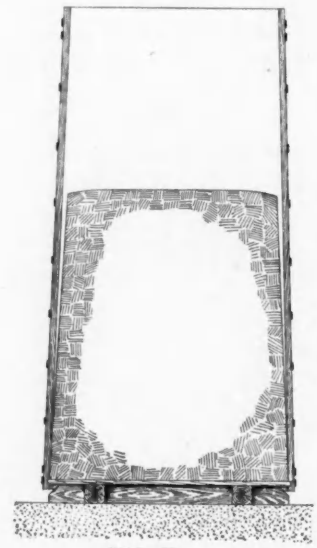


FIG. 3

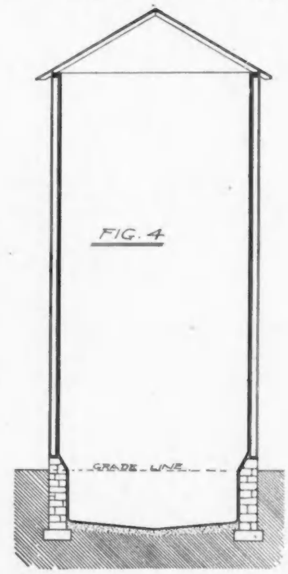


FIG. 4

Placing the silo deep not only saves elevating the silage so high when filling, but renders it almost entirely proof against frost.

Maywood Public Library

A TWO-STORY AND BASEMENT STRUCTURE, DESIGNED FOR PUBLIC GATHERINGS AS WELL AS PROVIDING READING AND LIBRARY SPACE FOR 20,000 VOLUMES

By G. W. Ashby

THE illustrations here given are taken from the drawings of the Maywood Public Library, which is now under course of construction, at Maywood, Ill. The building has a frontage of 63 feet by a length of 58 feet. Its design and classic style is very good and very appropriate for a building of this kind, being at the same time very substantially constructed. Its severe plainness is counteracted by two large Tuscan stone columns, which give an inviting appearance to the entrance.

The basement has ladies' and gentlemen's toilet rooms, a large men's reading and smoking room, boiler room, storage and unpacking room, etc.

The first floor has two reading rooms, delivery room, librarian's office, committee or board room, and a stack room with a capacity of about twenty thousand volumes.

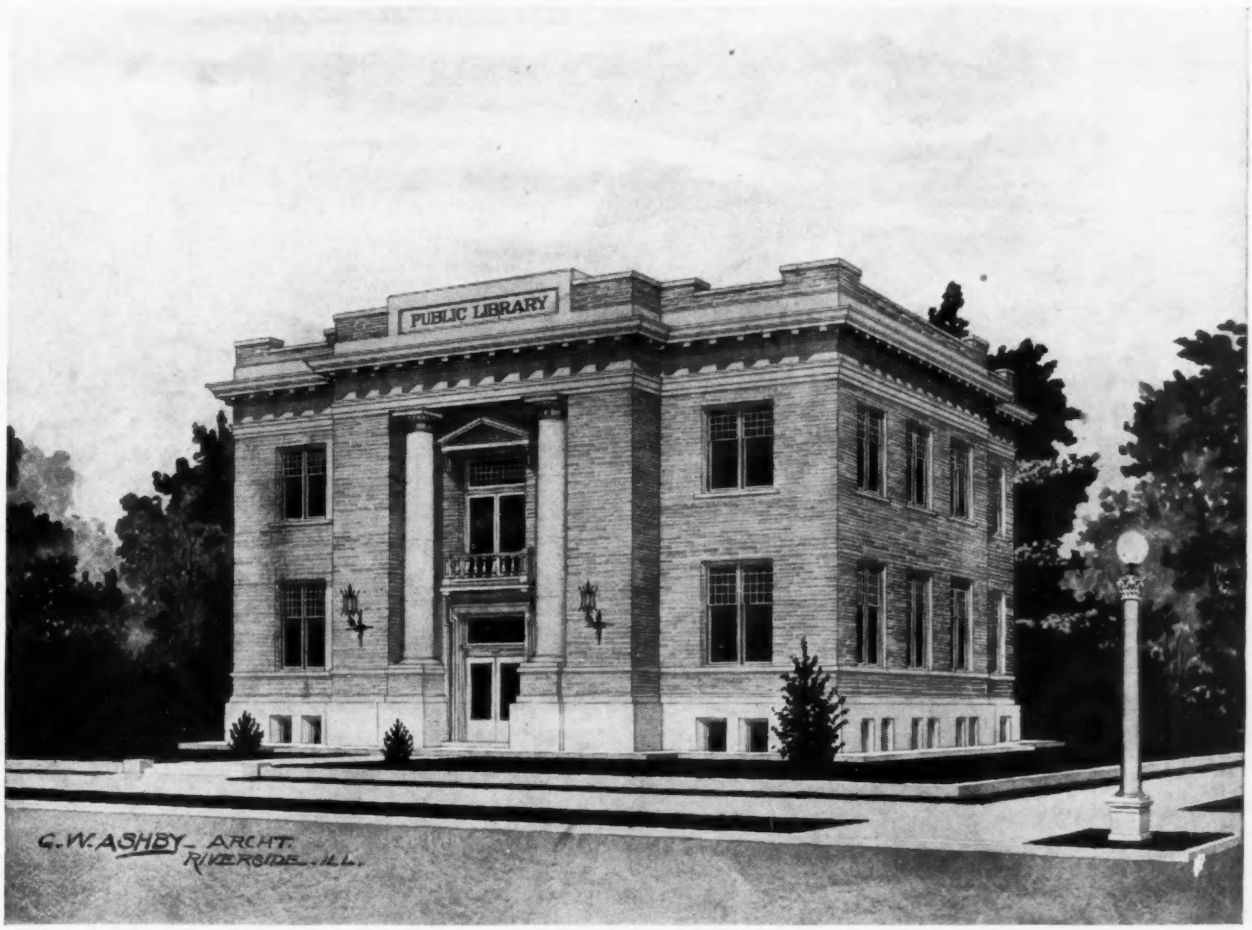
The second story has a large lecture room for educational, historic and other purposes.

The general arrangement of this plan is the result of a thorough investigation by the Maywood Library Board and the constructing architect who has made a special study of public buildings.

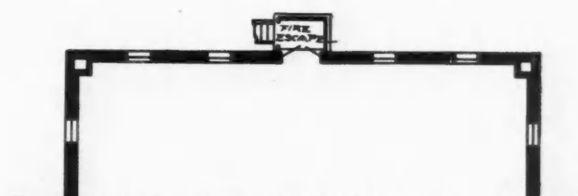
The building is being built complete for $12,000.

"The Secret of Success"

"Push," said the Button.
"Take pains," said the Window.
"Never lose your head," said the Barrel.
"Do a driving business," said the Hammer.
"Get a pull with the ring," said the Door Bell.
"Find a good thing and stick to it," said the Glue.
"Strive to make a good impression," said the Seal.



FIRST FLOOR PLAN



SECOND FLOOR PLAN

Maywood Public Library. See page 104.

Practical Carpentry

DWIGHT L. STODDARD

How to Shingle Properly

POINTERS FOR THE YOUNG MECHANIC WHO THINKS SHINGLING REQUIRES NO SKILL—HOW TO SECURE THE MOST SATISFACTORY RESULTS

IT IS not my aim to tell the many carpenters that read the American Carpenter and Builder how to shingle, as if they did not already know. There is an unwritten law that all carpenters know how to shingle—much better than they really do. But my main object is to assure the young mechanic who is put to shingling (simply because most

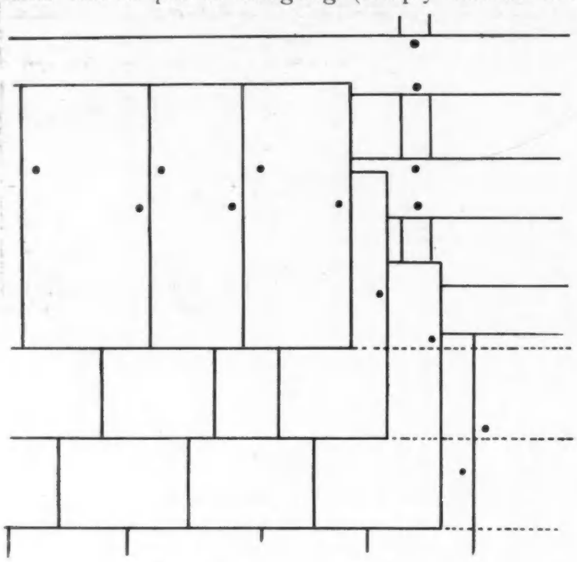


FIG. 1

people think any one can shingle) that he must not be discouraged and think that what he is doing requires no particular mechanical skill, and that he is not learning the trade or doing anything of any great importance.

My observation has been that shingling is one of the most important matters in house construction. In the early days a house consisted of practically nothing but a roof to keep the rain out. And even to-day, I care not how well the foundation and floors are made, or how plumb and beautiful the walls are, or how well decorated on the inside, or how nice the roof was framed by one skilled in roof framing, or how well it was sheathed. It is all practically worthless unless it is well shingled. There is no place like the roof for a carpenter to show his mechanical skill, for any one that can saw to a line and drive a nail can lay floor, put on siding and put up inside finish.

I wish to impress on the mind of the young mechanic that no matter what part of the trade he is working at, it is of some importance, and there is always an opportunity to learn something.

Some old mechanics that have had twice as much experience in house building say nail as high as possible. They say the higher in the shingle you nail the more air will get to all parts of the shingle and it will last longer, which is undoubtedly true. Another with possibly even more experience will say nail just as low as possible and have the nail covered with the next course, and gives for his reason that high winds and heavy rain and snow storms will not drive in.

My experience with shingling has been the same

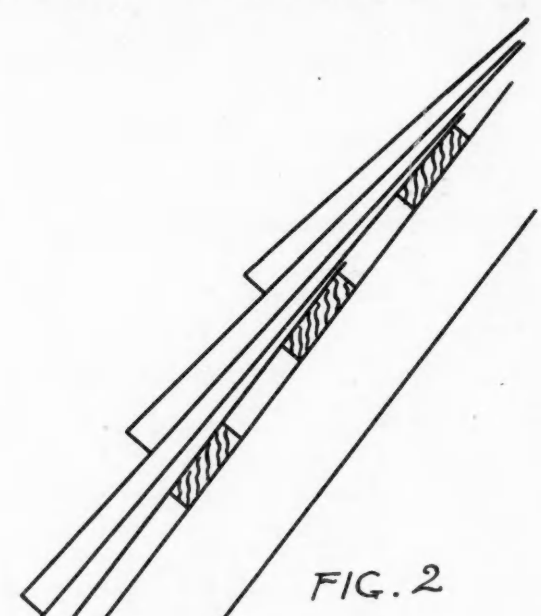


FIG. 2

as with all other matters in life—that the happy medium between the two extremes most always serves the best purpose.

Some think there is nothing like a six-inch shingle for a roof, and point to what a nice roof is made of slate all of the same size. It is all right for slate, but in my opinion all wrong for wood shingles, for if one cracks, and near the center as they generally do, it makes a crack three courses long, and should a few more crack there are bound to be bad leaks in the roof.

Figure 1 shows three courses of shingles being laid on the roof to three chalk lines, as I generally lay them, and you will notice that not a single joint comes over another, not even from the first to the fourth courses, so if one should split right at another joint it only makes a crack less than two-thirds the length of a shingle. By driving the nails one a little above the other they are not as liable to crack as if they were right opposite each other.

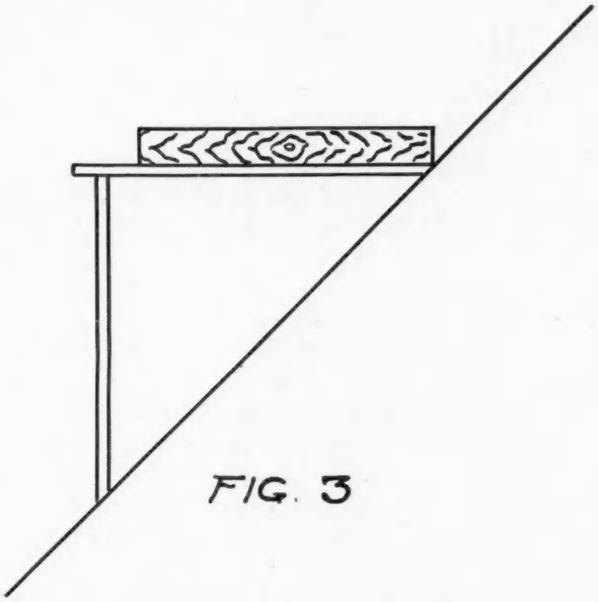


FIG. 3

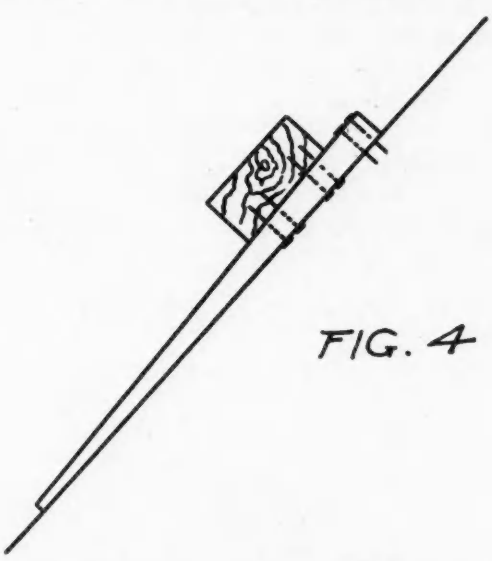


FIG. 4

Figure 2 is an end view and shows that not only is there practically three courses on all parts of a roof, but a good part of the fourth should be there also.

Figure 3. When I was a small boy in Vermont, in between two mountains, where we did not know what the outside world was doing, when we got so high we had to get a new rest for our feet we nailed brackets on the roof with tenpenny nails, and put a plank on them. One day when my father told them that in the west they nailed a two by four on with shingle nails they thought he was crazy. Figure 4 shows how it is done. It is the most common way, and does not make a leak, as the tenpenny nails would, although sometimes a shingle nail makes a hole. To avoid that, drive the shingle nail below where the nails were driven in the roof when you take it down, and it makes the holes break joints.

Some carpenters to avoid the danger of leak just mentioned, put the shingle on tip end up, shingle it in, and then saw it off when the scaffold is taken down. Others shingle over it and drive it out with a hand ax.

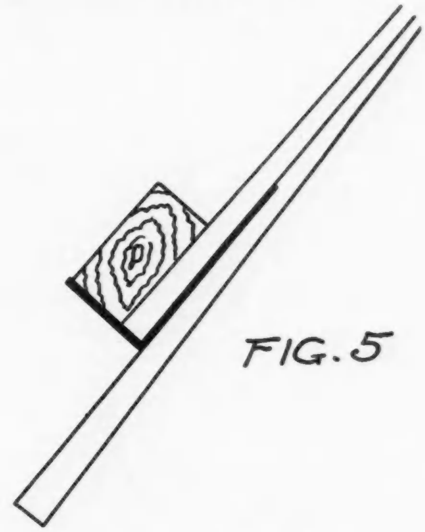


FIG. 5

Figure 5 shows a very simple iron bracket, which has many good points, but there is nothing quite as handy and cheap as the shingle. I once came sliding down a big barn roof on account of one of these brackets, but, like most accidents, it was more the fault of a careless workman than the bracket.

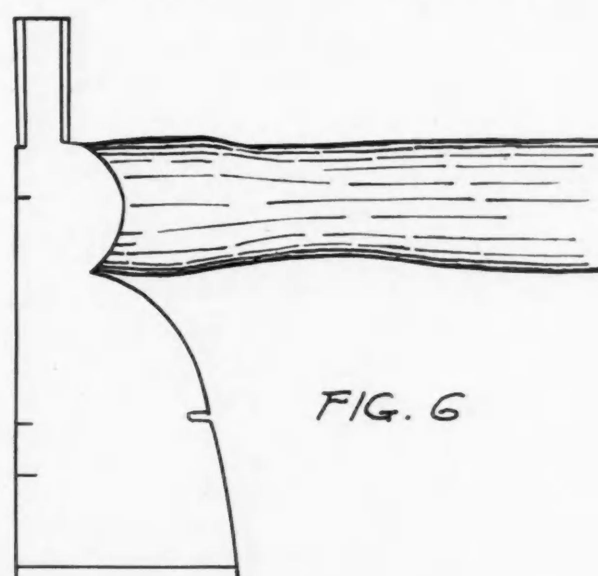


FIG. 6

Figure 6 is a very common shingling hatchet. File marks at one and one-half and two inches (the projection that is generally on a barn or shed roof—as most houses nowadays have gutters) and other marks at four and one-half and five inches (which are ordinary courses), and it makes a very convenient all-around rule, hammer and hatchet, and in the hands of a mechanic a very good roof can be laid even without the aid of chalk lines or straight edge.

Constructing an Ordinary Stair

II. DESCRIPTION OF THE HOUSED STRING STAIR AND ITS VARIETIES AND THE DIFFERENT METHODS OF FASTENING AND SUPPORTING IT—BLOCKING STRIPS

By Lewis R. Steinberg

LAST month we discussed methods of laying out an ordinary stair; in other words, getting the general dimensions of the stair, and now we are ready to build it.

Our object in this chapter will be to consider carefully the various details of construction, but in order not to be too general in the discussion we must limit ourselves somewhat. A very satisfactory plan is to

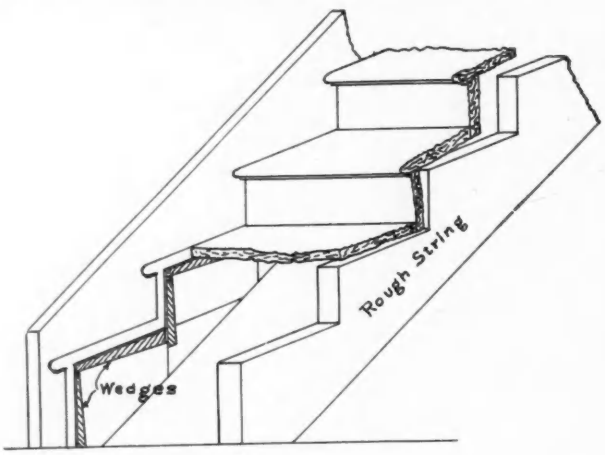


FIG. 1

take up the different kinds of stairs successively, and as the housed string stair is one of the simplest, and, at the same time, an important one, we will begin with it. This class of stairs may be divided into two kinds. First, where the stair is between two walls; that is, both strings are fastened to and supported by the walls; and second, where only one of the strings is fastened to the walls, and the other, the face, or outside string, is free.

The first is the cheaper, and is used very much in small cottages, and also as a rear stair in the better grade of houses. Of course, we find very often both of these stairs without the housed string. The treads are carried on a rough string, and the finished string is fastened to the treads and risers by nailing through it into the treads and risers, but, as this is very poor construction, we will not discuss it.

As some may not understand the term "Housed String," we will explain. By housed string we mean that the string is notched out to receive the ends of the treads and risers. An examination of Fig. 1 will show clearly what is meant.

In the stair between two walls, which we are now considering, rough strings are unnecessary, unless the stair is over 2 feet 6 inches wide, when a rough string must be provided under the middle of the stair. The finished strings are fastened to the walls, and are more rigid than if a rough string was the means of support.

After determining the tread and riser lengths, proceed laying out the string. A little device very helpful in laying out a string is a gauge-board, as shown in Fig. 2, upon which has been cut the proper length of tread and riser to the pitch of the stair. In notching out the treads and risers the notches should be cut large enough to receive a small wedge below the tread and back of the riser. See Fig. 2. These are used to make a tight fit in front, where the treads and risers come against the edge of the notches. When the stair is put together the wedges are covered with glue before being driven into place.

A closed string stair, that is, one between two walls, is built up against one of the walls before the second wall is built, which, when the stair is in place, is set up against it, and the string nearest to this wall is then fastened to the studding. If the stair is put in and lathing done afterwards pieces of inch stuff will have to be cut between the studding along the string to receive the ends of the lath. A better way, however, is to lath wall No. 1, before building the stair, then put in the stair, and when placing the studding

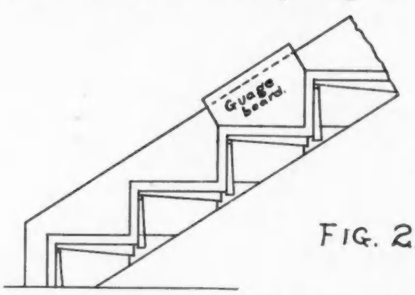


FIG. 2.

of wall No. 2, leave the thickness of a lath clearance between the studs and the near string. Then lath this wall, shoving the lath through behind the string and nailing them below and above the stair. When this is done the string may be fastened to the studding by nailing through the string beneath the treads and risers.

Care must be taken, however, that the string lies well against the studding—even if necessary to put in thin blocking strips at each nailing place. Otherwise, there is danger of breaking the glue joint, where the treads and risers fit into the string.

A stair of this kind must always be put in before plastering and the plastering is finished down upon the string. The stair should be covered with paper and small strips of boards on the treads so as to preserve the unfinished wood work from the injurious effects of the plaster which might be spattered upon it. It is also a good idea to give the stair a coat of linseed oil before plastering as the wood work is then less easily affected by plaster.

There are several methods of joining the risers and treads. In Fig. 3 are shown the various methods

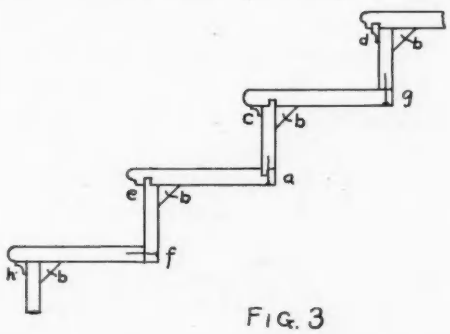


FIG. 3

of doing this. Some are considered better than others, but that is much a matter of opinion. At (A) in Fig. 3 is shown how the risers come down upon the tread and the tongue on the front side of the riser fits into a groove in the tread. If the fit is not good there will be a crack in front of the riser, which will become more apparent as the stair becomes older. At (G) is another method. This is the very way when there is a rough string in under the middle of the stair. At (F) is a similar arrangement except that the riser goes down behind the tread. All of these joints should be nailed or fastened with wood screws.

At (E) and (D), Fig. 3, are shown two ways of joining the tread and riser at the nosing. They are

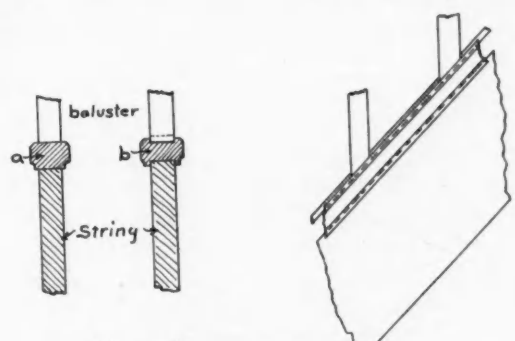


FIG. 4.

practically the same, the one at (D) having the moulding set into the groove, while at (E) a tongue is cut on the front of the riser to fit into the groove in the tread. In (D) and (E) there is the danger of having the nosing break off, because the tread, unless made of a rather thick piece of wood, may crack over the groove. In (C) and (H) are two more satisfactory methods. At (C) a tongue is cut on the back edge of the riser and the groove in the tread is as a result farther back from the front of the tread than in (E) and (D). A small moulding is put under the nosing and there is little danger of the nosing breaking off. In (G) no groove is cut in the tread, so that the full strength of the tread is preserved. In this case, however, it is almost necessary to put a triangular strip (B), as shown, so as to fasten the tread and riser together. This strip may be put on with good results in all the cases, as it will stiffen up the work considerably.

Now we will take up the stair which has one side open; that is, the string farthest from the wall, which is the face string. Fig. 4 shows a section and side elevation of this string. The treads and risers are housed the same as in the other stair, but the string must be made somewhat differently to fit the conditions. The strip (A) is placed upon the string to give it a better finish and may also be used to receive the lower ends of the balusters. These are beveled to fit the pitch of the string and fastened to the strip (A). A better method is shown in (B). The strip is grooved below to fit over the string, and above a groove is cut as wide as the balusters. These are set into the groove and a small strip as wide as the groove in (B), and a little thicker than the groove is deep, is fitted between the balusters. This gives a better finish to the joint between the string and balusters.

Next month we will continue with stairs in which the string and risers are mitered and the treads return on the ends, and also the manner of fastening the balusters.

How They Built a Home

They did without food.
They dressed in gunnysacks.
They euchred the gas meter.
They won prizes at progressive hearts.
They short-changed the peddlers.
They killed all book agents.
They spanked the kids with a shingle and saved their slippers.
They didn't pay the contractor.

Novel Moonlight Den

C. R. Hunt's new residence, at Kansas City, Mo., is to have a novelty in a moonlight den. Panels in gray tint will extend part way up the walls, the remainder of the space to the ceiling to be covered with silk squares, sewed together and put on with the raw seams out. Lights placed behind partitions will shine through in greenish gray color, heightening the moonlight effect.

The Making of a Practical Carpenter

FIRST OF A SERIES OF ARTICLES OF EQUAL INTEREST TO THE BEGINNER AND THE EXPERIENCED MAN
BEGINNING AT THE BEGINNING—MEASURING SURFACES AND SOLIDS

By Frank F. Addison

IN WRITING a series of articles on "Practical Carpentry" it is best to start at the beginning of carpentry and joinery, which is geometry. Many drop the subject after seeing the word geometry, thinking it is beyond their ability, but the fact is geometry is being used by them daily in their work—it is simply the measuring of lines, surfaces and solids. In taking up this subject it will be treated in the simplest way, making one step perfectly clear before

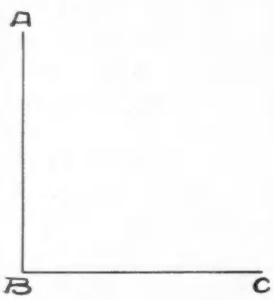


FIG. 1

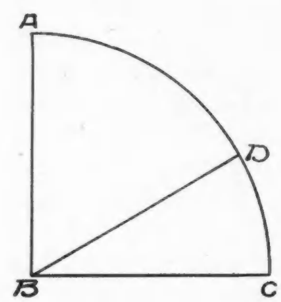


FIG. 2

taking up another, and when later practical work is explained it will be seen that many things usually difficult are greatly simplified by the knowledge of geometry. It is not said that a man cannot be a good carpenter without knowing geometry, but we do say he would be a better one if he did, as his work would not be limited. As we progress in the work many will be surprised at the great amount of the subject they already know from their daily use of it, and we will try and show them more ways of applying that knowledge. With this object in view, we have thought it best to enter into some of the details of geometry, and explain some of the more simple terms

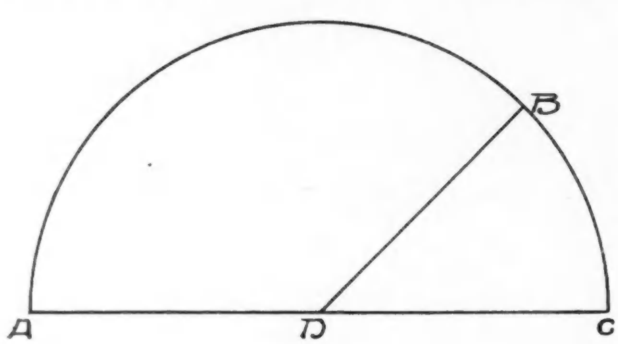


FIG. 3

and problems, with the hope that it will give the student a desire for a more thorough knowledge of the subject.

The terms and definitions used in geometry are as follows:

Geometry is the science of magnitude.

Magnitude has three dimensions—length, breadth and thickness.

A point has position, but not magnitude. When two lines cross one another, the place that marks their intersection or crossing is a point.

A line has length, without breadth or thickness.

A surface has length and breadth, but no thickness. For instance, a shadow gives a very good representation of a surface—its length and breadth can be measured; but it has no depth or substance. The quantity of space contained in any plane surface is called its area.

A plane is a flat surface, which will coincide with a straight line in every direction.

A curved surface is one that will not coincide with a straight line in all directions. By the term surface the outside of any body or object is understood.

A solid is anything which has length, breadth and thickness; it is understood to signify the solid contents or measurement contained within the different surfaces of which any body is formed.

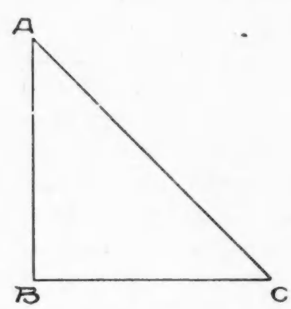


FIG. 4

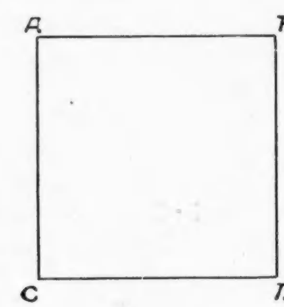


FIG. 5

A straight line is the shortest distance between two points.

A curved line is one that is continually changing by inflection.

A concave or convex line is such that it cannot be cut by a straight line in more than two points; for instance, the inside of a basin is concave—the outside of a ball is convex.

Parallel straight lines are everywhere at an equal distance from each other; consequently they can never meet.

An angle is formed by the inclination of two lines meeting in a point. The lines thus forming the angle are called the sides, and the point where the lines meet is called the vertex or angular point.

When an angle is expressed by three letters, as A B C, Fig. 1, the middle letter B should always denote the angular point.

A right angle is produced by one straight line standing upon another so as to make the adjacent angles equal, and is an angle of 90 degrees. This is what workmen call "square," and is the most useful figure they employ.

An acute angle is less than a right angle, or less than 90 degrees.

An obtuse angle is greater than a right angle, or more than 90 degrees.

The number of degrees by which an angle is less than 90 degrees is called the complement of the angle. For example, in Fig. 2, the angle C B D is the complement of the angle A B D, because the angle A B D plus angle C B D is equal to the right angle, or one of 90 degrees, or angle A B C.

The difference between an obtuse angle and a semicircle, or 180 degrees, is called the supplement of that angle. For example, in Fig. 3, angle C D B is the supplement of the angle A D B, because angle C D B added to angle A D B is equal to a semicircle, or an angle of 180 degrees.

Plane figures are bounded by straight lines, and are named according to the number of sides they contain. Thus, the space included within three straight lines, forming three angles, is called a triangle; tri, meaning three. A right-angled triangle has one right angle; the sides forming the right angle are called the base and perpendicular; the side opposite the right angle is named the hypothenuse. See Fig. 4. A B C is a right-angled triangle—A B is the base, C B is the perpendicular, and A C is the hypothenuse.

A parallelogram is a figure whose opposite sides are parallel, as A B C D, in Fig. 5.

A rectangle is a parallelogram, having four right angles, as A B C D, in Fig. 5.

A square is an equilateral rectangle, having all its sides and angles equal, like Fig. 5.

A diagonal is a straight line drawn between two opposite angular points of a four-sided figure, or between any two angular points of a polygon.

Every carpenter knows that in order to make a building endure he must have a good, solid foundation under it, and so in the study of carpentry, if you master the beginning or foundation of your work, the rest will be more secure in your mind. The terms and expressions used here are those commonly found in carpentry work, and we therefore advise our readers to thoroughly master this first article, as it will open the way for what is to follow.

Bill—Did you hear the trouble down at the new Skyhigh Building?

Jill—No; what now?

Bill—Why, the boss went into the building and riveted his eyes on the floor, and all the other riveters went on strike!

Facts About Glue

To distinguish good glue from bad, it is necessary to hold it between the eye and light; and if it appears of a strong dark brown color, and free from cloudy or black spots, it may be pronounced good. The best glue may likewise be known by immersing it in cold water for three or four days, and if it swells considerably without melting, and afterwards regains its former dimensions and properties by being dried, the article is of the best quality. In preparing glue for use, it should be softened and swelled by steeping it in cold water for a number of hours. It should then be dissolved, by gently boiling it till it is of a proper consistency to be easily brushed over any surface. A portion of water is added to glue to make it of a proper consistency, which portion may be about a quart of water to half a pound of glue. The qualities of glue are often impaired by frequent meltings. This may be known to be the case when it becomes of a dark and almost black color; yet, even then, it may be restored by boiling it over again, refining it, and adding a sufficient quantity of fresh glue. If common glue be melted with the smallest possible quantity of water, and well mixed by degrees with linseed oil, rendered dry by boiling it with litharge, a glue may be obtained that will not dissolve in water. By boiling common glue in skimmed milk the same effect may be produced. A small portion of finely ground chalk is sometimes added to the common solution of glue in water, to strengthen it and fit it for standing the weather. A glue that will resist both fire and water may be prepared by mixing a handful of quick-lime with four ounces of linseed oil, and then boiling to a good thickness and kept in the shade, on tin plates, to dry. It may be rendered ready for use by boiling it over a fire like common glue.

New Moving Van

While Samuel Clemens (Mark Twain) was a reporter on a San Francisco paper, a lady stopped him one day and said:

"Mr. Clemens, I have noticed you usually carry a cigar box under your arm; I'm afraid you are smoking too much."

"My dear madam," said Mr. Clemens, "I smoke very moderately, but you always happen to see me when I am moving."

Restricting Bids on Public Buildings

A bill has been introduced in the Illinois legislature which strikes at architects and contractors who endeavor to monopolize building material protected by trade mark. The measure makes it unlawful to limit bids for contracts for public buildings to contractors or architects who have the exclusive right to use a certain kind of material. This is intended to make the competition open on bids for public buildings.

Manual Training

IRA S. GRIFFITH

First Lessons in Carpentry

HOW TO PROPERLY USE THE PLANE AND SQUARE UP THE FOUR SIDES OF A STICK—HOW THE OLDER BOY CAN MAKE A USEFUL AND ORNAMENTAL TABOURET

IN ACCORDANCE with the plan laid out in the April number in this department, we shall begin by describing the making of an object so simple than any boy, although he has never seen a tool before, can make if he but reads the directions carefully and works honestly. Let us call it a plant support (Figure 1), a stick which can be placed in the ground and to which the plant can be tied by means of a cord. A clean, well-made plant stick will look much better in your mother's flower pot than that old dirty stick she has had to pick up in the yard to tie her geranium to because the plant had grown so tall it could not stand alone. Surprise her by making all the sticks she needs and meanwhile be learning the use of some of your tools.

You should have for this a piece of soft wood about eighteen inches long, a little over one inch wide and a little over one-half an inch thick. You must always remember that when we speak of the length of a piece of wood we mean in the direction parallel to or along the grain. You have learned by this time that wood splits easily along one direction, while in another it does not split at all, but breaks. The grain of wood extends in the direction in which wood splits easiest. A piece of wood might, therefore, be wider than it is long.

Place the piece of wood on the bench so that one end is against the bench stop. The bench stop is a piece of wood, or more often of metal, projecting through the top of the bench near one end. Its purpose is to keep the board from moving when you plane on it. You are ready now to smooth up the four rough sides with your plane.

Before beginning, look at your planes, if you have more than one, and select that one which is about fourteen inches long—the jack plane. The main use of this plane is to take off rough surfaces. Usually the cutting edge of this plane is ground slightly rounding at the bottom, so that it will cut faster than if it were ground straight across, as are the other plane blades.

There are some things about the adjustment of the plane which you must know before you can do very much with it. Figure 2 shows the way an iron plane would look if it were cut in two from end to end. This is called a sectional view. The cap C is held in place below its center by the screw G when the cap is clamped down upon the plane iron A by the little lever or cam B. Release this little lever and you will find that the cap and plane iron can be removed without changing the screw G. The adjustment of this screw should be changed only when the lever B does not press down hard enough to keep the plane iron from slipping out of adjustment, or when it presses too hard to be shut down. In the first case, tighten the screw; in the second, release it. Take out the plane iron and you will find clamped to it another piece called the cap iron H. The purpose of this cap iron is to bend and break the shaving so as to prevent the edge of the plane iron from tearing up the wood below the surface of the piece whenever the grain twists or runs down from the surface. The edge of the cap iron is not to be sharpened and should be kept back from that of the plane iron, which does the cutting, about one-thirty-second of an inch. This distance, which is called the "lead" of the cutting edge of the plane iron, varies according to the hardness or softness of the wood, and also according to the crookedness of the grain. In soft, straight-grained wood the cutting edge may have a lead of as much as one-sixteenth of an inch. Notice carefully Figure 3 the way in which the cap iron is fastened to plane iron, the bevel or sloping side of the plane iron being farthest from the cap iron. A common mistake for beginners is to clamp these two pieces together with the bevel of the plane iron next the cap iron. Another common mistake is to place the edge of the cap iron below that of the plane iron, or, in other words, to give the "lead" to the cap iron instead of the plane iron. A little thinking will show that there is no excuse for this mistake, for there would be no use to sharpen the edge of the plane iron if it were to be covered up by the dull edge of the cap iron. Replace the cap iron and plane iron after making the screw which fastens then together as tight as you can with the screwdriver. If this screw is not made tight you will find the cap iron slipping down over the plane iron and covering up its cutting edge. Turn the plane upside down, holding it towards the light with the toe F towards you, and glance along the bottom. If the plane iron does not project below the bottom, turn the brass screw D until it does, watching to see whether it projects evenly or not. If one side of the cutting edge projects more than the other, and it will nine cases out of ten, move the lever E until it is even. Watch the edge as you move the lever. For a thin shaving, the cutting edge should look like a black line of uniform thickness. For a thick shaving, the iron should project slightly. Unless you are taking off very rough wood, it is best to set the plane iron as shallow as you can, and yet be able to take off a continuous shaving. Many beginners have trouble because they set the iron too deep. In using the plane, avoid a stooping position. Stand well back (not along side) of that part of the piece which you are planing and push the plane steadily forward to the arm's length, trying to make long continuous shavings. The plane should rest perfectly flat on the wood from start to finish. When starting the shaving at the end of the board, it will be necessary to hold down hard on the knob at the forward part of the plane, and to hold firmly the handle at the rear so that the tool shall be level and not plane that part near the ends faster than it does the middle. If the wood roughs up as you plane, reverse the ends of the piece, so as to plane in the opposite direction. The roughing up is caused by planing against the grain, which has come to the surface at an angle. Sometimes, as in knotty pieces, the grain comes to the surface in opposite directions, so that the wood roughs up in which ever direction you plane. All you can do is to plane in the direction in which it roughs up the least. After a time you can tell by the way the grain looks which way you must plane without first trying the plane on it.

FIG. 1

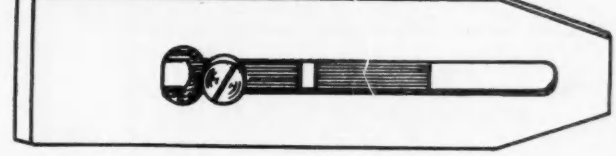


FIG. 3.

First, plane one of the broad sides straight and smooth. You can test the straightness of your work by shutting one eye and sighting along the surface from end to end. At first you had better test your ability to sight a piece straight by placing it along something which you know is straight. Mark this surface XX, and hereafter call it the working face. It is customary to select. before marking the working face, the narrow surface you are going to plane

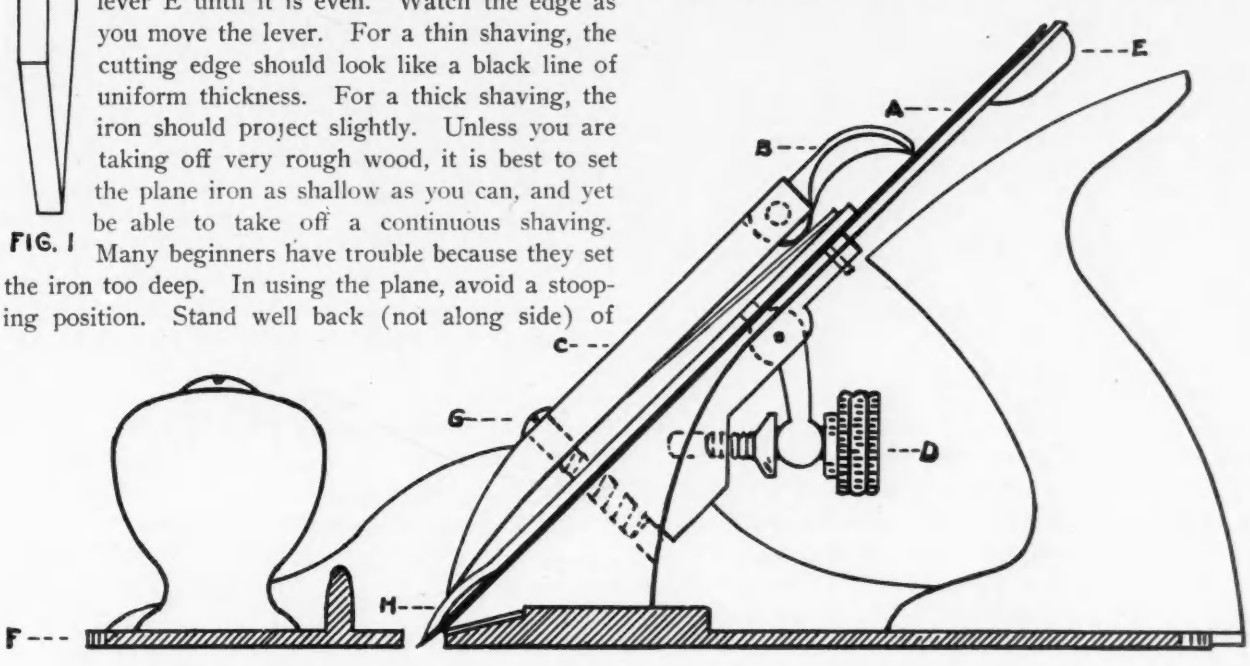


FIG. 2.

next, and place your XX marks so that they will come next this edge, Figure 5.

Second, plane the narrow surface or edge selected smooth and straight and also square with the working face. To test whether this edge is square; that is, makes a right angle with the working face, place the beam of the trysquare, Figure 4, A, firmly against the working face, holding them up between your eye and the light, and see if any light comes through under the blade B. If it does, you must note where and plane down the high places as may be required by

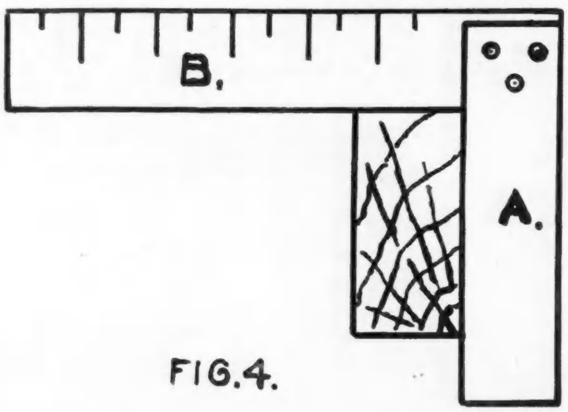


FIG.4.

tipping the plane slightly to one side or the other. It will be necessary to test in this way many times as you proceed. When this edge is straight and square mark it XX, as shown in Fig. 5, and hereafter call it the joint edge.

Third, plane the other narrow side or edge straight and square to the working face, being sure to hold the beam of the trysquare against the working face while testing. This surface is not to be marked nor are any of the rest on this piece.

Fourth, plane the remaining surface straight and

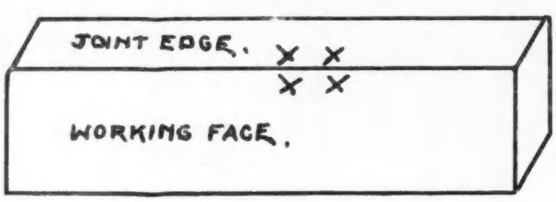


FIG.5.

square with the joint edge, testing with the beam of the trysquare against the joint edge.

In almost all work hereafter we shall have occasion to use a working face and a joint edge. Remember that they are the two surfaces at right angles to each other, which you marked XX, so you could easily know them. From these two sides, and these only, all measurements are to be made, and on these, and these only, the beam of the trysquare is to be placed in all testing. In this problem, the fewer shavings you have the better workman you may consider yourself, provided your piece is squared up properly. With your knife whittle the points and notches, as shown in Figure 1. In whittling, keep the whittled surfaces square with the working face and straight, and the two sides of the stick alike.

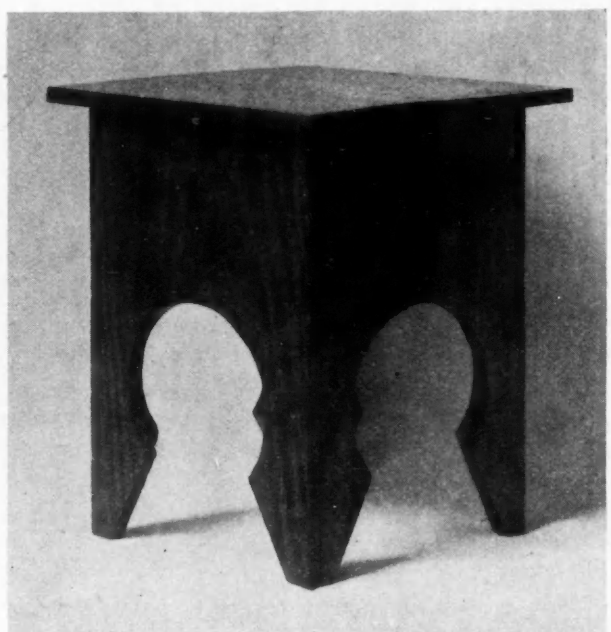
In next month's problem, knowledge of how to use the plane and knife and the trysquare for testing will be taken for granted; also the meaning and use of the working face and the joint edge.

TABOURET

The tabouret will look best if made of oak or some other hard wood and finished so as to show the natural markings or grain of the wood.

From the figured drawing, it will be seen that there are needed two pieces nine inches wide by fourteen inches long; two pieces ten inches wide by fourteen inches long; and one piece twelve inches square. When getting out the stock the pieces must be cut about half an inch longer and one-quarter of an inch wider than these figures call for.

First, square up in the usual way the side pieces



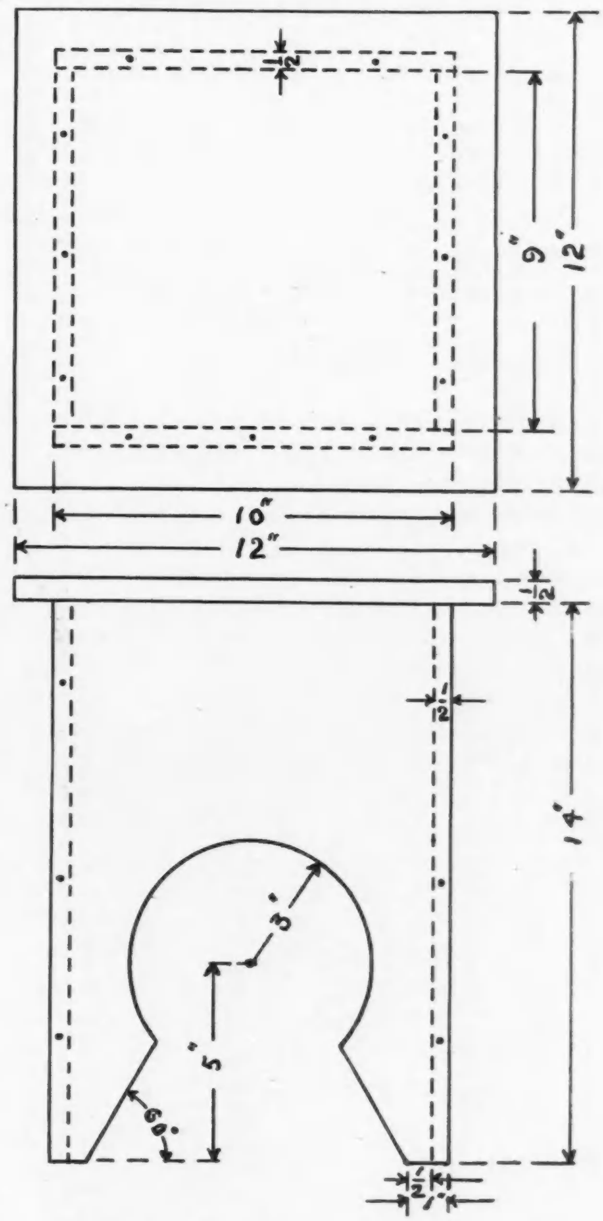
and the top. Notice that two of the sides lap over the other two in making the joint at the corner. In order that the tabouret may be square when finished, it is necessary to make two of the sides narrower than the other two. This kind of a joint is called the corner butt joint and is a very common one. In making a joint of this kind, care must be taken that the inside edges of the surface over which the lap is made are not high, as this would make a gap which would show on the outside when the pieces were all in place. Carpenters often plane the inside edge just a little lower than the outside one so as to insure a good joint on the outside. Place the working faces outward when assembling the parts.

The design on the sides can be modified to suit the individual taste. To lay out this one, find the middle of the pieces, measure up five inches on the line drawn along the middle, and with the dividers set to three inches between the points describe the circle. Measure in from the edge one-half an inch on the two narrow sides, and setting the bevel to an angle of sixty degrees connect these points with the circle. An easy way to get the correct angle from which to set the bevel is to make a circle of any size on a waste board with the dividers, then putting one point on the circumference of the circle at any place mark with the other point a line crossing the circle. Draw a line between the center of the circle and one of these points and another line between the two points. These two lines make the angle you want and you can set the bevel from them. On the two wide sides it will be necessary to measure in one inch instead of one-half in order to make allowance for the lap. The circle can be sawed with the turning saw or compass saw and can be smoothed up with the spoke-shave and steel scraper. At those places where there are sharp turns to be made, it is a good plan to bore holes before beginning to saw large enough for the saw to turn easily, boring on the pieces which are to become waste. Compare the sides by placing them all together to see that they were cut out alike. Thoroughly scrape and sandpaper each piece everywhere except on the edges and ends which go to make up the joints.

Place a narrow side piece in the vise and nail a wide side piece to it. If oak or other hard wood has been used, care must be taken not to nail so close to the ends as to split the wood. The nails will drive easier in hard wood if the points are dipped in oil. In sighting a nail straight, stand so as to look in the direction of the piece into which you are nailing. Place the other narrow piece in the vise and nail the wide piece, to which you have already fastened a side, to it.

Place this combination on the top of the bench and nail on the remaining side. Set the nail heads slightly. Plane or scrape any unevenness at the joints, being careful not to round the corners while doing it. The four sides must be square one with another before the top is nailed on. A good way to do this is to place the tabouret upright in the vise; square up the side with the steel square, then tighten up the vise. If your vise jaws are not long enough to reach clear across the tabouret's side place a board between the tabouret and jaw to prevent splitting the side. Should either of the sides next the jaws of the vise bow in, saw a stick a little longer than the inside width of the tabouret and prop it out until the top has been nailed on these two sides. Lay off on both sides of the top piece the place at which the sides are to come; on the top side, so you can see where to nail; on the bottom, so you can accurately place the top piece. After two sides have been nailed, give the tabouret a quarter turn in the vise and finish the nailing. The tabouret ought, if carefully made, to stand squarely on its four legs. If it does not, place it on some surface which you know to be level and with your dividers mark the amount to be taken off. If possible, use the saw to do this, as the plane is likely to split off the edges.

A good finish for the tabouret, if of oak, can be obtained by putting on a paste filler and two coats of



wax. Fillers come in different shades, light, medium and dark. Any color will do nicely. Brush the filler on, being careful to fill all the pores of the wood. After it has flatted or become dull in appearance, which usually takes from three to five minutes, rub it off across the grain with excelsior. Be sure to get the surface cleaned well. Allow the filler to harden over night, and then put on one coat of floor polish or wax. Put the wax on as thin as possible, but be sure to cover all the surface. After a few minutes rub it briskly with a woolen cloth. A second coat will help the appearance. A thin coat of shellac or varnish brushed on evenly after the filler has hardened and before the wax is put on will make the grain show up better still, the wax being put on after the shellac has hardened over night.

CORRESPONDENCE

Raising a Heavy Barn Frame

C. J. Case, of Johnsonburg, Pa., sends an interesting description and illustrations showing how to raise a heavy barn frame. Referring to the illustrations,

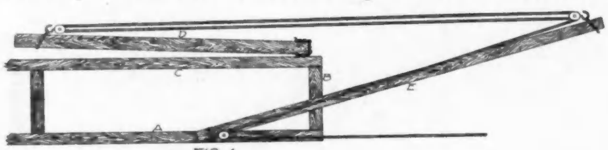


FIG. 1

which show the side elevation only, A indicates the sill of the basement, B the basement posts, C the main sill or plate on top of basement, D the main post, E the gin-pole. The first step is to drive a spike into the top of the sill a few inches back from where you wish to raise the main post or upright, then place the upright D on the sill C as shown in Fig. 1, and drive a spike into the top of D near

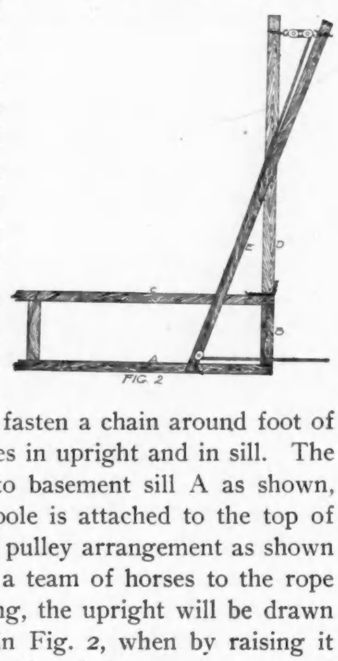


FIG. 2

the foot as shown, then fasten a chain around foot of upright attached to spikes in upright and in sill. The gin-pole E is attached to basement sill A as shown, and the top of the gin-pole is attached to the top of upright by means of the pulley arrangement as shown in Fig. 1. By hitching a team of horses to the rope at foot of E and drawing, the upright will be drawn into position as shown in Fig. 2, when by raising it slightly with a crowbar the chain can be removed from underneath and it is ready to be spiked down.

Estimating Cost of Labor

Henry Bauer, Middletown, Ohio, writes: "Please give me the proper way to get the exact or correct figures for labor on a building. I have one way, but I find I fall short. If you can give advice of this kind it will be appreciated."

[Answer.—As prices of labor differ very widely in the different sections of the country, we can give no fixed rule for estimating the cost of labor on any building, but would suggest the following as a handy rule to use:

Take some of the buildings you have erected in the past and find out exactly what the material cost you. Then find out what the labor cost you, where you made a fair profit, and where you did not make enough find out what you should have allowed for labor in order to have made a reasonable profit. You then have the proper cost of material and labor; next find out what per cent of the cost of the material the cost of labor is. This per cent may then be used in computing the cost of labor in all future work except in the case of some special work. For example:

Cost of material..............	$1,200
Cost of labor..................	300
Total	$1,500

To find out what per cent of the cost of material the cost of labor is, divide the labor at $300 by the material at $1,200. Thus:

1200)300.00(.25 or 25%
240 0
6000
6000

In estimating for future work, after having found the cost of material, add 25 per cent (or whatever it may be) to the cost for labor, for example:

Cost of material	$960.00	
Labor at	25%	
	$240.00	Cost of labor.
	960.00	Cost of material.
	$1200 00	Total cost.

J. A. F. Cardiff.]

Protection Against Rust

For farm implements of all kinds, having surfaces exposed, for carpenters' tools—indeed, for all metals likely to be injured by "rusting"—the following application is very highly recommended: Take any quantity of good hard lard, and, to every pound or so, add of common resin an amount about equal to half the size of an egg, or less. Melt them slowly together, stirring as they cool. Apply this with a cloth, or otherwise, just enough to give a thin coating to the metal surface to be protected. It can be wiped off almost entirely from surfaces where it will be undesirable, as in the case of knives and forks, etc. The resin prevents a strong smell, and the mixture keeps out the air and moisture. A fresh application may be needed when the coating is washed off by the friction of beating storms, or otherwise.

White Oak Getting Scarce

There are some woods which, for certain purposes, cannot be replaced with a substitute just because they may get scarce and expensive, and oak, for certain cooperage purposes, is one of those woods. This means, too, that we may see the time when good white oak will be the most expensive wood going, and the time is not as far away in the dim future as it may appear to some.—*Wood-Worker.*

Interior Decoration and Furnishing

JULIUS KARPEN

Furnishing a Six-Room Home for $350

THE FIRST OF A SERIES OF ARTICLES ON ARTISTIC AND SUBSTANTIAL FURNISHINGS AT A MODERATE COST—THE PARLOR AND A COMBINED LIBRARY AND SITTING ROOM

SOME rooms are attractive and inviting even when they are empty, while others are so barren in appearance that no amount of thought in their furnishing would ever make them acceptable, comfortable and home-like. Rooms properly planned and constructed, therefore, and decorated with some artistic sense and forethought, are the prerequisites of a home which, when furnished, will afford comfort and pleasure to its owners.

A sensible and substantial Morris Chair with a framework of solid quarter sawed oak

This series of articles has for its subject "Furnishing of a Home of Six Rooms," either in a cottage or a city apartment. Each room has been decorated to suit and great care has been exercised in obtaining an artistic and harmonious color scheme upon the walls. The right start having thus been made, the rest requires only a little care in selection and an adherence to certain fundamental rules, which must be followed in the purchase of home furnishings if we are to avoid mistakes, which always prove costly and discouraging.

The rooms to be furnished are parlor, library and sitting room combined, dining room, kitchen and two bedrooms. This distribution may, of course, be varied to suit individual requirements, but as each room will be treated separately, one or more rooms may be added or omitted as desired.

We start with an appropriation of $350, which is to furnish the six rooms complete with every requirement for housekeeping. The furniture to be selected is to be artistic, comfortable and of a dependable kind which, with ordinary usage, should last a lifetime. It is, of course, possible to furnish six rooms at a far less cost than is indicated herein, and while costliness of the

A Sectional Book Case
It is always uniform in appearance and grows with a library

furnishings may be varied to suit the purse of the buyer, the same general rules will apply no matter how valuable or extravagant the furnishings may be.

In this article we will treat only of the parlor, and sitting-room and library combined. Succeeding articles will take up the dining-room, kitchen and bedrooms.

We will set aside $100 for the parlor and $85 for the sitting-room and library. With this resolve, we will visit the leading furniture dealer in the city and with the assistance which he will render will carefully make our selections.

It is a mistake to suppose that furniture can be bought more cheaply by mail than through a local dealer. Mistakes are easily made in ordering through catalogues without the assistance and advice of a furniture dealer, who feels a responsibility to recommend only dependable goods which he is certain will please and satisfy. If it is impossible to make complete selections from a dealer's stock, he always has on hand a full set of illustrations of the wares of leading manufacturers in each line, and his frequent visits to the furniture markets enable him to guide in the selection of only the best and most reliable goods.

Much of the furniture sold to-day is thoroughly unreliable and a large part of it is absolutely dishonest in its material and construction. What is seen on the surface conveys no idea of what is underneath, and the methods used in imitation and substitution are such as to deceive even an expert. Much has been written concerning adulterations and frauds in food stuffs and every state and the United States government have enacted laws to punish offenders. While the state can thus protect, to a certain extent, the health of its citizens, matters have not yet progressed to a point when it can also step in and protect them from being robbed by dishonest manufacturers who unload fraudulent products in a manner which affords no redress, because the deception is exposed only by use and only after it is too late to complain.

A 3 Piece Solid Mahogany Parlor Suite

With loose cushion upholstery tied with silk cords The covering is a silk damask brocade or a panne plush in a suitable coloring

Get the advice and assistance, therefore, of a furniture dealer who is willing to assume all responsibility and guarantee the worth and dependable construction of the furniture which you purchase.

The furnishings shown in this article are of a general type and taken at random from such goods as may be found in the stocks of any first-class dealer, or which may be selected, with his assistance, from illustrations. The prices are only approximate and illustrative of what may be accomplished in artistic furnishings at a moderate outlay and expenditure of a little thought and care. Price never measures the artistic merit of a piece of furniture. And so it happens very often that the most expensive piece of furniture is, at the same time, the most inartistic. The homes of some of the wealthiest of American families, where single rooms represent an outlay of thousands of dollars, present a lack of artistic taste and utter absence of harmony of treatment which is truly appalling.

A Solid Oak Library Table
The top is 48x28 inches and it is 30 inches in height

There are four standards by which every piece of furniture must be measured and four questions to ask one's self every time a selection is made. If an article fails in any one of these requirements, it must be cast aside as unworthy of consideration.

First. Has it beauty?

Second. Does it afford comfort?

Third. Is it durable and lasting?

Fourth. Is it useful?

By these four standards each article must stand or fall. It is not enough that it contain one or two of these qualities of beauty, comfort, utility and durability. It must contain all or it is not in good taste and stands condemned.

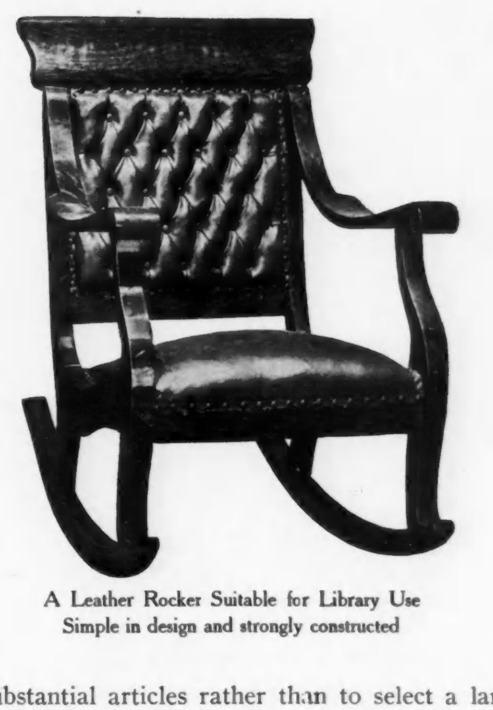
If we require that every article which we select must have these four qualifications, it will be impossible to make a mistake and we will then be certain to surround ourselves with useful and beautiful things which will grow more attractive and more satisfying the longer they are used.

One hundred dollars for the parlor is not excessive. An artistic and pretty parlor is the ambition of every prospective home furnisher, but even here we must never lose sight of the practical and sacrifice comfort and utility for the sake of appearance. A few well chosen pieces will furnish a parlor in an attractive manner, and it is far better to be extravagant in the selection of a few worthy pieces than in a purchase of a larger number of mediocre designs which will soon lose their charm. We, therefore, will confine the parlor furnishings to a parlor suite of three pieces in solid mahogany, along the lines of the one shown in illustration, which will not exceed $55 in cost. For the rugs and curtains we will lay aside $35, which still leaves a balance of $10 for pictures and miscellaneous decorations, which makes a total of $100 for the parlor.

We select solid mahogany for the parlor because it is most appropriate and because we intend the investment to be a permanent one. It will be noted that in the design shown, almost the entire value is in the framework and this, when properly constructed, will grow more beautiful as it grows older. The cushions will wear out and can be replaced either with or without the assistance of an upholsterer. If one can afford the luxury of an extra odd piece in the parlor, it may be added. By all means, having started with our parlor furnished in solid mahogany, let us continue and refuse to accept any other framework or finish for this room.

Rugs for the floor are more desirable because they are more sanitary, more lasting and more artistic. They may be taken out and cleaned at frequent intervals, while no process has yet been discovered for a proper cleansing of a carpet on the floor. If one should happen to change apartments a rug is still useful, while a carpet, because of inability to match, becomes of no value.

In the sitting room and library combined we will confine ourselves to the selection of necessities only. Here, too, we will be satisfied with a few meritorious and substantial articles rather than to select a larger number of articles without merit. As this is a room which will be used most frequently, we will decide upon solid oak as the most suitable woodwork which can receive hard usage more readily than any other known wood and retain its beauty. The following



A Leather Rocker Suitable for Library Use
Simple in design and strongly constructed

table, with values, will give an idea of what may be accomplished for this room:

Library table	$25.00
Morris chair	10.00
Sectional bookcase	15.00
Leather rocker	12.00
Total	$62.00

This allows $23 for a small rug and curtains.

A sectional bookcase is recommended because it is taken for granted that our library will grow and the bookcase by the addition of sections can keep pace with it and always remain uniform. The table should be of a substantial character and constructed so as to be practical for actual work to be performed on it. Each of the other pieces in this room, while not of elaborate, expensive or extravagant style, should be strongly constructed, comfortable and in good taste.

If our library is not extensive enough to start with three units, we can make a beginning at a less expense with one unit only and add others as our library grows.

Care exercised in the beginning will result in much economy in the end, and if we insist that every article which we purchase shall combine the qualities of beauty, comfort, utility and durability, we will be certain to surround ourselves with furnishings of which we will never tire and of which we will grow more fond the longer they are used.

The Athens of the South

About sixty miles west of Birmingham, Alabama, is located the city of Tuscaloosa, the university town of Alabama. It is one of the most beautiful cities of the South, and has always been celebrated for the culture of its inhabitants, the pure architecture of its residences and the noble oaks which shelter them from the sun. It has been called "The City of Oaks," "The Athens of the South," and similar titles of honor that describe its characteristics. The town was laid out by engineers of the United States government upon public lands before a house was erected, and many of the old families hold patents signed by the president of the United States. This was in 1819. The streets were made very wide, most of them 180 feet. A famous architect has declared that he has never seen in any other city so many "pure Greek porticoes" as are found in the old colonial homes of Tuscaloosa. The residences on the principal streets are all old, dating back many years before the war. Most of them were erected in the early part of the nineteenth century. Being the political capital and the seat of learning of the state, it had greater social importance than any other city between Savannah and New Orleans, and the uniform style of architecture was adopted by the rich planters, who built their homes here, in the imitation of the classical elegance which Thomas Jefferson had introduced into the South at the University of Virginia. The original buildings of the Alabama University were of the same style of classic architecture, with lofty Ionic pillars, Greek porticoes and colonnades, as those Jefferson designed for the University of Virginia, and planters, merchants and professional men, impressed by the beauty and refinement, adopted the same school of architecture for their residences. They erected imposing porticoes, and several of them built colonnades on three sides of their homes, with huge columns of stuccoed brick rising from the foundations to the roof.

Smallest Stores in Boston

The smallest individual store in Boston is at 303 Tremont street. It is wedge-shaped, being about four feet at the widest part, tapering to half a foot at the narrowest, and is some six feet in length with a corresponding height. The narrow door is just large enough to admit one person, while an ordinary window furnishes light for the German cobbler, who has been there for over three years. The cobbler seated at his bench is within arm's length of any article in the shop, and for him to stand and stretch himself would be impossible for one arm would go through the back partition and the other through the window in front. In point of width, the narrowest store in the city is in the vicinity of Dock square, in a large brick building, which was formerly used as a warehouse. This freak store is not three feet wide, but is about ten feet in length. As the business of the larger stores in the block has increased piece by piece the floor space at the sides and back has been taken, which has left this peculiarly shaped store in the center of the building. The business of the proprietor, that of repairing watches and clocks, fortunately does not call for much elbow room, but for plenty of light, of which there is an abundance, two large windows forming the entire front of the store.

A New Use of Electricity

T. O. Wilson, of Little Rock, Ark., is the patentee of an electrical apparatus by means of which trees are to be felled and sawed into logs. It consists of a platinum wire, which, heated to a very high temperature, takes the place of a saw. By the use of the wire trees can be cut very close to the ground, thereby saving a great deal of timber. The apparatus consists of a frame somewhat similar to that of a buck-saw, while in the place of the blade of the saw they use the resistance wire. The power used can be taken from a great distance and thus the field of action is almost unlimited.

A good carpenter looks after the work in hand, a poor one looks after his job.

Painting the New House

II. IMPORTANCE OF THE PRIMING COAT—GOOD MATERIAL AND GOOD WORKMANSHIP AS NECESSARY HERE AS IN LAYING FOUNDATIONS—KILLING KNOTS AND SAP

By Edward Hurst Brown

THE priming coat of paint is the foundation upon which the subsequent coats rest. Unless the priming is right, no matter how good the materials or how careful the painting of the subsequent coats, the result will surely prove defective. Unfortunately, too, many painters fail to realize the importance of the foundation coat and seem to think that anything is good enough for priming. They will use odds and ends of paint that have been returned from other jobs and have grown fatty standing in the tub, or will buy cheap, second-grade leads or so-called priming ochres, thinking that as the priming is to be covered up it does not matter how poor the material may be that is used. It is very much like the builder who thinks that, as the foundation of the house is buried beneath the ground and hidden, that the quality of the mortar used there will not matter and that the most inferior stone may safely be employed, forgetting that the whole weight of the house is to be borne upon this foundation. Again, the builder who erects a house upon soil that is incapable of sustaining the weight to be carried will surely come to grief. So the painter finds that not only the material to be selected for the priming coat is of the utmost importance, but the condition of the surface is equally so.

The quality of the lumber used in modern house building has more to do with the lack of durability of modern painting than most people imagine. Thirty years ago or so it was no uncommon thing for paint to last from eight to ten years before requiring renewal, while the same materials applied now will scarcely last more than two or at most three years before repainting is a necessity. It has been the fashion to blame the materials, but it is undoubtedly true that the white lead and other pigments are better and more carefully made to-day than they were a generation ago. It is true that the present day linseed oil is made by a different process, being pressed from linseed meal that has been steamed, using enormously high power hydraulic presses that squeeze out every possible percentage of oil, together with the moisture from the steam and not a little of the mucilaginous substances contained in the seed, while the older linseed oil was pressed cold, using comparatively moderate pressure, and yielding a much lower percentage of oil to the bushel than modern methods of manufacture will produce. This cold pressed oil contained very little mucilage, most of it being left in the oil cake. But in spite of the difference in the oil, there is scarcely enough inferiority in the materials used now to account for the difference in durability. It is more than likely that the unseasoned, or rather the kiln dried lumber used in modern building is largely responsible. The old, water-seasoned lumber that was rafted to market and often laid for several months in the water before being cut, had the wood acids soaked out of it. Kiln drying leaves them in the lumber, ready to become active again if moisture comes in contact with them. If a coat of paint is applied over wood of this kind, it has buried back of it a destructive agency, which needs only the presence of moisture to become active. This moisture is constantly present in the atmosphere, finding its way between the studding and soaking into the boards from the back or entering the crevices between the overlapping siding or clapboards. The acids destroy the oil and the paint perishes. The idea is prevalent among most architects and builders that all exposed woodwork should be primed as soon as it is erected. Now while this might have been good practice in the case of the old-fashioned water-seasoned lumber, it is entirely wrong when the house is built of the modern air-seasoned or kiln dried lumber. It is true that exposure to the weather may cause kiln-dried lumber to swell, but, on the other hand, this same exposure and the action of the rain beating on the surface of the wood, will, to a great extent, dissolve out the wood acids and render them less destructive to the paint. If paint durability is desirable—and it would seem to be so, to judge by the claims which various mixed paint manufacturers make for the superior durability of their particular material —then why not start right and do no painting until at least two or three rainstorms have thoroughly soaked the wood. Indeed, experience has amply demonstrated that a house which is not painted until after it has stood for a month or more will outwear one which is primed as soon as the boards are in position. Although contrary to the usual practice, one thing should be insisted on, and that is that no outside painting should be done until after the house has been plastered and the plastering has become thoroughly dry, because the plaster introduces a large quantity of moisture into the building, much of which is driven outward through the sheathing boards. This moisture not only liberates the wood acids, but, if more than one coat of paint has already been applied to the house, it has a tendency to cause blistering. The wood should always be perfectly dry before priming is done.

As has been stated, the practice of many painters, who think that anything is good enough for priming, is altogether wrong. To quote the words of one of the clearest thinkers who has probably ever written on the subjects of paints, the late William C. Wilson: "It is necessary to guard against inferior priming. Many think that anything is good enough for priming, and it is not uncommon to use cheap white paint for that purpose, or to mix with white lead, whiting or other cheapening material. If I would be dogmatic on any one point, it is that priming is the most important part of the work, and that for priming there is nothing superior, if equal, to pure white lead, and it should be the finest and best." This statement is particularly strong when it is considered that at the time Mr. Wilson was speaking to a gathering of architects as the representative of one of the largest firms manufacturing mixed paints in this country. However much he might advocate the use of a mixed paint on the subsequent coats, he deemed it inadvisable for the priming. And this is the general experience of all intelligent painters as well as that of mixed paint manufacturers, who look to the future reputation of their goods more than to the immediate dollars to be gained by selling a few additional gallons of paint for the first painting.

The essential qualities of a priming pigment are, first, extreme fineness of grinding, in order that the paint may enter into the pores of the wood and become clinched there, affording a good hold for the paint film. Secondly, that the pigment shall dry elastic. This excludes any paint containing zinc white, which dries to form with linseed oil a brittle and shrinking zinc soap. For this reason, mixed paints are unsuitable for priming. They will not adhere firmly to the wood and will be thrown off by its subsequent contraction and expansion due to changes in temperature or the varying amount of moisture in the air, and no matter what kind of paint may afterward be used on a priming coat containing zinc white, it will almost invariably peel or chip off in time. White lead, on the other hand, being soft and elastic, is specially well adapted for the priming coat. Where dark colors are to be used, a very durable priming paint is the well-known mineral brown, but in the choice of an iron oxide paint particular care must be taken to avoid paints of this class containing sulphur owing to their destructive action upon metal surfaces to which they may be applied. Unfortunately many cheap mineral or metallic paints have been placed on the market that are made from the spent pyrites from the sulphuric acid works, and such paints, although not destructive to a wooden surface, are injurious to iron and will affect pigments of any other color that may be applied over them. A great deal of cheap ochre has been sold for priming, and many so-called priming ochres have met with a large sale. These paints are largely adulterated with barytes, which is always more or less coarse in texture, and hence cannot penetrate deeply into the grain of the wood. The only kind of ochre that is permissible for priming is a first-class French ochre—the American ochres being almost invariably too coarse for the purpose. But a good quality of ochre will cost as much as white lead, hence there will be no economy in its use.

One of the most serious objections to the use of ochre for priming is the tendency which this material has to cause subsequent coats of paint to peel or to blister and flake off, leaving the ochre coat so firmly attached to the wood that nothing short of the gasoline torch will remove it. Instances are on record of buildings that have been primed with ochre and after having stood for a number of years have been repainted, when the entire paint coat blistered and began to peel, leaving the ochre priming intact. The same thing has been noticed on old houses that have originally been primed with Venetian red, which was a good deal used some forty or fifty years ago.

In cases where it is expected that the colors will always be dark, such as the ochres, umbers or siennas, these colors may be used from the wood out, but there is always the chance that at some future time the owner may want the house repainted with a lighter color, when trouble is apt to occur, unless the original priming coat was composed largely of pure white lead.

In order to hide discolorations in the wood, especially where the house is to be painted white, it is advisable to add a small proportion of pure lampblack to the priming coat, so as to produce a light lead color. From one to two per cent will be amply sufficient.

The priming coat should be mixed rather thinner than the subsequent coats, since much of its oil will be sucked into the wood by capillary attraction. Pure raw linseed oil should be used, with only just enough driers to cause the priming to dry out of the way of injury by rain within the next twelve hours. In general it may be said that the less driers that are used in paint, the greater will be its durability, but no hard and fast rule can be laid down as to the quantity to be employed, because no two makes of driers have exactly the same drying property and the condition of the atmosphere or the season of the year will govern the proportion. The judgment of the experienced painter is better than any hard and fast formula for the proportioning of the thinners in any coat of paint, be it the priming or the subsequent coats. In the western part of the country, very little or no turpentine is used in the priming coat, but the practice of most of the best painters along the eastern seaboard is to use considerable turpentine. The builder can be certain, however, that no painter would add turpentine to his paint unless he thought it necessary, for it is quite a little dearer than linseed oil, and owing to the rapid destruction of the long-leafed pine forests of the South the price is not likely to be materially lowered. Benzine should be avoided in the priming coat, for the first coat should dry flat or free from gloss. Benzine, although it reduces the paint, so completely evaporates, that, unless an excess of it is used, it does not materially affect the gloss of the paint.

It is essential for the durability of the paint that all knots or sappy places in the wood shall be coated with some material which will seal up the resinous matter within the wood and prevent it from causing blisters or otherwise destroying the paint. The best material known for the purpose is pure orange shellac. This is better than bleached shellac for this purpose, since the latter has lost much of its strength, owing to the chemicals employed in bleaching. A wood alcohol shellac, although inferior to one made by dissolving the gum shellac in grain alcohol, is good enough for covering these knots and sappy places. It is the practice of most painters to shellac knots before priming, but some experienced painters maintain that better results are obtained by priming first. It is therefore well for the architect or builder, in a matter of this kind, to defer to the judgment of the painter, insisting only that all knots and sappy places should be well coated with shellac. One reason advanced for shellacking after priming is that the shellac is better protected from the action of moisture which may penetrate through the boards, shellac being very susceptible to moisture.

As many painters are careless about the quality of the material they use for priming, so they are equally indifferent to the workmanship that is used in spreading it. A good mechanic is just as essential here, where the work is to be covered up, as later on, and there is no excuse for the careless workman who slaps on the paint in a hit or miss fashion, brushing it on in any direction just so the wood is covered. It takes little if any more time for the skilled painter to apply the paint smoothly and evenly, avoiding brush marks: and if they are left on the priming coat they will show through the subsequent coats.

The priming should be well brushed out and rubbed into the grain of the wood. Unfortunately it has become common in many parts of the country to use a wide (four inch) wall brush for outside painting, because the men can cover a greater space in a given time. The journeymen prefer this kind of a brush, because less elbow grease is required, but there is no doubt that better and more durable painting will be accomplished where the painters use the old-fashioned round brush, known as the "pound brush." There is more spring to the bristles of this kind of a brush, and when used properly it will work the paint into the wood more effectually than where the wall brush is used.

Perhaps this is the best point to state that paint should always be applied in thin coats well brushed out. No greater mistake can be made than the use of heavy coats of paint, although it is the custom of many architects to specify "good heavy coats." Heavy coats almost invariably cause blistering or wrinkling of the paint skin, and will not last as long as thinner coats. The old practice of making the priming coat thin and then following it up with two or more coats of paint, mixed moderately stout, and well brushed out till they were thin on the surface, largely accounted for the greater durability of the painting of a generation ago. Unfortunately, it is almost impossible in these days to get mechanics who really love their work and who take pride in it. All that most workmen seem to care for is to secure their pay envelope by the easiest means possible, and they will save themselves hard work whenever they can, hence there is very little painting done nowadays as it should be, and it is difficult to get journeymen who are willing to rub paint out sufficiently. But even if the thin coats must be secured by using the paint thinner, it is better always to spread the paint out thin, and it is almost axiomatic that three thin coats of paint will give fifty per cent more wear than two heavy coats, although less material is applied in the three coats.

All cracks and nail holes must be thoroughly filled with putty, in order to make a firm and solid foundation for the subsequent coats of paint. This puttying is usually done after the priming, but a few experienced painters prefer to putty before priming, holding that better results will be obtained thereby. The putty should be made from the best grade of bolted whiting, mixed with pure raw linseed oil. Very little pure putty is sold commercially, and much trouble results from the use of putty made from marble dust and kerosene, or containing these materials. Still, pure putty can be obtained if the painter is willing to pay for it, and the saving effected on a house by the use of cheap putty is so slight that the pure should always be insisted on. Some painters find it so difficult to obtain pure putty that they make their own by mixing the whiting and oil together very much the same way bread dough is kneaded, and although such putty may cost them a little more, it will not shrink and fall out like the cheap putty, nor will it discolor the paint that is applied over it.

After the house has been primed and puttied and the paint has become thoroughly dry, the surface should be sandpapered, to give a smooth foundation for the subsequent coats.

"The Rhyme of the Builder Man"

It ain't that his work will look like work,
Nor stand without crack or flaw;
But just because of the nerve he's got
An' ther things he'll do with his saw.
Ther Devil himself near split himself,
An' dislocated his jaw,
A watching thet cross-eyed carpenter
Do things with a cross-cut saw:
Thet wonderful cross-cut saw.

He'll rip ther shingles off ther roof,
Or pull out a framing spike;
He'll gouge a mortise out of a plank,
Drive nails an' screws an' ther like;
He'll use ther tooth side an' then ther back,
An' ther end is just as good;
It would make er plumber jealous an' sick
To see what he'll do to wood.

It ain't that his work will look like work
Nor stand without crack or flaw;
But just because of ther nerve he's got
An' ther things he'll do with a saw:
Thet versatile cross-cut saw.

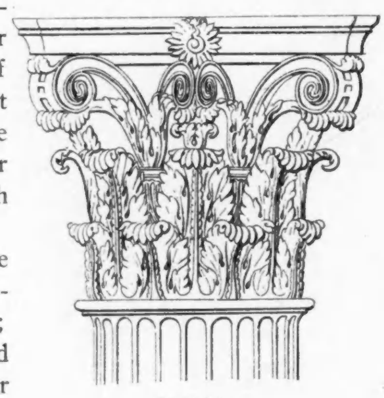
Ancient Architecture

WILLIAM REUTHER

A Glimpse of Grecian Architecture

PRIVATE HOMES LACKED THE SPLENDOR AND MAGNIFICENCE OF THEIR TEMPLES—DESCRIPTION OF THE THREE DISTINCT ORDERS, THE DORIC, THE IONIC, THE CORINTHIAN

IN STUDYING the architecture of Greece one must study their temples and other public buildings, because the republican spirit of Greece tended to repress all appearance of luxury in their private homes. The people seem to have thrown all their power into the splendour and magnificence of their temples; and it was not until a late period that their houses received much attention.



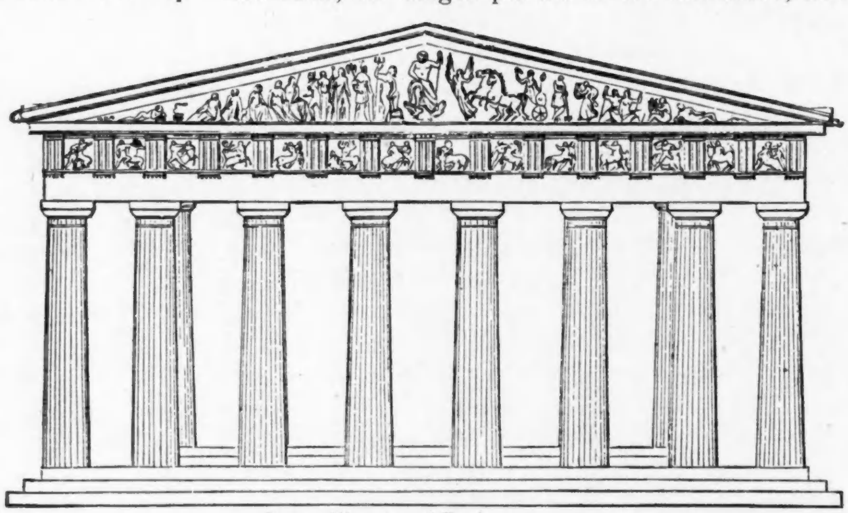
Corinthian

Grecian art can be said to have originated in themselves; it was the outward expression of their life, habits and religion. It is severely simple, solid and extremely graceful. "Carpentry," says one writer, "is incontestably the model upon which Greek architecture is founded; and of all models which nature has supplied to the art, this is, beyond doubt, the finest and most perfect of all, as it includes all those parts that are effective for utility and beauty."

The Greeks, unlike the Romans, did not build monuments and triumphal arches in honor of their victorious generals, but instead built temples in honor of the gods and goddesses who protected and watched over them. The defeat of the Persians at Marathon and other celebrated victories had brought peace to all of the states of Greece, and liberty, the love of country, ambition in every department of life, had made Athens the focus of the arts and sciences. It was indeed only after the flight of the general of Xerxes that a general restoration of their monuments and the rebuilding of Athens was set about.

Grecian architecture is divided into three orders, the Doric, the Ionic and the Corinthian. The Doric which is the most ancient, is severely simple and lacks decoration of any kind. The great pillars of the Parthenon are good examples of the Doric order, and with their exceeding strength and simplicity they express gravitation and support. The Parthenon was erected in honor of Minerva, the goddess of war and wisdom, of virginity and holiness, of irreproachable severity and stood overlooking Athens as a daily reminder to them of their devotions. The Greeks were very religious, not only one day in the week, but every day, and so in their temple their ideas of religion were outside, and could be seen from a great distance, and the people were constantly in the presence of this expression of the greatest and deepest religious idea.

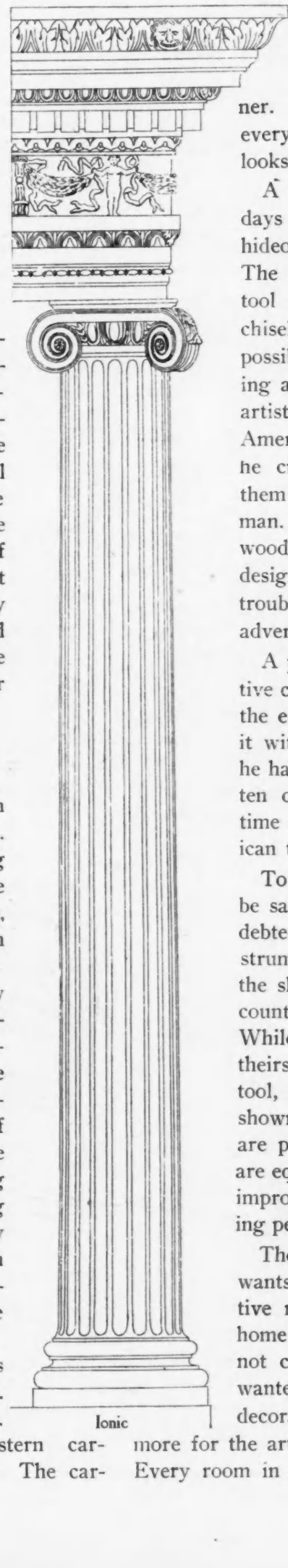
The next order in point of time is the Ionic, whose chief characteristic is its capital. This capital has not all its sides similar—two, which may be termed the faces, are ranged parallel to the architrave; and two others, at right angles to the face and underneath the architrave, which may be called the sides. Spiral bands, or volutes as they are called, ornament



Doric—Elevation of Parthenon

each side of the face, and are connected by a band passing across the upper portion of the face. An example of the Ionic order is found at Priene, in the temple erected in honor of Minerva.

Corinthian order.—Many writers are of the opinion that the Corinthian capital was invented by the Egyptians. Although many well-formed capitals are to be found in the ruins of Egypt, the taste, the delicacy of the foliage, the beautiful form and elegance of the leaves and volutes, with the symmetrical and easy disposition of the whole, are superior to anything yet discovered among Egyptian ruins. To-day the Corinthian capital exhibits the utmost elegance that has ever been attained in architectural composition, though many attempts have been made to exceed it. The Corinthian order is appropriate for all buildings in which magnificence, elegance and gaiety are requisite. A good example of the Corinthian order is the temple of Jupiter Olympus, erected by Adrian, at Athens. Owing to the sacrifice of solidity and massiveness to attain elegance and form, the Ionic and Corinthian orders have not withstood the onslaughts of the weather as well as the Doric.



Ionic

Chinese Carpenters Slow

The efforts made to introduce modern tools in China have met with poor success. The Chinese are slow to accept anything of foreign make. Their prejudices are due more to their religion than anything else, and no Chinaman looks with favor upon anything that is made by the white man.

An illustration of this fact is the way that the carpenters of China work. Nearly every tool that they use is operated exactly opposite to the manner in which the American mechanic uses them. The drawing knife is a misnomer when you speak of the tool as used by a Chinaman. The Chinese carpenter shaves wood by pushing the knife from him rather than by drawing it toward him. And in like manner many other useful tools that are to be found in the Chinaman's set are operated the reverse of our way of handling the same tool.

An American carpenter can do five times as much in a day as a Chinese carpenter. He also does his work with less labor. But in the matter of finery the eastern carpenter may give him a race for honors. The carpenter in China broadens his field until he becomes more of a high-class cabinet maker or carver in wood than his American brother. This is due to the desire of the Chinese people to have the dragon appear in every possible place and manner. The dragon is a religious symbol and everywhere that the Chinese householder looks he wants to see the dragon.

A Chinese carver-carpenter will spend days with a chisel working away at some hideous design drawn by his employer. The way that he handles the sharp-edged tool is a marvel. He can take an inch chisel and work its edges into the smallest possible places, turning a corner or gouging a wing or a fish scale as deftly as an artist could draw the figures. When the American maps out his pieces of wood he cuts them separately and then glues them together. Not so with the Chinaman. He starts in on a job by gluing his woods together and then cutting out his designs. Any carpenter can see how much trouble is added to his work through his adversity to the modern carpentry.

A plane is a tool that is foreign to a native carpenter in China. If he has to shave the edge of a piece of wood he goes after it with a chisel. He keeps at work until he has finished the job. Usually he spends ten or twelve times as much labor and time on it as would be taken by an American to do the same amount of work.

To give credit where it is due, it must be said that the American carpenter is indebted to the Chinese for many useful instruments used in carpentry. Many of the sharp-edged tools that are used in this country were invented by the Chinese. While our tools are improvements upon theirs, we must admit that the primitive tool, upon which we improved, was first shown us by the Chinaman. The Chinese are prone to use primitive tools and they are equally quick to condemn the use of the improvements made by the English-speaking people.

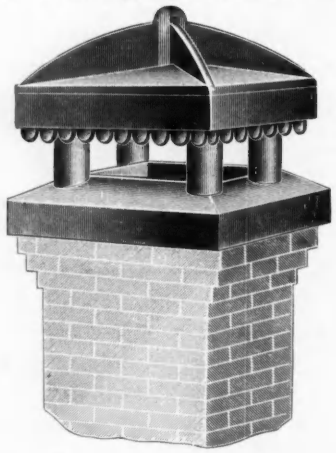
The average American home builder wants his home to be finished in an attractive manner. For this addition to the home he is willing to pay. The extra does not cost a great deal. If, however, he wanted his home decorated as the Chinese decorate their residences he would pay more for the artistic finish than for his actual home. Every room in a Chinese home is skillfully carved.

New Tools for the Carpenter and Builder

INTERESTING DESCRIPTIONS AND ILLUSTRATIONS OF IMPORTANT MACHINES AND MATERIALS THAT ENTER INTO HOUSE CONSTRUCTION IN ITS MANY PHASES AND DETAILS

An Improved Chimney Cap

The American Artificial Stone Company offer to the public a line of chimney caps and cap stones which are simply and scientificially designed, absolutely durable, inexpensive, an ornament to a building, and a source of comfort to the



owner. These caps are manufactured from a special mixture, moulded from patterns and cast in sand. They are warranted to outlast any chimney and are not effected by the gases from the chimneys nor climatic changes. Each cap is tested before leaving the factory and is warranted to perform its work properly. Write the American Artificial Stone Company, New Britain, Conn., for price list and descriptive booklet.

Cracked Cement Blocks Impossible

The Hartwick Automatic Concrete Block Machine Company, of Jackson, Mich., is manufacturing a hollow block machine, which for simplicity, quickness in operation and the perfect block it produces has elicited admiration from all who have seen and used it.

Among the strong points of the machine is the range of work which it covers, making any or all style blocks, hollow or solid, from two inches to sixteen inches wide, and any length to twenty-four inches. The face of this machine is

not hinged and does not drop down or draw away on an angle or radius, but is a straightaway release from the block, making an injury or crack to the block impossible.

Another very important feature is the locking of the cores—top, bottom and ends—so there is absolutely no vibration in tamping. Consequently cracked and warped blocks are an impossibility on this machine. The cores are first loosened from the blocks by a foot trip, thus making removal of cores an easy matter.

An expensive feature of the ordinary block machine and one which has caused much trouble is the pallets. On the Hartwick machines this expense is greatly reduced by the fact that on one pallet, say of twelve inches, any size or style of block is made, and if a sixteen-inch pallet is used all sized blocks can be made on the bottom plate, thus not requiring a separate size pallet for each size block.

This company has just patented an attachment which fits to the back of their block machine and moulds in the block a groove whereby lath can be attached after the walls have been built, thus creating a second air space and insuring absolute protection from frost and dampness.

The company will be pleased to forward to any address upon application their complete catalogue describing their machine and method of working it. Address, Hartwick Automatic Concrete Block Machine Company, 228 Washington street, Jackson, Mich.

A New Door Knob

The Laanna Manufacturing Company, of 3614 Howell street, Philadelphia, Pa., are manufacturing the Roberts

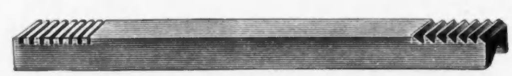


Fig. 1

Fig. 2

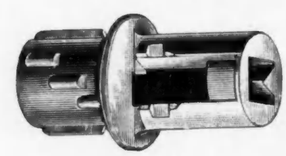


Fig. 3

Fig. 4

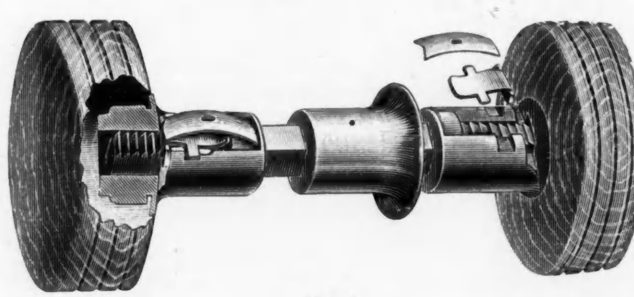


Fig. 5

"Screwless Spindle" wood door knob. This invention consists of a spindle having teeth or notches milled on both ends, as in Fig. 1, the same being cut so as to engage with the small dog, Fig. 2, which is held in position in the knob neck, Fig. 3, by a small, finely tempered spring, Fig. 4. The spindle is grooved on one side so as to engage with a corresponding lug or projection in the knob neck, the object being to prevent the knob being placed upside down, which would render it useless.

To release the knob from either end of the spindle, it is only necessary to use a small pointed object, which is placed in the small hole in the knob neck, and press the end of the dog or catch downward, and at the same time pull the knob off.

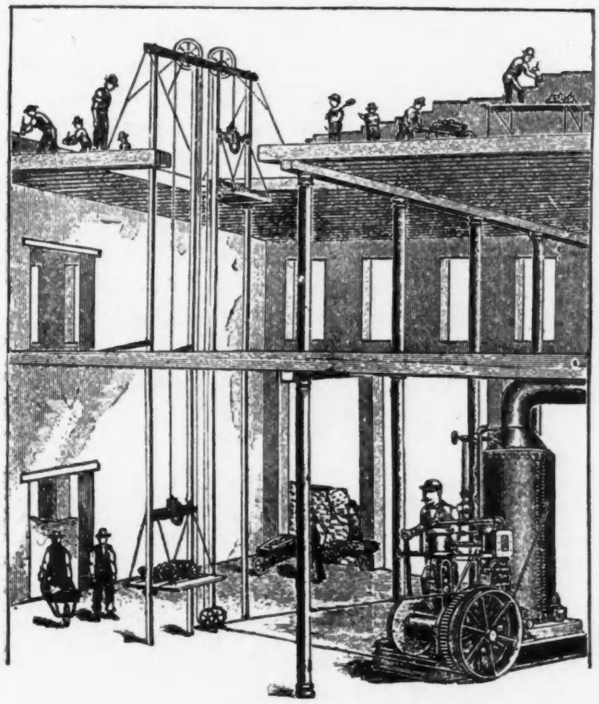
In Fig. 5 the parts assembled in their relative positions are shown, giving a very comprehensive idea of this simple but most effective device.

The Roberts knob is practical, reliable and mechanically perfect, and every knob is guaranteed. A free sample will be furnished with pleasure upon application.

Derricks and Material Elevators.

The accompanying cut illustrates one of the National Hoist & Machine Company's material elevators, which are made for either hand, horse or steam power.

This company also makes a special hoist to operate either



single or double cage elevators, which can be run by an ordinary gasolene or steam engine, connecting by belt.

They also make derricks and hoists of all sizes and descriptions. Catalogue sent on request. See advertisement in another column.

The Parker Vises

Nearly every carpenter and woodworker needs a good vise. The Charles Parker Company are manufacturing a fine line of woodworkers' vises with swivel back jaws and swiveled on base, designed especially for the woodworking trade. The Parker vises, same as the famous Parker gun, manufactured by the above concern, have many valuable and exclusive features. This concern also manufactures a full line of vises for blacksmiths, jewelers, wheelrights, filers, mechanics and dye-sinkers. They will send you one of their complete catalogues free if you will write them and mention the AMERICAN CARPENTER AND BUILDER. Address, The Charles Parker Company, Meriden, Ct.

The Clipper Cement Block Machines

A cement block machine that is meeting with much favor has recently been placed on the market by The Clipper Machine Co., of Dows, Iowa, and has some features which the makers claim are superior in several ways. All the face blocks are tamped with the face down, which has several advantages:

First—A block made with the face down will show a better face, as the face being in the bottom of the machine will receive all the pressure and thus follow the minutest detail of the cut faces.

Second—Blocks may be faced with a very thin facing of richer material, thus making a fine grained face with very little extra expense.

Third—A block made with the face down may be made much wetter than blocks made with the face to the side, as the facing material may be made dry enough so that it will not adhere to the face, and the balance of the block can be made very wet, in fact, wet enough so that when tamped heavily the moisture will rise to the surface. This saves a great deal of labor in curing the blocks, as almost enough water can be incorporated in the mass to allow of perfect crystallization and does not require the careful watching and sprinkling that the dry block will.

This machine produces hollow blocks, veneering blocks, circular blocks, chimney blocks, pier blocks, in rock-faced, plain-faced, panel-faced. Attachments are furnished for making fractional blocks of all kinds.

The Clipper Machine Company will be glad to furnish particulars to any one interested.

An Improved Circular Saw

A hand and foot power circular saw that is being manufactured by J. M. Marston Company, of Boston, Mass., has many points of superiority. The frame of this saw is made entirely of iron and of a design that gives it great strength, and with the amount of iron and the thorough manner of building together makes it very rigid, and its weight is sufficient to make fastening to the floor while working unnecessary.

In constructing this machine, nothing but the very best iron and steel is used and all parts are designed with reference to the work they are to perform. The working parts consist of two shafts and saw arbors. The center shaft receives power from the operator either by treadle or crank, and is applied direct by means of a 20-inch cut gear on that shaft, which meshes into a 2-inch gun metal gear on the saw arbor, and with a 4¾-inch gear on the lower shaft, which also carries a lathe turned balance wheel 23 inches in diameter and weighing forty pounds. By this means the balance wheel is given a speed four and one-half times greater than the driving shaft, giving it sufficient momentum and power to carry the saw steadily through the work. At the same time the 20-inch gear meshing into the 2-inch gear on the saw arbor gives the saw a speed ten times greater than the driving shaft. The shafts of this machine are made of steel, the arbors have a ⅜-inch hole and set screw in opposite or outer end for holding bits, whether the machine is with or without boring table. The 20-inch and 4½-inch gears are made and carefully turned from the very best of iron and are accurately cut by automatic machinery and will run quietly and smoothly.

Fuller particulars can be obtained from an illustrated catalogue, which will be sent free by mentioning the AMERICAN CARPENTER AND BUILDER when writing. Address, J. M. Marston & Company, 250 Ruggles street, Boston, Mass.

Great Variety of Cement Blocks

The Stringer Machine Company, Jackson, Mich., in this issue present their advertisement of a first-class concrete building block machine. The company has sold a large number of machines, which have given perfect satisfaction.

An important feature of their machine is that blocks of any size or shape, from a fraction of an inch to thirty-two inches long, can be made from the moulds. Blocks with plain face, beveled face, rock face; blocks for porch columns with four rock edges, if desired, chimney with two flues and four rock edges, culvert blocks, angles, gables to suit any angle or pitch, angle blocks for the purpose of turning corners in building construction, for veneered work or other work, window sills and water table four to six inches in length, as well as fence posts, can all be made in moulds of the Stringer machine.

Any reader of the AMERICAN CARPENTER AND BUILDER interested in the concrete construction question, should secure additional information from the company. Address Stringer Machine Company, 120 West Trail street, Jackson, Mich.

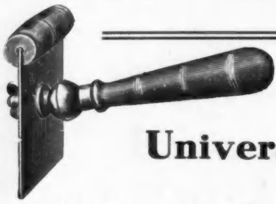
Book of Tables for Mechanics

The Stanley Rule & Level Co., of New Britain, Conn., whose advertisement appears in this issue, have just issued Catalogue No. 34, giving a description of the full line of tools manufactured by them, many of which are new and of especial interest. In this book will also be found various tables of interest to all mechanics. Ask your dealer for a copy of this catalogue.

Where Haste Proved a Failure

New York City builders and contractors are paying the penalty of too much haste, which is well worth calling to the attention of the carpenters and contractors elsewhere. In the attempt to overcome all difficulties and accomplish speed in building, a number of buildings have been executed during the past winter with masons and bricklayers working in the coldest weather. Now the penalty is enforcing itself. In several places houses constructed under such conditions have fallen. The spring thaw has crumbled the mortar like dry sand, and walls erected under those conditions have fallen out like cardboards. It has long been known that fresh mortar laid under low temperature would not "set," and it is a common thing for portions of a wall laid in or overtaken by sudden cold weather to be taken down and rebuilt in warmer weather. In many cities there are laws against laying brick walls when the thermometer registers below freezing, but in New York brick may be laid unless the mercury registers 24 degrees, which is eight degrees below the freezing point. It is well to take notice of the failure, because New York ways are often copied.

Joseph L. Ferrel, a chemist of Philadelphia, has invented a process for treating wood with chemicals making it fireproof. The wood is thoroughly saturated by hydraulic force with sulphate of aluminum, which makes it incombustible. If it is proven practicable it will revolutionize the building industry, as the need and demand for fireproof wood is so great that its use would be almost universal.



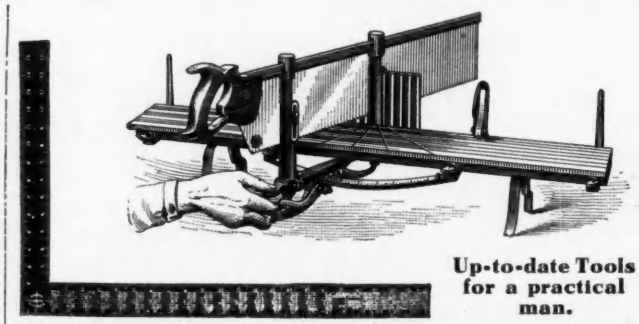
STARRETT

Universal Scraper

Eight sharp cutting edges. Instantly adjusted by ball joint connection. Blade may be instantly set at any angle. Neatest and best scraper made.

Send for free Catalogue No. 176

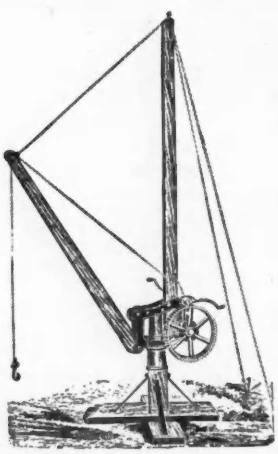
The L. S. Starrett Co., Athol, Mass., U. S. A.



Up-to-date Tools for a practical man.

NICHOLLS' FRAMING SQUARE AND COMMON SENSE MITER BOX

NICHOLLS MFG. CO., Ottumwa, Iowa



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Special derricks for handling

Cement Hollow Blocks

The finest derrick for this purpose made.

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Write for catalog and prices.

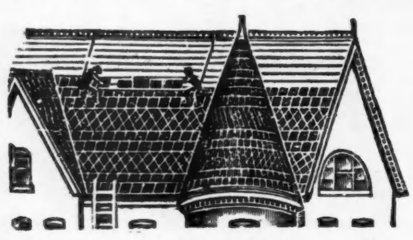
NATIONAL HOIST & MACHINE CO.
460 W. 22d St., CHICAGO, ILL.

FURNACE MISTAKES PREVENTED Free

Our new illustrated book prevents mistakes. It's free. Send for it now and save regrets. It tells how to arrange plans for heating and ventilating with a furnace. It directs how to select a furnace, where to place it, etc. It explains how we can sell the No. 45 Leader Steel Furnace for $49 and pay the freight east of Omaha; how to set up your own furnace without an expert's help. Save money. Write for it.

Hess Warming & Ventilating Co.
Room 720, Tacoma Bldg., Chicago

Genuine Bangor Unfading Black Roofing Slate, Blackboards, Structural Slate



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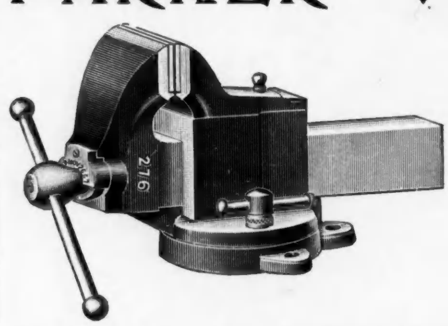
The Bangor Slate Co.
Lock Box 94 BANGOR, PA.

ALL ORDERS FILLED PROMPTLY

PARKER VISES



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Is the one who conducts his business on systematic principles.
Estimating the cost rapidly and correctly is the first step to success.
A simple, rapid and practical method for estimating the cost has been prepared by a successful builder, who has used same in his business for years.
Based on actual experience, not theory. Saves risk of omissions often made by customary methods of estimating.

A $2,000 Residence Estimated in 30 Minutes.

Invaluable for repair work, which is so hard to estimate exactly.
First edition nearly sold out in 60 days. This phenomenal sale allows us to sell the course for 50c. post paid.

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GREAT BARGAIN

J. M. BACHERT
12 S. Water St. Room 5 CLEVELAND, O.

"Yankee Tools"

The newest, cleverest and most satisfactory in use, and the first to be offered at so reasonable a price that every up-to-date mechanic could buy tools of their quality and character.

Other tools are very good tools, but "Yankee" tools are better.

"Yankee" tools are sold by all leading dealers in tools and hardware everywhere. Ask your dealer to see them.

No 15. "Yankee" Ratchet Screw Driver, with Finger Turn on Blade.

No. 30. "Yankee" Spiral-Ratchet Screw Driver, Right and Left Hand.

No. 44. "Yankee" Automatic Drill, Eight Drill Points in Handle, and Adjustable Tension to Spring.

No. 50. "Yankee" Reciprocating Drill for Iron, Steel, Brass, Wood, etc.

Our "Yankee" Tool Book tells all about these and some others, and is mailed free on application to—

North Bros. Mfg. Co.

PHILADELPHIA, PA.

"TEN MACHINES IN ONE."

NORMANDIN HOLLOW CONCRETE BLOCK MACHINE

Styles and Variety of Stone Unlimited.

Absolutely the Best.

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