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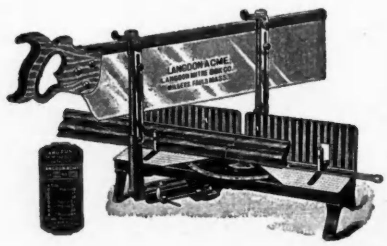

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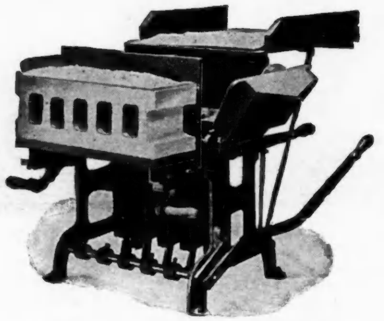

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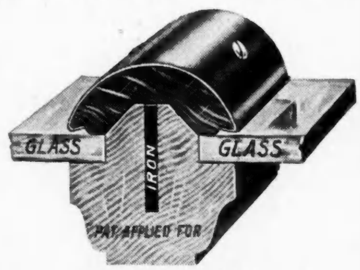

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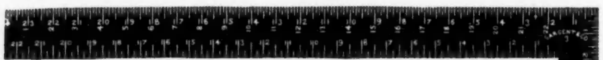

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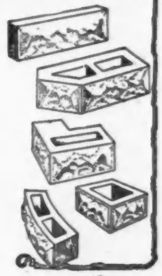

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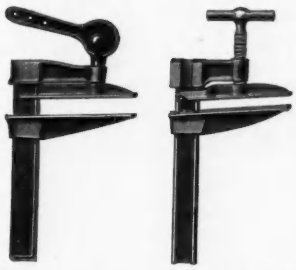

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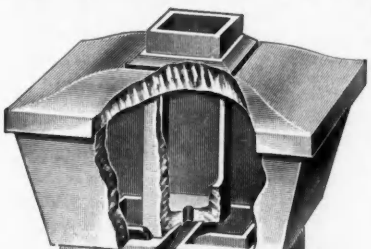

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AMERICAN CARPENTER AND BUILDER

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

Vol. I SEPTEMBER, 1905 No. 6

Why Uncle Rural Always Succeeded

BY J. CROW TAYLOR

IT was at the rebuilding of the saw mill, barn and stable of Buckland & Lawrence, and it was a nasty job. The barn, which was an immense box structure with a roof made up of half-inch plank cut into four feet lengths and put on clapboard fashion, had spread out with the weight of the roof just as it was being completed and made a nasty wreck of itself, incidentally crippling up a man or two. The original building was done by a carpenter who naturally under the circumstances was not present at the reconstruction, and he left an ugly mess to be cleared away and rebuilt. It seems that the junior partner, Mr. Lawrence, who was called the Little Boss, had taken quite an active part in planning the erection of the barn, but when it spread out the senior partner, who was familiarly known as the Big Boss, or the real thing, to the crew, took a hand in the game and sent for Uncle Rural Williams, who had built their mill and done a lot of other work for them and had been side-tracked from the barn job originally because it was thought anybody could build a box barn for a saw mill, and one of the under carpenters, who had been at work under Uncle Rural in the mill, was given the barn job, because he would do it for less money and would build it on whatever plans the Little Boss desired, while Uncle Rural had a habit of refusing to be led away from any set ideas of his own by the Little Boss or anybody else.

When trouble came, however, they were glad to get Uncle Rural and pay him his price, and the first thing the Big Boss said to him when he came on the ground was, "We've had a nasty wreck, haven't we? I don't think anything of this kind would have happened had we had you do the work. Now, you take your men and ask for anything you want in the shape of helpers and supplies, and go to work and straighten out this barn without asking any questions of anybody, for you know better what it needs than me or anybody else, and all I want is to have it fixed up so that it will stand, and I know you know how to do that."

During the midday meal at the saw mill boarding house Uncle Rural had been unusually quiet and apparently thinking deeply like he does sometimes when there is a complicated job on hand, but when the meal was over and the little bunch of carpenters started back to the barn, he turned around and said, "J. B., ever since you started out to learn the trade under me I have been making it a point to tell you every once in awhile to be careful and not get the big head, for when a young man gets to thinking he knows it all, he don't know enough to know he don't know anything. Well now, this job we've got on hand now reminds me that there is another bit of advice I want to give you, and that is, do a job right or don't do it at all."

"If I remember right," J. B. replied, "you've told me something like that several times before. Don't you know that many a time I've reported to you that certain tasks which you had assigned me had been completed and you would straighten up and look at me a minute and then say without ever going to look at the work, 'J. B., I think you had better go do that over. You got through with it too quickly to have done a real good job.' I know I remember it mighty well myself, because it has made me feel both small and hot several times."

"Yes. Yes, I know, but that was a little different from this. My idea in all that was to keep you from slighting or half-doing your work to get through quicker, which is a good thing, and I want you to keep in mind all the time, so that as you go along through the world and learn more you will learn that there are certain right ways to do anything, and when you know that and somebody wants you to do something that you know is not right, then it is time to insist on doing the job right or not at all. We have just had a case in point here between Charley Mosby, who built this barn and the Little Boss, and out of this I want you to get an object lesson that you'll never forget. You and I both know that Mosby is a fair workman, and I know whether you do or not that he did things here that his judgment told him were wrong, simply because the Little Boss wanted him to. This barn, as you will observe, is a very cheaply constructed box affair of rather large proportions, and, generally speaking, it is all right for this purpose, which is to shelter the teams of this mill for two or three years, but the whole trouble came from the fool idea a Little Boss got into his head. He wanted a hay loft in this box barn, that is, storage room for hay in a loft more than would ordinarially be provided between the joist and rafters of such a structure, so what does he do but tell Mosby to build the box sides so as to extend four feet above the joists with the rafters on the top of this extension of the box sides so as to give a story and a half structure. This, as you will note, only gave the carpenter a chance to tie the barn sides together with the joist nailed to the post at each side every eight feet. In other words, instead of having the rafters tied together with a joist, a joist to every pair of rafters, there is just a tie every eight feet, and that tie is down four feet below the heels of the rafters. Some effort was made to provide against this weakness by nailing collar beams of one by eight-inch plank to the rafters up about midway. Now, that this would not hold we have had plenty of evidence by the blamed thing spreading out and falling down just as they were finishing it up, and they were blamed lucky that it didn't do more harm than it did. I took Mosby to task about it and asked him if I had not taught him better than that, and if he didn't know that the way to make a barn with a hay loft in it was to make a frame barn, and that any man ought to have better sense than to try to make a hay loft extension in a box barn. He said he knew better and tried to argue the Little Boss out of it, but the Little Boss had his heart set on having a hay loft and insisted on having the barn constructed the way it was.

"Well, said I, the thing I blame you with is that when you knew you were called on to do something that was not right, when your judgment told you that a structure of that kind was not safe, and you could not persuade the Boss to do otherwise, that you did not pick up your tools and go home.

" 'I see where you are right, Uncle,' was Mosby's answer, 'and I confess that I was a fool in that matter, but the trouble with me was I needed the money and didn't feel like I could afford to do anything so rash as to throw up my job, but I see now that I would have been better off had I done so, because the job was only a short one, and now the Little Boss is throwing the blame on me, and the damage to my reputation will hurt me worse than I would have been hurt had I thrown up the job and gone home."

"Of course, you are right about that, Uncle Rural, but still, don't you think that you are drawing it a little strong? You and I, and everybody else here that knows anything much about this job, knows that while the Little Boss lays the blame on Mosby and says he didn't use enough nails and all that, that the fault was really in the Little Boss' plans and Mosby is not to blame because the barn fell down. You are giving a demonstration of that right now by entirely ignoring the Little Boss' plans for a hay loft and cutting this barn down to a regular box barn with the rafters tied to the joist in the regular way."

"That is where you think you are right, but still you are wrong. There is no question but what I will give Mosby work myself practically as quick as I ever did, because he is a good workman, but should he go out among strangers for a job and inquiries are made about him, there are nine chances to ten that somebody will say, 'Oh, yes, that's the fellow that built a barn for Buckland & Lawrence and it fell down just as he was finishing it.' And there are people who will remember him through that failure who otherwise would probably forget him in a very short time, at least would not have anything to say for or against him. This may sound like harsh judgment, but it is just what he would get, and in a strict sense of the trade, he is entitled to it, for while he has not shown lack of ability as a workman, he has shown lack of strength of his convictions as a man in a responsible position should. Carpenters and builders are not paid entirely for their skill with tools, but partly for their judgment, and a man who proves himself deficient in judgment is incompetent for anything else but an under workman, that is, he must always have a boss over him, somebody to do the thinking and planning and assume the responsibilities, and when that condition exists he is not really a full-fledged workman.

"Now, there are two ways of being deficient in judgment, that is, through ignorance or lack of judgment pure and simple, while the other comes from being too easily influenced to do things that a man's judgment teaches him is not right. In other words, a lack of strength and moral stamina to carry out one's own ideas when outside influences are brought to bear. And, in my mind, this latter deficiency is the worst of all. There is some little excuse for a man who errs through ignorance and there is always room for improvement by learning better. But the man who is not ignorant and is simply deficient in judgment through moral weakness is almost hopeless, because to make him really worthy of trust involves creating strength of character, which is a much more complicated job than ridding a man of ignorance pure and simple. By way of illustration, don't you remember, J. B., that the Little Boss and I had a set-to about setting some posts when we were building the mill here?"

"Yes."

"Do you remember what I told him when he came around and wanted me to make certain changes in the plans of the mill building?"

"Yes, I remember distinctly you told him that they had you hired and were paying you good money, presumably because you knew what was best to do. That you had this thing planned out according to your best judgment, and if it was not satisfactory and they thought they could do it better themselves, they did not need you there and you would go home and let them do it themselves."

"Well, you probably thought I was a little blunt about it, and there was no question but what the Little Boss thought, and continues to think that I am a blamed crank. In fact, he got rather sore at me and all that, but he went away and let me alone, and now as you see when he got into trouble with this barn the first thing they did was to send for me. Why? simply because while they may think I am something of a crank, they know, or at least think they know, that when I get through with it it will be put up there so it will stand."

"I think I understand what you mean, Uncle Rural," was J. B.'s reply, "and it's good logic, but if we all carry it out I see trouble ahead for some of us. It's all right for you to stand on your dignity, and say what's what, because you have an established reputation, and everybody has a wholesome respect for your judgment in things of that kind, but with fellows like Mosby and myself, for instance, it is a little different, and when we begin to assert ourselves, there is danger of trouble. Suppose, for example, that you should instruct me to do a piece of work some one way, while my judgment tells me it should be another. Would it be up to me to tell you I would do it my way or not do it at all?"

"Young man," said Uncle Rural, "there is both a distinction and a difference between impudence and independence, and there is also a difference between making a bluff and making a bluff good, and I want to tell you right now, if ever the day comes that I set you to do a job that is wrong, and you know it is wrong, it is then time for you to go about setting me straight in the matter, and if you fail in that it is time for you to refuse to do it, for a man's reputation is worth more than his job any time. But be sure you know it is wrong; otherwise you may make a monkey out of yourself instead of making a step toward building up a good reputation."

Natural Theater in France

A natural theater, that is to say, a theater in the open air, will be established at Champigny, near Paris. It will be remembered that the ancient amphitheaters at Arles, Beziers and Nimes have been reopened, and the plays are attended by large crowds. In former years there were hundreds of such open-air theaters scattered all over France, and which were then very well patronized.

Country Houses in Russia

The timber built dwellings of even the richest land owners in Russia lack the picturesque construction familiar to travelers in Norway and Sweden. The walls are generally formed of square beams, from one foot to eighteen inches in thickness, laid one on the other and neatly joined at the corners. They are fastened together by wooden bolts, sometimes three feet in length, driven at short intervals. The interstices are made air tight with dried moss, saturated with pitch, then dried in the sun, and the whole is covered with a sheathing of thin planks, on the inside as well as the outside of the walls. When these walls are covered with paint on the outside and plaster within they are as impenetrable to the winter blasts as the hull of a ship, and far warmer than the same thickness of stone or brick would be.

The old houses have thatched roofs, like those of the peasant's *izba* (cottage), but more modern dwellings are shingled. The rooms are almost always lofty and some of them, notably the drawing room and the dining room, are of large dimensions.

The plaster walls are tinted with a wash of some light shade for the drawing and bedrooms, and a darker one, possibly brown, for the dining room. The furniture is simple, very likely home made, or, as is frequently the case of late years, one of the cheaper varieties of American and English manufacture.

In describing the Russian country dwelling mention may be made of the vast underground construction which takes the place of our cellar, says a writer who has traveled through the country. This is the storehouse, equal to the house in area, and is divided by means of corridors radiating from a large open space in the center, the doors of these storerooms being all securely fastened with huge home made locks.

The central space is occupied by a bed of carefully dried sand, in which are planted roots to be used during the long months of winter—parsnips, carrots, turnips and the like. Huge casks and barrels, looking like a regiment of very stout soldiers in the dim light, are filled with salted beef, fish, half fermented cabbage (*stchie*) and beet roots. These form an important part of the winter diet.

Should the storerooms be opened to our inspection we would see innumerable sides of bacon, smoked mutton, hams, smoked geese, and still other casks containing butter, linseed and other vegetable oils, cheeses (an important item of farm produce), and other regiments formed by sacks of flour.

Impossible, you say? Not at all, for you must remember that on this estate from forty to fifty mouths must be fed every day, besides the guests, who form no inconsiderable item in the consumption of the winter's stores.

It is the man that takes pride in his work who is most likely to do work to be proud of.

Waiting for the Painter

AMERICAN CARPENTER AND BUILDER

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WILLIAM A. RADFORD, EDITOR.
WILLIAM REUTHER, ASSOCIATE EDITOR.

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

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IT isn't always the man who makes the quickest motions who does the most work in a day.

THE good carpenter usually objects to lending his tools, not because he wants to be mean, but because he realizes the value of his tools and also the damage they will suffer in the hands of a careless workman.

Correspondence

WE have been very much pleased to receive a number of short articles from our readers on subjects which are of interest to the carpenter and builder. We will publish these from month to mouth, as many original ideas are brought out, and will be given to the carpenters throughout the country which otherwise would remain in just one locality. Every carpenter and builder who has anything of interest or an original way of doing certain work is invited to contribute to this department, and if his article is acceptable we will pay him a fair price, depending on its value to the general readers. This department is also open to those who desire information on anything pertaining to the building trade. These questions are referred to our various competent editors, who will answer them as rapidly as possible. It must be remembered that these men are extremely busy, and we suggest that all questions be made as clear and concise as possible.

Objecting to Tenements

IT HAS been suggested that the workingmen should not be herded together like sheep, as is now being done in the tenements. The idea being that they could be given individual homes and at no greater rental than they are now forced to pay.

While the idea is a splendid one, it must be remembered that it is not so much the cost of construction that affects the rental of tenements, but rather the value of the ground upon which they were erected. It would require a much vaster land area to furnish the people with individual homes than is required in tenements, and it would, of necessity, increase the cost to the owner, in addition to the increased cost of construction.

The poorer people are not seeking so much the individual homes as they are clean and comfortable quarters. If the tenement houses were constructed with all sanitary arrangements, with the view of having them clean and healthful, the working people would consider that they were pretty well cared for.

Proper Ventilation

ONE OF the essentials of good health is pure air, and plenty of it. In order to enjoy this at all times, it is necessary to have our buildings equipped with good ventilating systems. By a good ventilating system we mean one that will bring in thirty cubic feet of pure air every minute for every occupant of the room and also take out the same amount of impure air. Several eastern states have passed laws specifying that good sanitary heating, plumbing and ventilating systems be installed in all public buildings. This should be taken up by all legislatures, as it is something which is of vital importance to every state.

Many of our schools have poor ventilating systems, with the result that hundreds of children are breathing air loaded with poisonous gases. This can be very readily noticed by entering a large, well-filled school room, where, if there is a good circulation of pure air, the air smells as pure as outdoors. If there is no circulation of pure air, the change is so great that it almost chokes one and it has a strong odor. The children in this last room cannot help but get that languid, sleepy feeling which is due to the poison in the air.

It would be well for all legislatures to pass laws making it necessary to have good sanitary conditions in every public building, as there is nothing a growing child needs more than good, pure air.

Safe Load for a Floor

TIMBERS TO USE IN SUPPORTINC A FLOOR TO BE USED FOR MEETINGS—PROPER SIZE OF TIMBERS TO USE IN A ROOF TRUSS

By Frank E. Kidder

AS THE inquiries this month are such as are frequently met by the carpenters and builders, in their every-day work, a detailed description is here given with the hope that it will be profitable to many:

To the Editor: Somerset, Mich.

Owing to the expense of securing timber twenty-two feet long, it is proposed to use sixteen or eighteen-foot stuff for framing the second story floor of a building to be used as a hall for secret societies. The outside ends of the joists are to be supported alternately by the side walls and the interior ends by headers secured between the two adjacent joists, as shown in the attached diagram. What depth of joists would be required if placed on twelve or sixteen-inch centers, the thickness being two inches in either case? Can you give a formula for figuring the safe load for a floor as shown.

E. E. SANFORD.

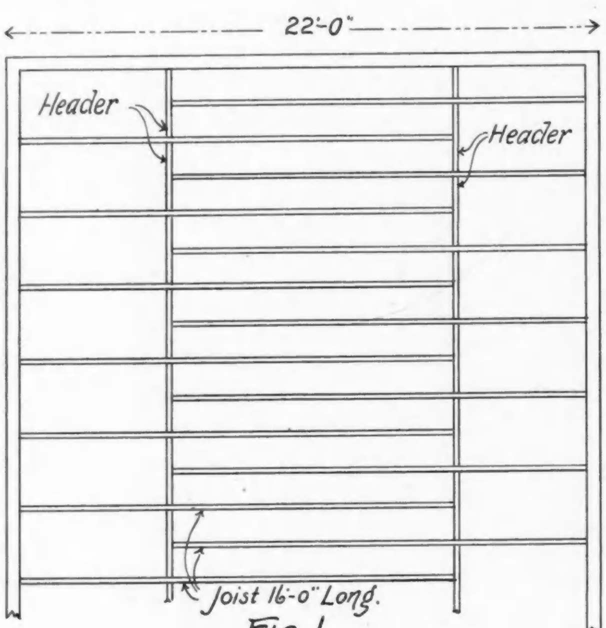


FIG. 1.

It is impossible to give a formula for figuring the safe load of a floor framed as shown by E. E. S. The only way in which the strength can be computed is to assume a certain load per square foot as the maximum load to be supported, then compute the load that must be carried by one joist, and finally the size of joist to support this load. For the floor of a hall where there may be dancing, 100 pounds per square foot is as light a load as should be assumed for both the dead and live loads. On this basis we will compute the equivalent distributed load on the beam "X," Fig. 2, the dimensions corresponding with those given in Fig. 1, assuming that the walls are 6 inches thick. The load on beam "X," from A to B = 10 ft. × 1 ft. × 100 lbs. = 1,000 lbs.; from B to C = $5\frac{1}{2}$ ft. × 2 ft. × 100 lbs. = 1,100 lbs. Total distributed load equals 2,100 lbs. Concentrated load at B from header = 2-3 of load from A to B = 667 lbs. + 1-6 of load from A to C = 183 lbs.; total 850 lbs. This concentrated load should be multiplied by 1.8 to reduce it to an equivalent distributed load. A concentrated load at one-third of the span exerts a bending moment 1.78 times that of the same load distributed. In this case the header being a little more than one-third the span from the support, I have multiplied by 1.8. Performing the multiplication, we have 1,530 pounds, which must be added to the 2,100 pounds, giving 3,630 pounds as the load for which the joists should be proportioned. The rule for depth of joists to carry a given distributed load is, square of the depth equals the product of the load by the span divided by twice the thickness, multiplied by the strength of the wood, which for common pine may be taken at 60 pounds. Applying the rule to beam "X", we have

$$d^2 = \frac{15\frac{1}{2}\text{ ft.} \times 3630}{2 \times 2 \times 60} = 234, \text{ or } d = 15.3 \text{ ins.}$$

Therefore, to be safe for dancing purposes, the joists for this floor should be 2 by 15.3 ins. center to center. If three-inch joists are used, $d^2 = \frac{15\frac{1}{2}\text{ ft.} \times 3630}{2 \times 3 \times 60} = 156$, and $d = 12\frac{1}{2}$ ins. If the joists were 22 feet long and 12 inches on centers, the load would be 21 × 100 = 2100 lbs., which for a span of 21 feet would require 2 by 14-in. or 3 by 12-in. joists, showing that

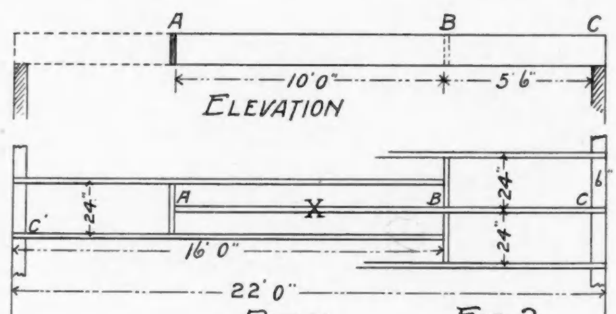


FIG. 2.

the method of framing shown by E. E. S. requires larger joists to give the same strength than if the joists were the entire span. Moreover, to develop the full strength of the floor, the inner end of each joist and both ends of the stirrups should be hung in joist hangers or stirrups, which would bring the cost of the floor considerably above what it would probably be for 22-foot joists shipped in. In olden times, when the facilities for transportation were limited, it was often impossible to get long joists, so that contrivances such as this were commonly used, but nowadays it is a question of time and freight in getting timbers up to forty feet or more in length.

To the Editor: Newland, Va.

Will you please tell me the proper size to have the timbers in a truss roof having a span of thirty-two feet, and

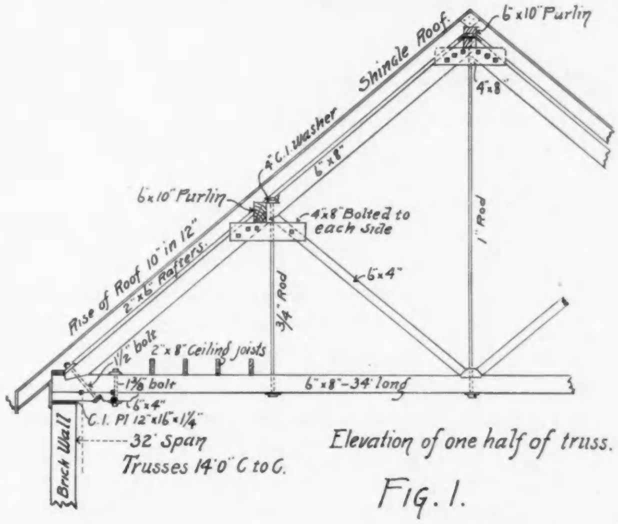


FIG. 1.

what is the proper pitch to have the roof to look well and be substantial and self-supporting? W. T. REAMY.

Our correspondent does not state whether the roof is to be covered with slate or shingles—how far apart the trusses are to be spaced, or whether the truss is to support a ceiling or not, all of which effect the weight to be carried, and consequently the size of the

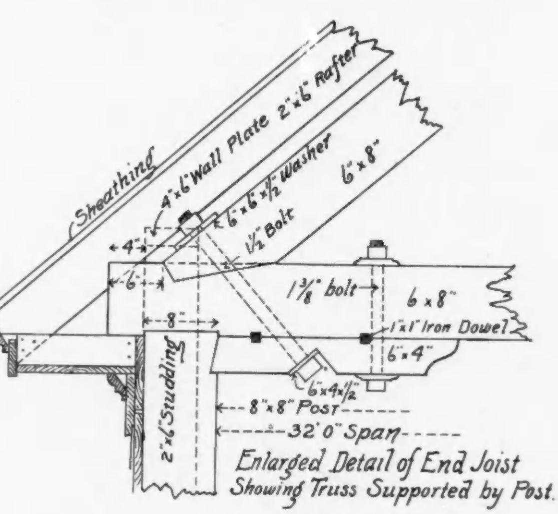


FIG. 2.

timbers. For either a slate or shingle roof, a pitch or rise of ten inches in twelve is both economical and pleasing in appearance. A steeper pitch is not objectionable except that it increases the length of rafters and consequently the cost. For the southern states, the dimensions given in Fig. 1 are about as small as should be used for trusses spaced fourteen feet on centers, and supporting a plastered ceiling. If there is no ceiling, and nothing to be supported but the roof, the truss rafters and tie beam may be made six by six, and the rods reduced to five-eighths and seven-eighths inches. The tie beam should be in one piece thirty-four feet long. Fig. 2 shows a detail for support on posts. If supported by a brick wall, the construction will be slightly modified as shown in Fig. 1. If the building is only one or two stories in height a twelve-inch wall will probably answer, but I recommend that it be reinforced under the trusses by a four by twenty-one-inch pilaster.

Mound Builders Who Made Bricks

In many respects Aztalan, in Minnesota, is among the most remarkable prehistoric monuments in the Northwest. It is the only brick-walled town site in this country. It is on the bottom land of the Crayfish river, about two miles from Lake Mills. The inclosing walls of the town site are about 700 feet on its flanks and 1,500 feet long. The river served to complete the inclosure of seventeen acres of land. Within and without the inclosure there are round, truncated and oblong mounds. Just beyond the inclosing walls the land rises abruptly over twenty feet to the rolling tablelands of the surrounding country. From the bank above a stone could be tossed into the town site, within the inclosure, which would seem to be a good reason why this inclosure, which has been called a fort, could not have been intended for a defense against any human enemy.

Along the brow of the higher land is a row of more than thirteen round pyramidal mounds, ranging from three to twelve feet in height. From the top of these mounds, or standing on the tableland, an enemy could command the whole town site. It has always been conceded that Aztalan was not enclosed for the purpose of defense. It has been supposed that it was walled for protection from wild animals, though the inclosure has never been high or abrupt enough since its discovery to keep out the panther, wildcat, wolf, bear, moose or buffalo, which were the only dangerous animals of the woods hereabouts.

The purpose of its inhabitants in constructing this inclosure over half a mile long still remains a mystery. The most remarkable art of Aztalan is its brick walls and walks. In this it is singular and alone, the only example of bricklaying among all the monuments of the mound builders. These brick or bricklets are not rectangular and regular in form and size, as are the modern brick. They are simply balls of plastic clay, welded by the hand into small bricklets of irregular form, about the average size of a snowball. The material used was the glacial yellowish red clay of the vicinity, and the color of the bricks is red or light yellow. Under the glass, scrapings appear like a handful of crystal sand.

The largest room in the world is the room for self improvement.

STEEL SQUARE

ALFRED W. WOODS

The Steel Square and its Possibilities

SHOWING DIFFERENT POSITIONS OF THE STEEL SQUARE IN THE CONSTRUCTION OF SIMILAR GEOMETRICAL DIAGRAMS—FIGURES TO USE IN OBTAINING THE SAME

WHAT may not be accomplished with the aid of the steel square in the construction of useful and ornamental diagrams would indeed be a hard question to answer. It is safe to say that there can be no tool devised that will ever supersede the steel square in covering so wide a range in the various construction arts. It is all contained in the simple scale of measure in connection with the 90 degrees formed by the arms of the steel square ready to solve the most intricate problems when knowingly handled by the operator.

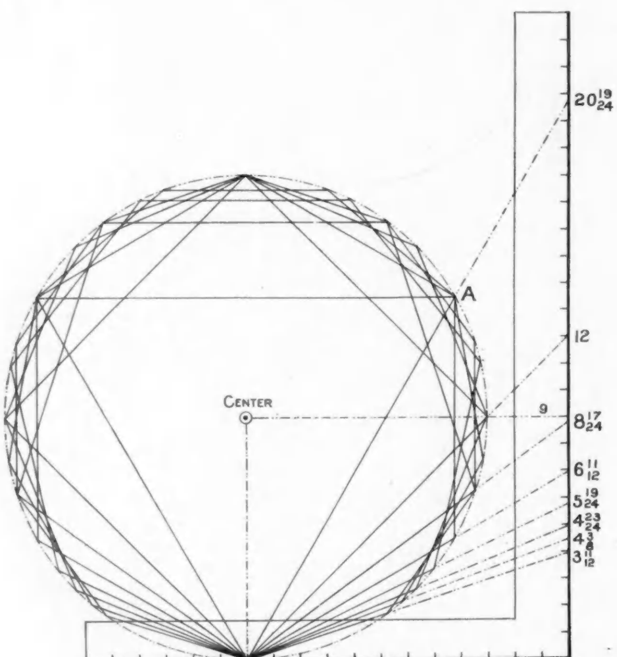


FIG. 29.

In presenting these illustrations, it is our aim to put them in such a way that the reader will readily understand the principle involved so that they may be intelligently reproduced, and thereby assist in opening up the way for much useful information.

In Fig. 29 is shown the polygon family circle. In this, we show eight of the polygons enclosed in a circle, the center of which may be at a point anywhere on a perpendicular line above twelve on the tongue of the steel square. In this case it is taken at nine inches above, thereby giving a circle of eighteen inches in diameter. Where the circle cuts the miter lines, as from 12 to A of the triangle will be the length of one of the sides and from which the others may be spaced. The reader will notice this, that a corner of each polygon is resting at 12 on the tongue, while in the next illustration, as shown in Fig. 30, they are, so to speak, run down at the heel. In this illustration only the triangle, square and octagon are shown and are enclosed in the circumscribed diameter of the triangle with an inscribed diameter of one foot. In this the length of the sides of the polygons are determined from the heel of the steel square to the intersection of the miter lines with the circle as from the heel to A and B for the square and octagon respectively.

In Fig. 31 is shown two sets of polygons in connection with the degrees and according to the scale, the inner set is drawn to a circumscribed diameter of one foot, while the outer set is drawn to an inscribed diameter of nineteen inches. The starting point in

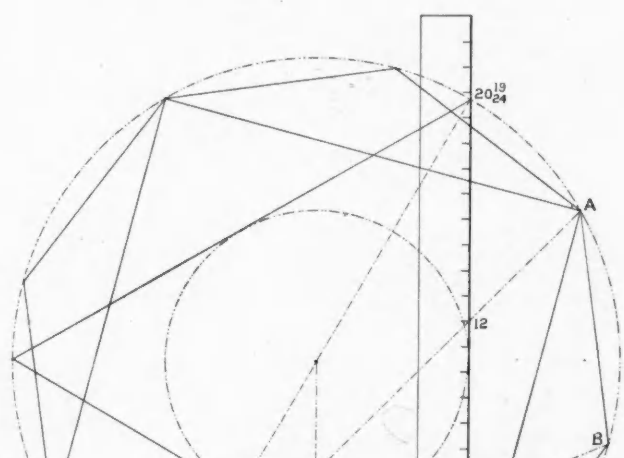


FIG. 30.

either case is at midway of the sides of the polygons, and the more drawn, the more nearly a true circle they will form. In the former, the corners form

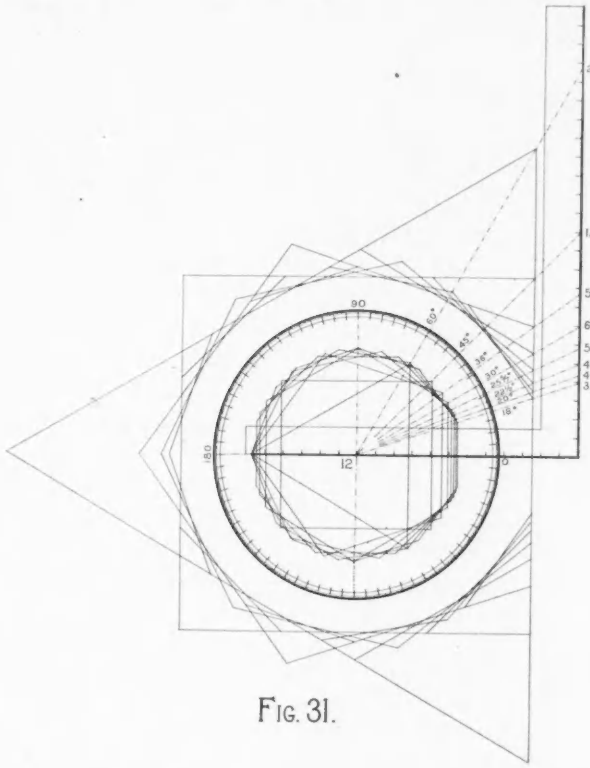


FIG. 31.

the circle and in the latter the central part of the sides lends to the shaping of the circle.

In Fig. 32 are shown the polygon circles. In this

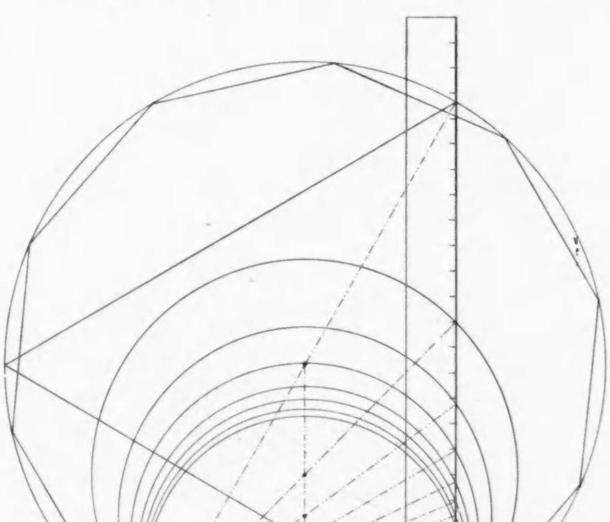


FIG. 32.

illustration each polygon has its individual circle. Beginning with the triangle we show the miter lines for eight of the polygons and by squaring up from 6 on the tongue and at the intersections with the miter lines determine the center of the circles. The reader will notice that each circle cuts at three points on the steel square, also notice the dropping down of the circles and the shadows they cast at the two lower points of the steel square. At first glance it might appear that the circles are not true, but a more careful inspection would show that they are as true as can be described with the compass. The descent of these circles from the triangle down to the decagon is quite rapid, but from this on down it would be a very different thing. The miter lines of a polygon

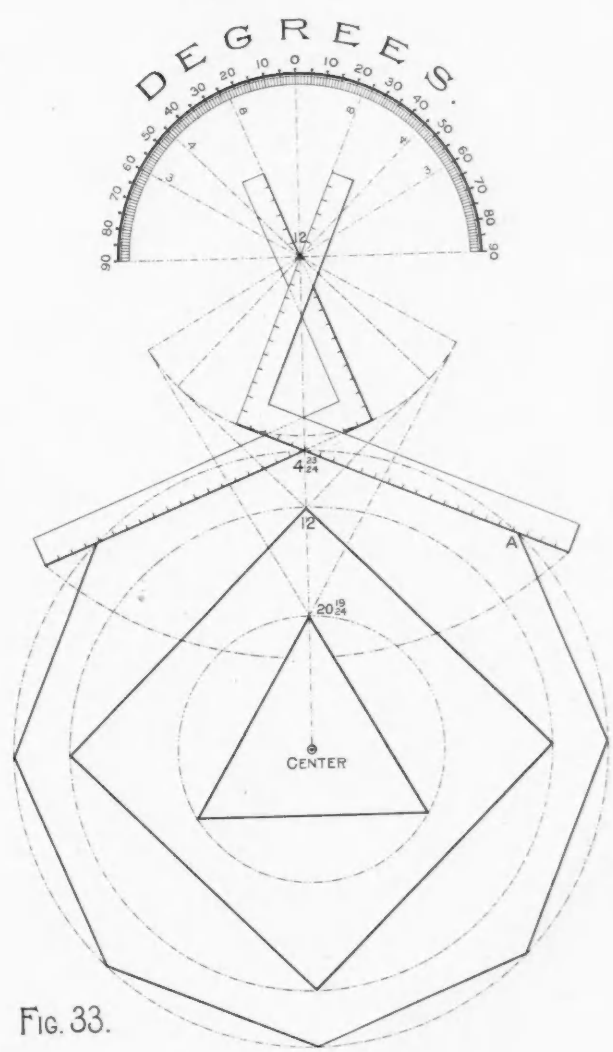


FIG. 33.

having 360 sides would intersect the blade at one degree, or .21 (5-24) which is less than one-fourth of an inch, and would be the length of the sides of the polygon with an inscribed diameter of one foot. The miter line for a polygon having 720 sides would intersect the blade at .10476. From this it would appear that the continued increase of the sides of a polygon of this size would become too short to be discernible, yet according to trigonometry they could go on and on multiplying in number of sides and the decimal would never be entirely disposed of, leaving it in the infinitestimal or where the polygon really ends and the true circle begins.

In Fig. 33 is shown another way of handling the steel square in laying out the polygons. Here we show two squares as though they were pivoted at 12 on the tongue and made to work like a pair of shears. Just above this is shown the semi-circle with its 180-degree divisions also centering at 12. The degrees

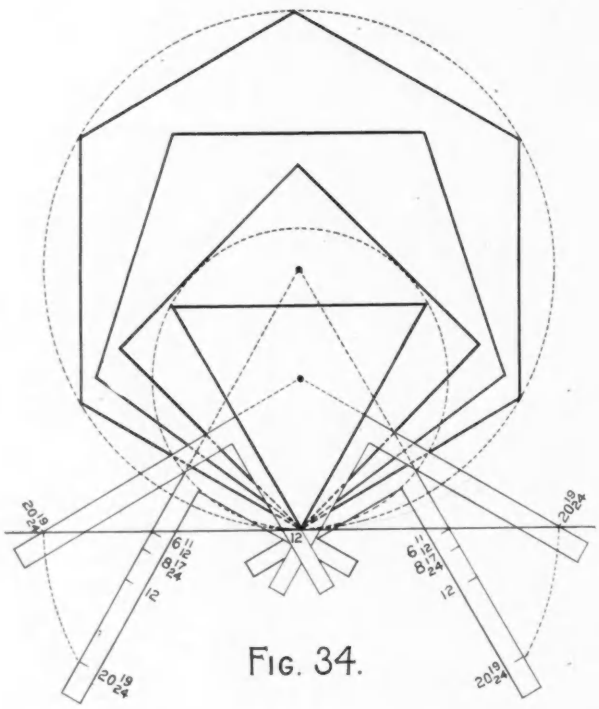


Fig. 34.

are read from the top each way and are to the steel square as the dial to the weighing scales. Thus, to find the side of an octagon, divide 180 by 8, equals 22½. Now swing the blades up until the tongues are in lines with 22½ degrees and the angle formed by the blades will be that of the octagon corner as shown in the illustration, 12 and the figures at the intersection of the blades (4 23-24) will give the required miter. The blade giving the cut. By laying off the desired circumscribed radius on a line directly below the intersection of the blades and where the circle intersects the line of the blade as from 4 23-24 to A will be the length of the desired sides. The quotient for the square, or tetragon, is 45, and that for the triangle is 60 degrees, as shown. For effect in the illustration, we have used one common center for the above polygons. The dotted lines represent the space over which the steel square would travel in laying out these polygons. By using the same center, the pentagon, hexagon and heptagon would come in their order between the tetragon or square and octagon and continue on as the number of sides are increased in the polygon.

We have one more illustration along this line we wish to present as shown in Fig. 34. In this we show four of the polygons beginning with the triangle and developed with the aid of the steel square from a straight line. The application of the squares is shown for the triangle and hexagon with the figures given for the square and pentagon. Now just suppose the tongues of the steel square are pivoted at 12 to the line as shown. Now by raising the blade up until the figures on same that gives the miter, intersects the straight line, the angle formed by the tongues will be that of the corresponding polygon. According to the illustration the sides of all of the polygons are 24 inches in length, though they could be by this method laid out to any desired length and by squaring out from the sides at one-half of the desired length and the intersection of these lines will be the center of the desired polygon.

With this we will close. In the next number we will continue along these lines, but dwelling more to the practical application of the steel square to things that the woodworker is frequently called upon to perform.

Possibilities of a Carpenter

The following is a fair amount of work that can be accomplished by the average intelligent, industrious and competent carpenter in a day of eight hours:

Can cut and lay 500 feet of sheathing boards.

Can cut and lay 250 feet of siding or clapboards.

Can cut and lay 2 M shingles.

Can place in position 750 feet of joists.

Can place in position 500 feet of studding.

Can place in position 400 feet of four-inch flooring and 300 feet of two-inch finish flooring.

Can fit 150 lineal feet of baseboard—one member.

Can fit 125 feet of baseboards—two members.

Can fit 100 lineal feet of baseboard—three members.

Can case 12 doors and windows—one member casing.

Can case 8 doors and windows—two members casing.

Can fit and hang 8 doors.

Can fit locks on 12 doors.

Can fit and hang 10 two-sash windows.—"Record and Guide."

Portable Summer Cottages

Portable summer cottages meet the needs of those who want to spend the summer in the country, but who cannot afford to own a house and lot or to rent an expensive country home. It is an easy matter to hire a small plot of ground either at the seashore or in the mountains at a low cost and spend the summer in one of these houses. The cost of transportation by freight is not great, for they can be packed into a very small space, each part being flat. They are not so plain as one might suppose, for many of them have piazzas or wings, which may be added if desired.—Country Life in America.

BUILDING CONSTRUCTION

J.A.F. CARDIFF

Building a Home

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

PLATE XI illustrates and shows the application of the principal joints used in framing. Starting with the main sill, Fig. 37, the method of jointing at the corners is shown; the joint being known as angle halving. The corner post and studs are mortised into sill. This is done in the best work, the common way being to cut off posts and studs with square ends, and spike to sill and girt. The beams are shown let into the sill.

Fig. 38 illustrates tee halving, as in the case of wall plates coming together at right angles.

Fig. 39 illustrates beveled halving. This joint is used in splicing plates and sills.

Fig. 40 illustrates dovetailed halving.

Fig. 1 shows the girt framed into corner post with a mortise and tenon joint, pinned with hardwood pins or well spiked.

Fig. 2 shows the girt framed into corner post with a dovetailed tenon joint. The girt is secured firmly in place by driving the wedge shown.

Fig. 3 shows an isometric view of the dovetailed tenon joint.

FRAMING AROUND A FIREPLACE

Plate XII illustrates the use of the tusk and tenon joint and the wrought iron joist hanger in fireplace framing.

One-half of Fig. A3 shows the header, trimmers, and tail beams framed together with the tusk and tenon joint, which is considered the best joint, both theoretically and practically; and the other half of the plan shows the use of the wrought iron hanger, which is used when it is important to preserve the entire strength of the timbers.

Fig. 44 illustrates the use of hanger to support tail beam.

Fig. 45 is an isometric view showing construction of the tusk and tenon joint. This joint is also shown in Fig. 46. The thickness of the tenon "X" is one-sixth the depth of the beam, and the tenon is so fixed that it has its lowest surface in the center of the depth of the beam. "Z" is the tusk which bears weight of the header and is let into the trimmer about one and one-half inches and secured in place by means of the hardwood wedge, "Y."

The projection of the tenon beyond the surface of the beam, as well as the wedge, are omitted when they would be in the way. This construction is illustrated in Fig. 47, which shows the tenon secured with a hardwood pin through the center of the header; and is also shown in Fig. 48, where it is secured in place by means of a three-quarter-inch bolt. A hole is cut in the beam as shown, to receive the nut, and is made large enough so that nut may be turned.

Fig. 49 shows a cheaper method of framing, which is used to a considerable extent, though not with as satisfactory results as the previous examples. The tail beam is supported on a "two by four" joist, spiked to the header.

A Hexagonal Office

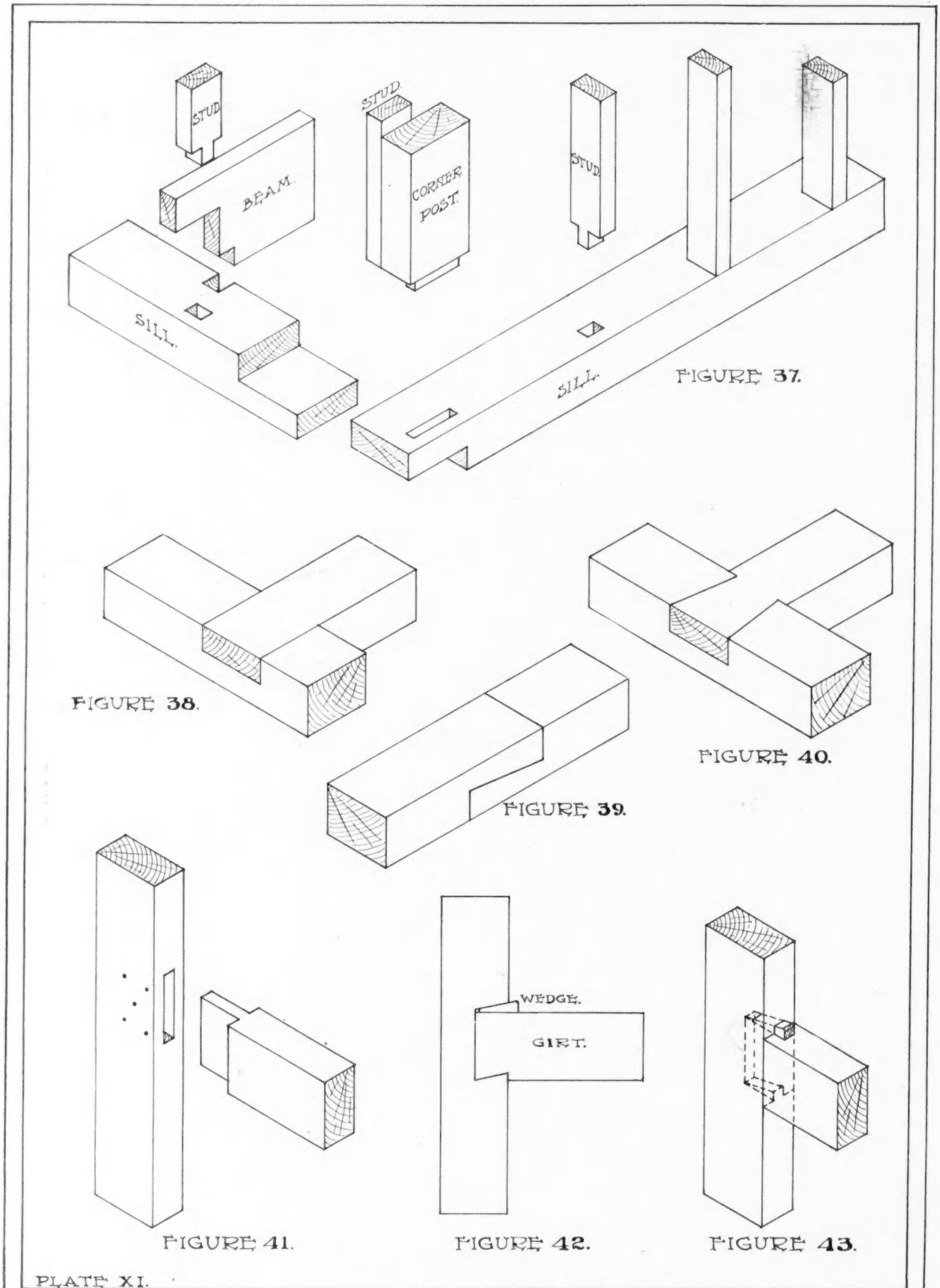
A lawyer built him an office in the form of a hexagon. The novelty of the structure attracted the attention of some Irishmen who were passing by. They made a full stop, and viewed the building very critically. The lawyer, somewhat disgusted at their curiosity, raised the window, put his head out and addressed them:

"What do you stand there for, like a pack of blockheads, gazing at my office? Do you take it for a church?"

"Faith," answered one of them, "I was thinking so 'till I saw the divel poke his head out of the windy."

Movable Missions

Rhode Island has a wheeled chapel used by the Episcopal mission, capable of being moved from place to place upon its own running gear; but the most elaborate traveling chapel is one which forms a part of the special train to Lourdes on the occasion of the annual pilgrimage. Here through a dispensation from the late pope mass may be said while the train is running at full speed.



FRAMING JOINTS.

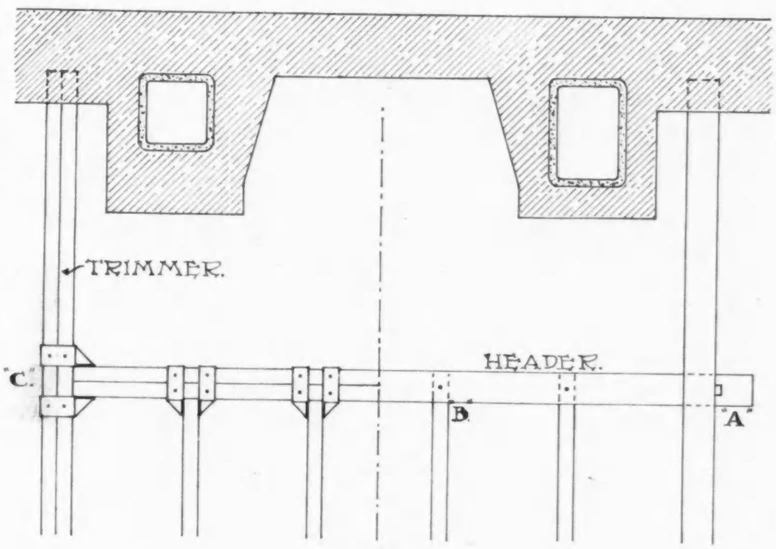


FIGURE 43.

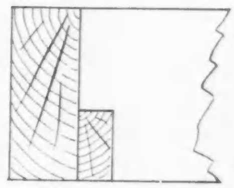


FIGURE 49.

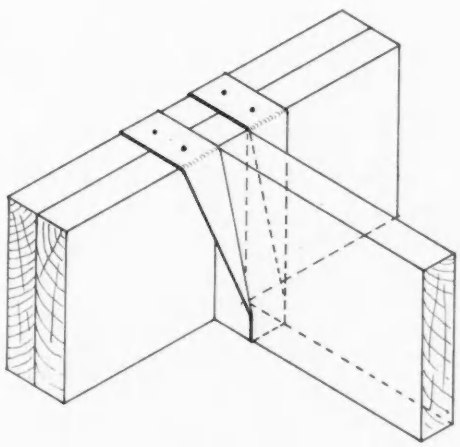


FIGURE 44.

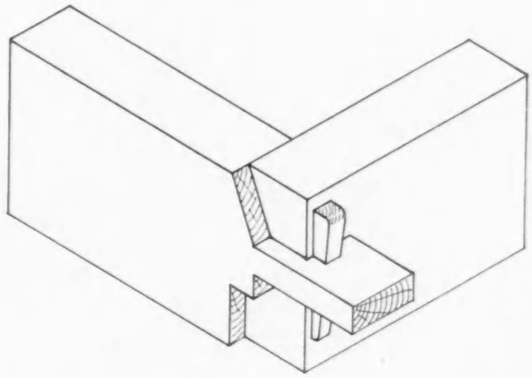


FIGURE 45.

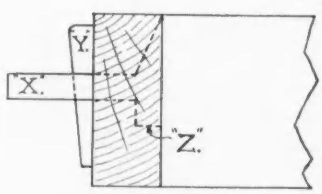


FIGURE 46.

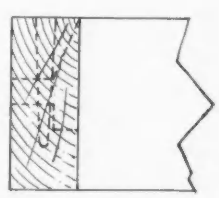


FIGURE 47.

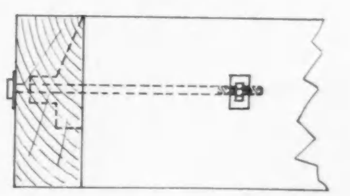


FIGURE 48.

PLATE XII.

FRAMING.

FRAMING A HOUSE

I. P. HICKS

Proper Installation of Furnace Pipes

BEST WAY TO SET STUDDING AND JOISTS WITH THE OBJECT OF ACCOMMODATING FURNACE PIPES— WHERE TO PLACE REGISTERS TO LET IN WARM AIR AND LET OUT COLD AIR

WE NOTICE in the ordinary residence that the contractor or foreman makes no provision to take care of furnace pipes until the furnace man comes to put in the pipes, and then perhaps there is twice as much cutting to do as there would have been had the matter been given a little attention when it was most needed. The piping of a house for a furnace is a matter that deserves more care and consideration than it usually gets. It is a well-known fact that there are more or less furnaces put in that do not work satisfactorily. The fault is usually laid to the furnace or its maker. That there are some furnaces that are better than others is very reasonable, just as there are good stoves and bad stoves. But the best furnace ever made may fail if it is improperly installed.

Nobody would expect a watch to run if the balance wheel was gone, and you cannot expect a furnace to work satisfactorily if some essential point has been left out in its installation. By installation, we do not mean simply setting the furnace, but we mean the entire plant and system of pipes. A furnace may not be quite as delicate as a watch, but there are essential things about the working of a furnace that must not be overlooked if satisfactory results are to be expected. The free and easy circulation of air is undoubtedly the balance wheel that makes the furnace work satisfactorily.

Before going into further details regarding the furnace, we want to offer a few suggestions to carpenters and contractors in regard to setting studding and joists to accommodate the pipes. First, get all the registers located and marked on the plan. The architect should mark the location of registers on the plan and the location of the furnace and the registers should be duly considered. They should be placed so as to keep out of the way of beds and not come too close to doors, and yet be where they can be reached by the most direct line possible from the furnace, and also avoid cutting the timbers of the house to any great extent. This makes quite a bit to look after, and enough to need some care in the location of pipes and registers.

No furnace pipe should be run up in a two by four partition; nothing less than two by six should be used, and if a large pipe, use two by eight studding where the pipe is put in. Many contractors use partitions with two by two where the furnace pipes are put in, but we do not believe this is good judgment—might as well get the studding wide enough in one piece and save the extra work of furring, and also the extra nails that the furring requires. Where there are partitions running parallel with the floor joists it is common for the architect to specify double joists for such places. This, of course, is all right in its way, but if there are furnace pipes to go up in the partition they cannot be put in without cutting the joists half in two and perhaps more. A better way is to know just exactly the space taken up by the partition and set a joist close up to each side of the partition, so the furnace pipe can go between the joists and up through the partition. Pieces can be cut in so a plate can be put on top of the joists to set the studding on, and the plate would only have to be cut where the pipes come through, and this would give full strength to the joists, and if looked after at the right time could be put in quicker than any carpenter could cut out the holes for the pipes in the old haphazard way.

A very serious blunder in putting in a furnace is the lack of providing for the escape of the cold air from the rooms. Cold air is drawn into the furnace through the cold air duct, heated by the furnace and sent through the pipes to the different rooms in the house wherever it is desired. Stand over a register when the heat is turned on and you can feel a strong current of warm air coming into the room. It is the universal opinion and conclusion that the warm air coming into the room forces the cold air out, and by this process the room is heated. Now is it not reasonable to suppose that there should be a suitable place provided for the cold air in the room to escape? You cannot continually force air into a room unless there is some place for it to escape. Without this, when the room is full of air, the air in the room will hold back the warm air from the furnace, and the room will not heat satisfactorily and possibly not at all. We have seen houses with rooms that would not heat even when the pipes to all other parts of the house were shut off. Such a condition cannot be anything else but faulty construction.

If you want a house to heat nicely, provide a cold air register of almost the same capacity as the warm air register for each room, and locate them in the best possible positions. Do not be satisfied with just an opening into a partition with a plate over it, for it is not right. See that each cold air register is of proper size and that it has a pipe of proper size leading either to a vent flue in a chimney or to a main cold air return pipe leading to the furnace well. It is a good thing to run a large cold air return pipe to the furnace well and connect the cold air return pipes from each cold air register with this. We mean this pipe to be entirely separate from the cold air duct to the furnace.

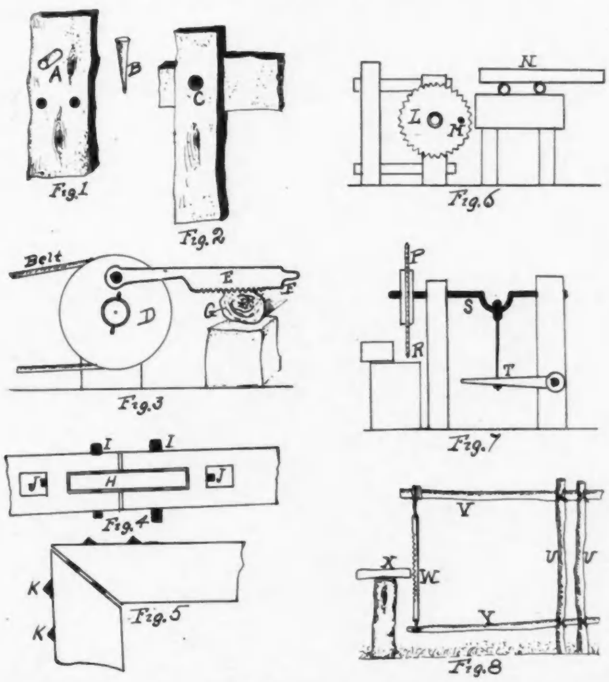
The main trouble is people want things too cheap, and in order to cut down expenses they leave out all the flues and pipes that they can, and thus hundreds of furnaces are condemned every day, and all through the false idea of economy.

The furnace is all right; it's the way they are allowed to be put in that leads up to the trouble.

Woodworking Machinery in New Japan

CRUDE DEVICES USED IN SAWING LUMBER—GREAT FIELD FOR MODERN TYPES OF WOODWORKING MACHINERY—SIMPLE MACHINES DESIRED

THE leading woodworking machinery establishments of the country are already making preparations to supply Japan and Russia with modern types of woodworking machinery after the war. The havoc of the war in the lumber and metal dis-



tricts proper have not been great, but the moral effect has been remarkable. According to recent reports from both countries, as soon as hostilities cease, the industrial enterprises will boom, and the artisans of the two countries will turn their attention from making equipments of war to the repair and construction of bridges, buildings, docks and other properties that have been neglected and in some cases destroyed during the war. It is stated further from reliable sources that when the innovation begins that very much of the old style apparatus used by the Japanese and the Russian artisans will give way to the up-to-date mechanisms.

That the home-made machines, crude, lacking in speed and other elements essential to success in these days, will be substituted with the labor-saving devices that both countries have ignored for years. I can tell the situation mainly from the Japanese standpoint. At the outbreak of the war I was in Nagasaki, Japan. Having visited there a number of times since the Spanish-American war, I had obtained a general idea of the nature of the woodworking machinery employed. There awaits in Japan even now, and will to a greater degree, an outlet for woodworking tools and machinery that would surprise the lumber machinery man if he were to investigate. I gathered a number of points while there and made note of them. I conversed with some of the American agents on the ground, also with users of the machines. The demand then, as will be after the war, calls for lighter machines, rather than the heavier ones that we are accustomed to. The individual worker must be appealed to. The tools and machines should be simple in design and easy to handle, otherwise they are not understood by the Japanese workman, and he places them to one side, where they remain until some American or other person comes along to show the Japanese how to manage the tool or machine.

We look for the labor-saving device. The Japanese and in most cases the Russian looks for simplicity. We want the factory product, with profits reasonable. They want the single machine to run in a back room or shed, with small product and small profits. Time and money are no object.

In order that an idea may be had of the present types of machines used in parts of Japan, the annexed illustrations are given. There are, of course, a number of up-to-date establishments in all the important cities and large towns, where modern machines, few in number, have been installed and first-class work turned out. But all through the provinces, and smaller places, one finds the crudest of contrivances in service and the most ancient patterns in lumber work.

For example, in one shop they were making what looked like shingles, formed as in Fig. 1, all handwork, and with the wood pin, a, to fasten the piece of wood to its place. I was told that often the pins were tapered and used in this form, as at b.

Fig. 2 is a rough sketch of the plan of jointing two pieces at an angle with the hardwood pin passing through, as at c.

Fig. 3 is one of the crude saws in use. The saw proper is a heavy, thick, bulky steel affair, the weight of which alone is almost enough to keep it down. But there is a handle at f and one of the men grasps this and presses on it. The stock to be sawed is at g. The saw is given the necessary motion by the wood-wheel, d, and this wheel is turned from a traction machine nearby.

Fig. 4 shows another mode of connecting joints. The key-like piece, h, is set into the ends and hardwood keys i, i and j, j, are inserted as shown. A form of making an angle is represented in Fig. 5. The joint is fitted with the pins k, k, which pass through in the manner described. This type of joint is strong when properly made.

In Fig. 6 is a drawing of one of the attempts at construction of a modern disk saw. The saw itself is of the common circular plan and is usually purchased outright. I noticed several cases, however, in which the circular saws were of domestic shape. The saw is set up on a hub with flanges and the latter is fitted to a stud, as at l. Then, instead of running this saw by power, a handle is put in and one man is employed to turn it. A stand is rigged up and the piece of lumber to be sawed is shoved along on rollers, as at n. Two men were operating this device when seen by the correspondent. They labored hard and earnestly, and did not accomplish in an hour what one of the power machines of common pattern under ordinary conditions would accomplish in two minutes. One of the nearest attempts I saw to the actual power revolving circular saw in one district is represented in Fig. 7. Two uprights were arranged and journals fitted to the upper ends, so that the wrought iron shafts could be turned in the same. Then the circular saw was set-screwed to the shaft, as at p. The crank formed in the shaft was fitted with a connecting rod to a pedal, t, below. Thus the workman was able to manipulate the pedal and turn the saw. I was told that it was intended that foot power be used, but the pedal was too high, and when I looked on the workman was turning the affair by using his hands on the lever t. At r is the place calculated for the sawing of the lumber.

One sees crude sawing devices out in the country fashioned after the pattern of the one shown in Fig. 8. This is made of elastic bamboo or kindred poles. The main poles, u, u, are adjusted securely in the ground, about ten feet high, and a cross piece, v, specially chosen for its elasticity, is secured with cords, as shown. A mate for this piece is placed below at v. The blade of the saw is secured between these two cross pieces, as shown at w. A post is set up near the saw and the piece of wood to be sawed is placed upon it, as shown at x. The workman can work this saw by grasping the lower rod, y, and working it up and down. These are illustrations of some of the crudest forms of devices that I noticed. As before stated, one may find some very excellent types of lumber working tools and machinery, but only as an exception to the general rule.

A large field is going to open up in Japan and Russia as soon as the present complications cease. Then will come the opportunity for the machine builders and tool makers of the United States. I noticed that there were American agents for typewriting machines, pianos, windmills, tools, etc., in nearly all of the prominent places. These agents are usually reached by addressing a personal letter to the postmaster, asking him to turn certain letters, descriptive catalogues, etc., over to one of the agents. The agent usually takes the matter in hand and displays the engravings of tools and machines in his show window, announcing the fact that he is ready to take orders for the same. In this way quite a business has been developed on the commissoin basis, with agents on the ground, which agents may handle metal working tools, printing presses or kodaks. One agent I know does a good business in mining machinery, flour mill machinery and phonographs.

How to Renovate Furniture

To renovate pieces of furniture the old varnish must be removed. To do this pour boiling water, to which a little piece of washing soda has been added, over the piece of furniture, and after it is dry wipe it with a piece of flannel which has been wet in either turpentine or naphtha. The next day it will have to be sandpapered. To take the dye evenly the whole surface should be wet just before the color is applied with clear hot water. Most housekeepers prefer a white enamel to any colored stain. When white is used the piece of furniture which you are renovating must be left perfectly dry. Give it two coats of white varnish, then rub it down with sandpaper, and after this oil it with a soft silk cloth and rub until there is a high polish.

A Great Book

As one of your subscribers I must say that I am very much pleased with your book and find that it contains very much useful knowledge; it is very interesting to sit down and see and read about what good mechanics are doing. I must say again that it is a great book.—Ezra O. Waterbury, Nassau, N. Y.

PRACTICAL CARPENTRY

Geometrical Handrailing

A SERIES OF ILLUSTRATED ARTICLES ON STAIR BUILDING, USING GEOMETRY AS THE BASIS—SOME SIMPLE, ESSENTIAL PROBLEMS SOLVED

By Morris Williams

IN THIS and future articles will be presented a system of handrailing so simple as to eliminate from all minds the supposition that handrailing is something beyond the capacity of an ordinary carpenter.

In my study of the subject for a period covering at least thirty years, I have found that every system is founded on the same geometrical problems, varying only in a different method of solution and application to the conditions arising from the varied designs of stairways.

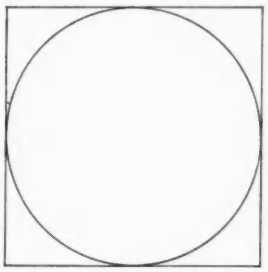


Fig. 1.

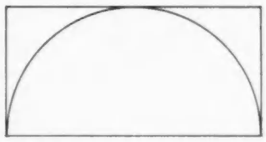


Fig. 2.

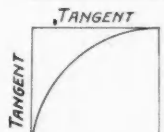


Fig. 3.

In this article I shall present a few of these problems and a simple method of solution, which will be the basis of all solutions in future articles of the various designs of stairways presented as examples.

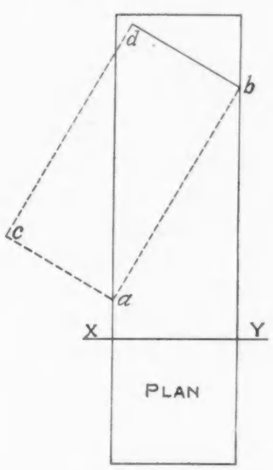


Fig. 4.

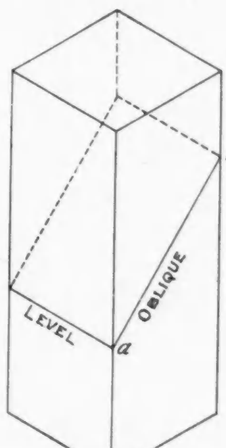


Fig. 5.

In Fig. 1 is shown a plain figure representing a square and an inscribed circle.

In Fig. 2 an oblong figure, enclosing a semicircle; and in Fig. 3 a square with an inscribed quadrant.

With few exceptions these figures represent all the varieties of plan *well holes* in geometrical stairways, and the science of handrailing may be defined as that which solves the various developments of the lines constituting them.

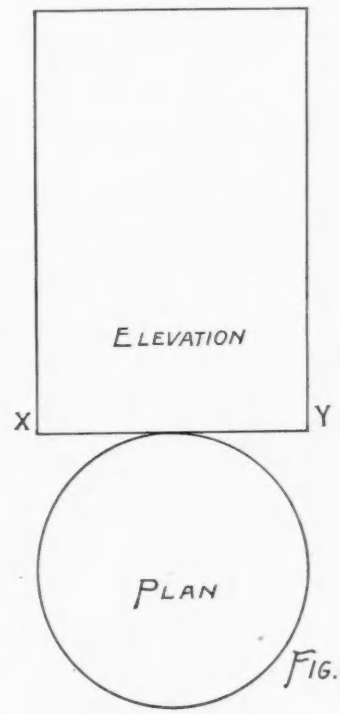


Fig. 6.

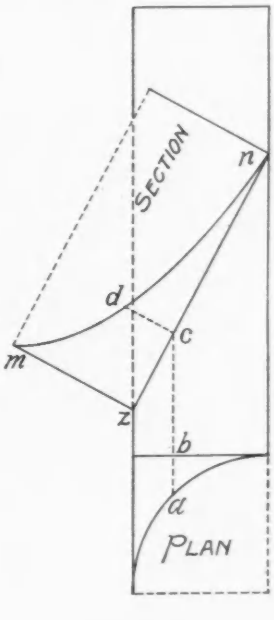


Fig. 7.

The straight lines in each figure represent the plan lines of prisms, and the curved lines the plan lines of cylinders.

In Fig. 4 is shown a plan and elevation of a rectangle prism and in Fig. 5 an isometric view of the same. In both figures is also shown a section, cut made obliquely to one side, as at *a-b*.

To find the form of the section; draw the line *a-c* perpendicular to the line *a-b*, and the same length as one side of the plan.

From *b* to *d* draw a parallel line to *a-c*, and by connecting *d-c*, the form of the section will be found as shown by the dotted lines *a-c-d-b*. This solution may be verified if a saw cut is made through a square piece of wood at the same angle to the side as the line *a-b* is made in this figure. The end of the wood cut through *a-b* will be of the same form as the section shown in Fig. 4.

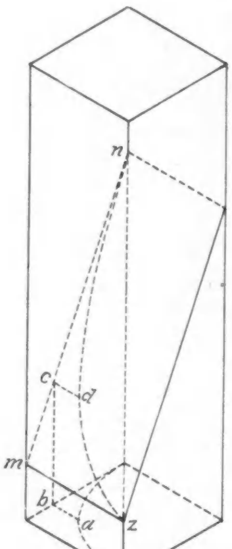


Fig. 8.

Prisms may assume the form of any of the polygons; and some times in stairway construction problems are met calling for the development and projections of lines of prisms having either acute or obtuse angles. Such is generally the case when the stringer is curved out at the bottom of a stairway.

Fig. 6 represents a plan and elevation of a cylinder. In handrailing all well-holes of whatever shape are called cylinders:—thus a quadrant, a semicircle, or even a square well-hole are known as cylinders, where geometrical exactness limits its form to a solid having circles for its ends. It will be noticed that Fig. 7 is a reproduction of Fig. 4 with an addition of a quadrant in the plan, and the same developed in the section. The dotted line *a-b-c* is drawn from any point in the curve of the plan quadrant to intersect the oblique line of the sections; as shown at *c;* then square to the same line from *c* to *d;* making *c-d* equal in length to *a-b* of the plan. Point *d* will be contained in the developed curve of the section; also the points *m* and *n*.

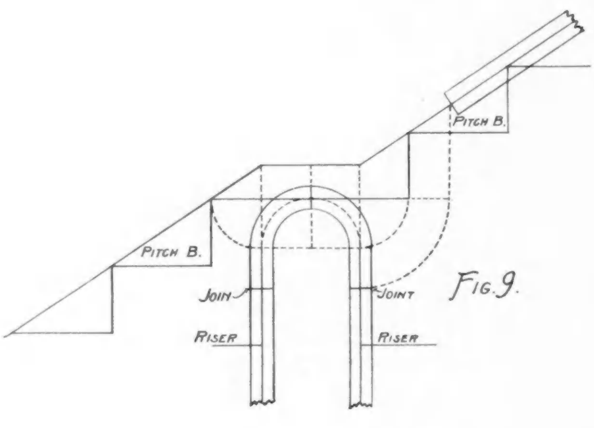


Fig. 9.

Having thus found three points in the curve of the section, it is evident that by connecting the three by means of any flexible material that will bend to touch each one, the curve of the section will be described, as shown from *n-d-m*.

Applying the constructive principle involved in this figure to handrailing, the curve of the plan to represent the plan center of a rail, then the curve of the section will be the developed center of a wreath; and the lines *n-z* and *z-m* the developed tangents.

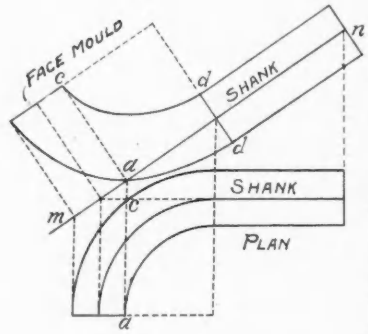


Fig. 10.

Fig. 8 is a perspective view of Fig. 7 folded; every point and line in the plan is shown developed and the curve *z-d-n* of the section to be the development of the plan quadrant.

In Fig. 9 is shown the plan and elevation of a level landing stairway and in Fig. 10 the face mold for the wreath is shown developed, the method being the same as that explained in Fig. 7.

Let the plan in Fig. 10 represent half the well-hole shown in Fig. 9, with the addition of a short piece of the straight rail; which is known as the "shank."

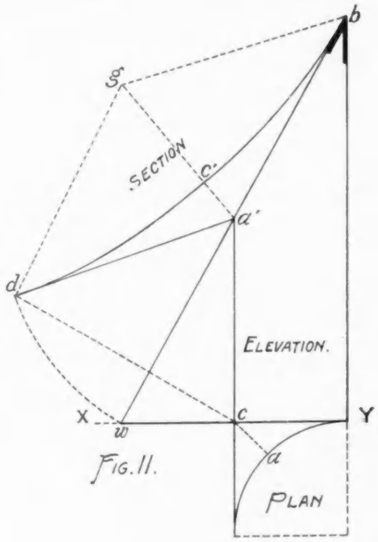


Fig. 11.

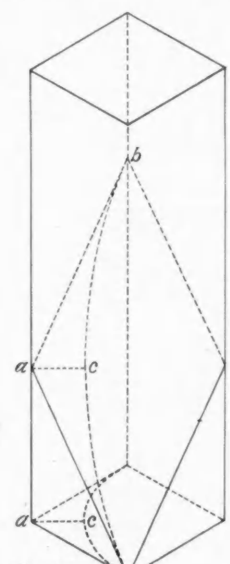


Fig. 12.

Draw the line *a-b-a* across the curve of the plan, and square to the pitch line *m-n* draw *a-c;* make the mold at *d-d* the same width as that of the straight rail at *c*, as determined by the parallel lines to *ac* projected from the plan. The curve may be described by bending a lath to touch the points found.

In Fig. 11 is shown a method to develop a section through a square prism when cut obliquely to two of its sides. An isometric view of such section is shown in Fig. 12.

The square and quadrant shown in Fig. 11 below *x-y* represent the plan or base and *a-b* in the elevation the inclination of the cut.

Continue *a-b* to *w;* draw the dotted line from *c*, square to the cut line *w-a-b;* and from *a* as a center and *a-w* as radius, describe the dotted curved line as shown, to intersect the dotted line drawn from *c* in *d;* connect *d* and *a.* Make *b-g* parallel to *a-d* and *d-g* parallel to *a-b;* thus completing the form of the section.

Make *a-c* on the section equal *a-c* on the plan. By connecting the points *d-c-b* as shown, the curved line of the plan is shown developed in the section.

By comparing this figure with Fig. 12, it will be an easy matter to perceive how the principle involved in its solution may be applied to handrailing.

The Making of a Practical Carpenter

FINDING LENGTH OF VENEERS FOR BENDING AROUND SOFFITS—FULL DESCRIPTION OF A TRAMMEL TO CONSTRUCT AN ELLIPSE—HOW TO SAW KERFS TO SPRING A BOARD

By Frank F. Addison

WHEN carpenters are required to find the lengths of veneers or other materials required for bending round soffits of door and window heads, the following method will be found to be both simple and useful:

To draw a straight line equal to any given arc of a circle. Let AB (Fig. 23) be the given arc. Find C

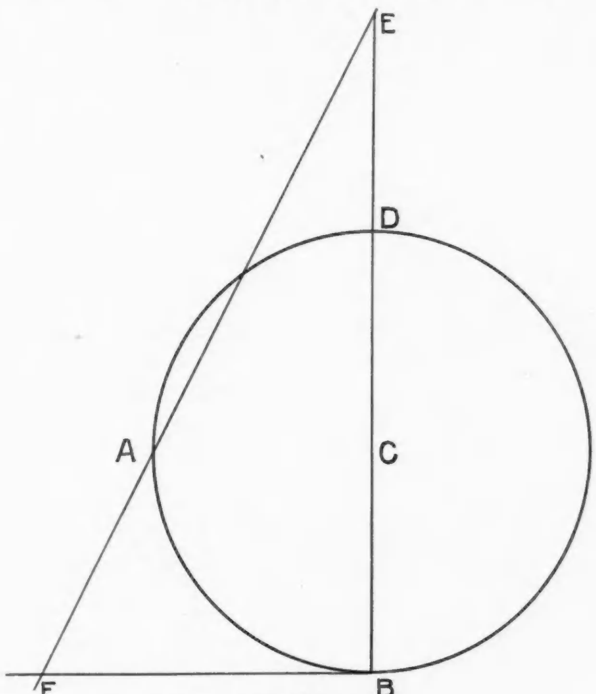


FIG. 23.

the center of the arc, and complete the circle ADB. Draw the diameter BD, and produce it to E, until DE be equal to CD. Join AE, and extend it so as to meet a tangent drawn from B in the point F; then BF will be equal to the arc AB.

Another thing a carpenter is called upon to do very often in his work is to draw an ellipse, and the following method describes how to draw an ellipse with the trammel:

The trammel is an instrument consisting of two principal parts, the fixed part in the form of a cross EFGH (Fig. 24), and the moveable piece or tracer kilm. The fixed piece is made of two rectangular bars or pieces of wood of equal thickness, joined together so as to be in the same plane. On one side of the frame so formed a groove is made, forming a right-angled triangular cross. In the groove two studs, k and l, are fitted to slide freely and carry attached to them the tracer kilm. The tracer is general-

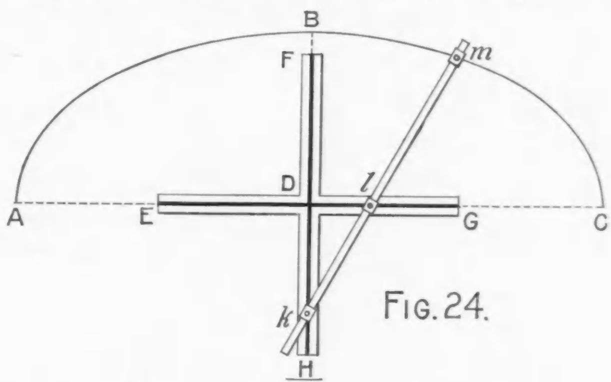


FIG. 24.

ly made to slide through the socket fixed to each stud and provided with a screw or wedge, by which the distance apart of the studs may be regulated. The tracer has another slider, m, also adjustable, which carries a pencil or point. The instrument is used as follows: Let AC be the major and HB the minor axis of an ellipse; lay the cross of the trammel on these lines, so that the center lines of it may coincide with them; then adjust the sliders of the tracer so that the distance between, k and m, may be equal to half the major axis, and the distance between l and m equal to half the minor axis; then by moving the bar round the pencil in the slider will describe the ellipse.

To find how far apart to saw kerfs to spring a

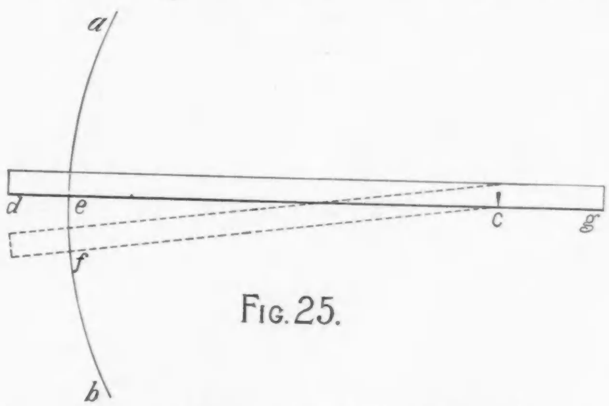


FIG. 25.

board or moulding: Let ab (Fig. 25) be the curve around which it is desired to spring a piece of stock. Take a piece of stock, dg, of the thickness which is to be used; lay it down so that the edge shall pass through the center, c, and mark from c to g and also at e. Now, with the saw which is to be used make a kerf nearly through the piece of stock at c. Keeping this piece on the line eg, spring down the end, d, until the kerf is closed, then mark the point f; ef will be the distance apart to saw kerfs.

A Four-Room School House

BUILT SO AN ADDITION CAN READILY BE ADDED WHEN NECESSARY—COMPLETE WATER SYSTEM OF THEIR OWN—COST VERY MODERATE

THE accompanying illustration shows the four-room school located in Cook county, Ill. It is constructed of mottled buff brick with a stone foundation. The roof is of slate.

The basement, which has a cement floor, is equipped with toilet rooms, fuel rooms and a furnace room.

The entire interior finish of the school is in oak and the doors in all the rooms are glass panelled, thus affording a view of the various rooms from the hall.

The building is so constructed that an additional four rooms can be readily added and the architect is now drawing plans for such an addition. The school lies outside of the water district and so the school is equipped with a one and one-half horsepower engine which pumps water from a deep well into a large tank which is located in the garret of the building, thereby affording them an excellent water supply. The rooms are twenty-five by thirty-two feet and are equipped with blackboards, book-cases and drinking fountains.

One of the fine features of a building of this kind is that as soon as the school becomes too small to hold the children, an addition of equal size can be added without impairing the looks of the building, but rather improving it.

The cost of this building was $13,500.

LIGHTING THE SCHOOL ROOM

The object in lighting a school room should be, first, to get the proper amount; second, to get it from the proper direction; third, to have it uniformly distributed and sufficiently diffused, and to do this under all conditions of weather.

Every foot of unnecessary glass is a detriment. It lets in the heat in summer and the cold in winter. Cold draughts are the great cause of illness, and the most dangerous draught is one that strikes the back. Therefore, there should never be full length windows at the back of the school room unless they are provided with double sash and have steam pipes beneath sufficient to counteract the cold draught.

Wide windows let in more light than the same amount of glass in narrow windows. The diagonal rays are largely cut off by the thickness of the wall in narrow windows. Three wide windows will light almost any school room better than four or five narrow ones and will have fewer cracks for cold air.

The most effective light comes from the clear sky, shining through the window directly upon the object to be lighted. In order that the farther side of the room shall receive such direct light it must pass through the upper part of the window. If there be enough light for the farther parts of the room, there will be more than enough for those near the windows, and hence the upper half of the window is more effective than the lower half, and the higher the window is from the floor the more light from a given area of glass.

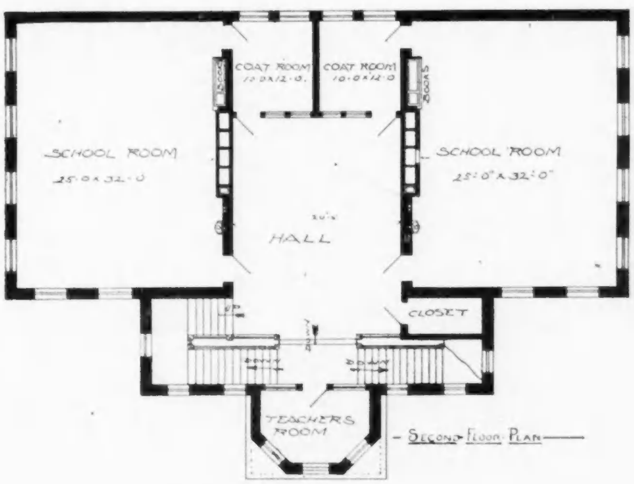
This principle should not be carried to such an extreme as to cut off a view of the landscape, especially when the surroundings are pleasant. Place the window sills at such a height that the children can see the ground when standing at the window, but not when seated. This will bring the lower edge of the glass about three and one-half feet above the floor. This is leading to the greater use of square head windows in preference to arched forms, as it utilizes the upper half of the window.

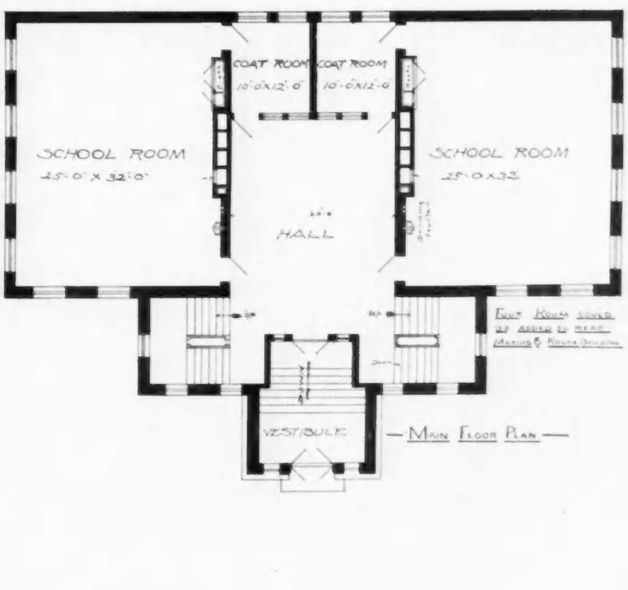
UNIFORM DISTRIBUTION OF LIGHT

The great difficulty lies in lighting the inner part of the room without excess near the windows. To accomplish this and preserve the proper direction of the light on a bright day, we may screen the lower part of the windows and admit light from the upper portion only.

Whatever shades or blinds are used they must be hung so that they can be lowered from the top while screening the lower part of the window. Shades should never be hung in the ordinary manner at the top, for then the lower part of windows cannot be screened without darkening the top entirely and cutting off all effective light from the inner side of the room. The simplest device is to use one shade hung on a moveable roller, so that the light may be admitted both at top and bottom of window in any desired amount

The use of translucent or prismatic glass in the upper portion of a window has such marked advantages over the ordinary clear window glass as to deserve special comment. It has been proven that such glass not only softens the light, but gives a marked increase to its effectiveness, especially in cases where a considerable portion of the sky is cut off by opposite buildings. The rays which would, with clear glass, shine on the floor near the window and be absorbed, are with transclucent glass reflected and diffused over the inner part of the room and ceiling, which, being thus illuminated, radiates a soft light where most needed.





DESIGN OF A FOUR ROOM SCHOOL

Planing Mill Work.

— *J. Crow Taylor.* —

Possibilities of a Scroll Saw

COMPARING THE VARIOUS KINDS OF WORK WHICH CAN BE DONE WITH A BAND SAW AND SCROLL SAW—BEST PLACE TO USE EACH

THERE is no man in a position to have more influence in promoting the decorative features of home building in the country districts, encouraging the use of scroll work and other artistic trimmings than the village carpenter, and there is no one so much inclined to push this class of work as the man who makes it himself. There is scroll work, turned work and carved work, in an almost endless variety of designs to be had from the city planing mills, but somehow it is something that the average village carpenter does not, as a rule, manifest any deep interest in unless he takes up the manufacture of these articles himself. Then he at once becomes enthusiastic on the subject and occasionally we find it overdone, find houses that are made ugly with a surplus of what we call "gingerbread work," while they might have been made very much more attractive than the usual plain structure by a judicious use of this same class of work. However, the purpose here is not so much to deal with the use and abuse of this class of finish as it is to discuss its manufacture as a side line to the carpenter business, that is, a feature of the carpenter shop.

This is one class of machine work that can be made of scrap material largely, and may be manufactured either with hand or foot power machines, or the regular line of power machinery built for this work. The hand scroll saw machine, or rather the foot power machine, is already pretty well known to the carpenter trade, and it is a very useful addition to any carpenter shop, but inasmuch as it calls for the exercise of considerable manual labor, it is not calculated to beget the amount of enthusiasm for pushing scroll work as may be expected where one is fortunate enough to have a small power plant of some kind for driving tools in the carpenter shop. The writer is already on record as an ardent advocate of small power units in the carpenter shop in the form of gasoline engines, which have now reached the stage of development where one can have enough power to run what machines are really necessary in such a shop at a comparatively small outlay for an engine and a nominal cost for operation. When one by purchasing a small gasoline engine can get power at the rate of about ten cents a day per horse power, it almost makes a man feel tired to think about operating a machine by either hand or foot power. However, if you can't get an engine, get a scroll saw anyway, because it is a good thing to have, and then just as soon as you can, get a little engine or make some other arrangements for the use of a little motive power, and your ideas of scroll work will soon begin to expand wonderfully.

The question that will confront many a carpenter when he reaches the power scroll saw stage is, whether he needs a scroll saw or a small band saw. And this, like many other questions, depends quite a lot on circumstances. It is queer, isn't it, how circumstances, how local conditions butt into almost any and every question that comes up, but it is one of the things we can't get around, and the fact of the matter is that local conditions do much toward shaping the life and dispositions of man himself. The band saw with its great capacity for work and wide scope of variety in uses is a mighty inviting proposition, and the more one becomes acquainted with this machine the more he wants it; but there are naturally times when one should resist the temptation to invest in the band saw and stick strictly to the scroll saw.

For those carpenters who are situated in the timbered part of the country, that is, that part of the country which produces lumber as well as consumes it, there are a great many openings for the profitable use of the band saw in connection with the carpenter shop when one reaches the stage of equipping the shop with power appliances. The sizes most desirable for use in such places are machines with wheels from thirty to thirty-six inches in diameter, and in these sizes there is quite a variety to select from, some having tilt tables and others having tilt columns, and others with special features of one kind and another. These special features, however, are not of as much importance to the carpenter as they are to certain big wood working establishments which have large quantities of special work to do, and as a rule they are really not of enough importance to make it worth while to pay the difference in price between these machines and those of plainer type. The one thing we do want with the band saw, however, is good guides for the saw blade. It is immaterial whether you buy the plainest and simplest machine on the market, for generally they will give as good service as any, just so the wheels are in good shape, if you only have good guides. It is really the wheels and the guides that make the band saw and insure satisfaction in its use, and where you have these you can get along very well without any other special features to the machine.

One of the appealing features about a band saw machine is that you can cut nearly anything on it and do the work at a speed that puts the scroll saw to shame. And, entirely aside from various lines of shaped work that apply in the carpenter trade, there is, if a man is situated in the timber as stated, a chance to engage in the various side lines. For example, let us assume that one is located where there are several small saw mills cutting oak and other hardwoods, there is a chance to buy up short lengths, scrap and cull stock of various kinds at a low price and manufacture it into wagon and agricultural material cut to shape. There has been some work done successfully along these lines in the making at odd times of wagon felloes, hounds, plow beams and various other articles that are used by country blacksmith shops and by manufacturers of wagons and farm implements. And, where lumber is available at bargain figures like it frequently is, where one can pick up stock that the mill man can't very well ship on the market, there is a chance to build up a very nice business in this line and it is a class of work that can be done during the winter months when times are rather dull in the carpenter shop. One should start into this kind of business carefully and on a small scale and develop the business as one's knowledge and acquaintance with the trade increases. The best customers really for material of this kind are the blacksmith shops in the country towns, who purchase quite a lot of this stock right along from iron stores in the city, stock which is made in the woods, shipped to the city and then back to the blacksmith shops, making it cost so much more than one can get for such material on the market in the city that there is room to make quite a concession to the local shops and still have a better margin for profit than shipping to the city in car lots.

When we get down to the scroll work proper, however, and get away from local surroundings that are inviting to the band saw aside from the ordinary shop work itself, the band saw begins to lose its advantages over the regular scroll saw. You can, of course, do quite a variety of scroll work on the band saw, and in the city planing mills where they operate both scroll and band saws we can get demonstration of this fact, and also of the fact that the band saw will do scroll work faster than the regular scroll saw, by seeing the greater part of the scroll work done on the band saw machine. You will find, however, that the sawyer will have to be something of an expert and keep his band saws in the pink of condition, otherwise the work will be rough as compared to that done on the scroll saw. It is really practically impossible to do work as smooth on the band saw as it can be done on the scroll saw, because the band saw must have its teeth set for clearance, while the scroll saw has its back made thin for clearance and the teeth as a rule are straight and do their work without leaving what we call saw marks on the wood. This is a very important item, too, in scroll work, for it is more trouble to smooth up a rough job by hand with sandpaper than it is to begin over and cut a smooth job from the start. An expert with the band saw, however, can do a neat job and those of you who have attended big fairs and expositions have witnessed some very intricate and neat scroll sawings being done by these machines and the work sold as souvenirs to the visitors. There is one point, however, where the band saw strikes a stump that makes it practically essential to have a scroll saw in the shop no matter whether you have a band saw or not, and that is, when you come to doing what is termed inside work. When it becomes necessary to get inside of a piece of board and cut out a design without cutting through to the outer edge there is where your band saw is barred, while if you have a scroll saw all you need to do is to bore a hole, raise your top slide or unhook your scroll saw and, passing it through the hole, couple up again, and there you are. This is a very important point, too, for it is impossible to do anything like a full line of scroll work of any kind without having this inside work. You can't even make a decent lot of brackets. In fact, when you come to sum the matter up it looks like there is almost as much inside work as there is outside work, and while it is a good enough plan to use the band saw for outside work when you have both machines, it is practically impossible to dispense with the scroll saw, while on the other hand you can do very well without the band saw. Generally speaking, one might say that where the intention is to confine operations to scroll sawing and regular carpenter shop work, a good scroll saw is the thing to have, and the band saw may be dispensed with until such time as when the shop reaches large proportions and begins to take on a full complement of wood working machinery.

Worth Ten Times Its Price

"I am a subscriber to your magnificent journal. I have received ten times the value of the subscription price already. I would not do without it, and I recommend it to all my fellow workmen."—A. C. Dill, Franklin, Nebraska.

Don't forget that a poorly planned and poorly built house costs just as much as the other kind.

HEATING

WM. H. PEARCE. M. E.

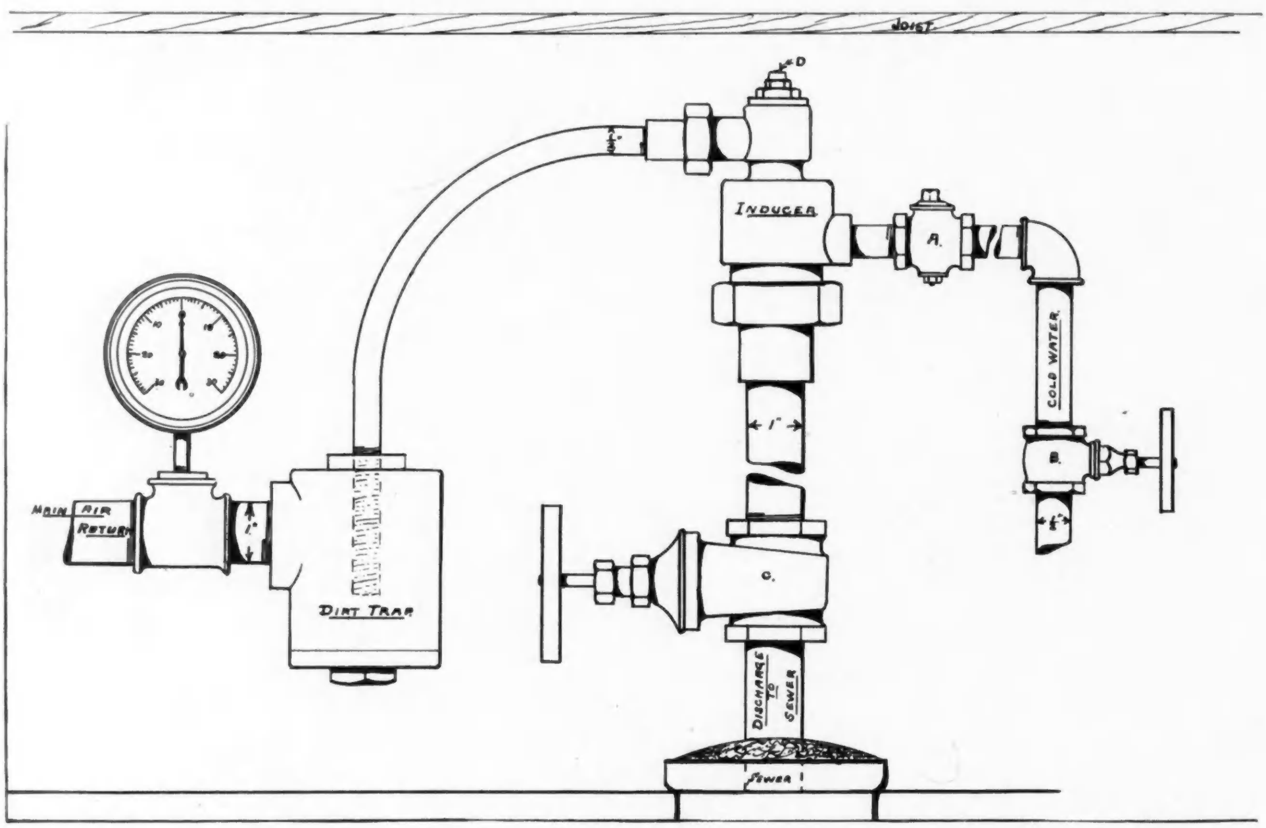
Application of Steam Heating

BY INDUCED CIRCULATION ADAPTED TO HOMES, APARTMENT HOUSES, SCHOOLS, ETC., FULLY EXPLAINED, WITH ILLUSTRATIONS SHOWING SOME OF THE APPARATUS USED

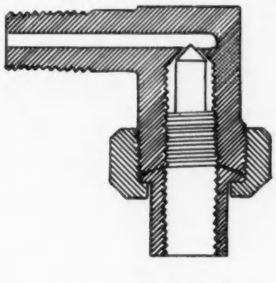
STEAM has always been recognized by good engineers as the best of our heating mediums. By comparison with water its velocity may be considered as ten times greater. One pound will convey about 1,000 heat units, water conveying but 20. One pound of steam occupies 20 cubic feet of space, one pound of water occupies but 27 8-10 cubic inches of space. A steam radiator may be shut off entirely if desired, while with water it must be constantly circulating to prevent freezing.

The greatest objection to the use of steam is the pounding and cracking in the pipes, of which we all know much, but understand little of its cause or remedy. If we did, we would not be so ready to advise our neighbors in the use of hot air or some other scheme to counteract the evil.

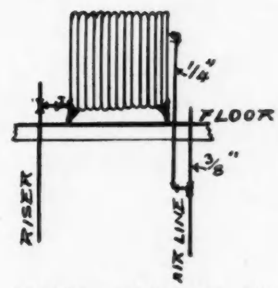
If a bottle be filled with water, then turned upside down it will be noticed that considerable effort is made by the air in its endeavors to rush in and fill the void created by the outgoing water and not until this void is filled will the water run out freely. This same process takes place in a cold radiator or pipe. When steam is turned on a battle takes place between the hot steam seeking to enter and the cold water and air in the pipes or radiator that block its passage. The convulsions are more pronounced than in the case of the bottle due to the greater differences of pressure and temperature. Incidentally, it occurs to the writer that when this process of cracking and thumping in steam pipes takes place in the early hours of the morning there must be some similarity of temper—on the part of the occupant of the room, as the language sometimes used would not be printed by this magazine. The cold air in the radiator is caused by leaky valves



and joints and also by the condensation of steam. To get good circulation it is necessary that there must be some way by which the cold air may be drawn out. To relieve the air pressure, air relief valves are usually brought into play, these valves being made on the thermostatic principle, expanding when the heat strikes them and closing when the heat leaves the valve. They have been used for many years in

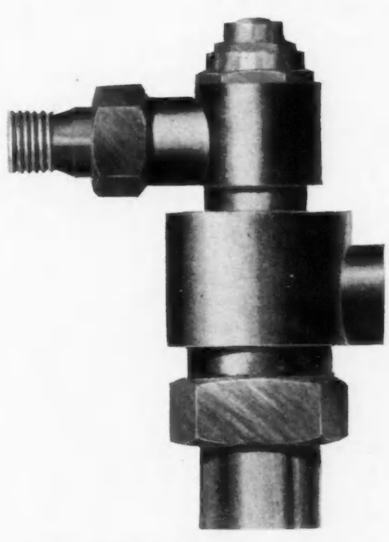


VENT VALVE

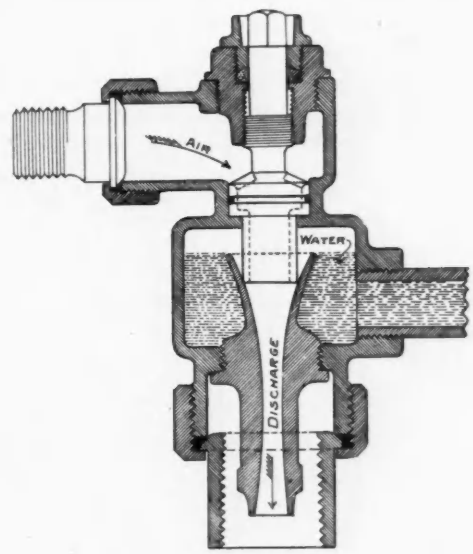


APPLICATION OF VENT VALVE

different forms and new ones on the same principle are constantly being placed upon the market. As the thermostat itself is generally a piece of hard rubber it soon loses its expansive qualities, and in any event, it is necessarily cold when open and lets the air into the radiator which has to be forced out when the steam seeks to enter. Other forms of these devices have a double thermostat supposed to work both ways and correct the evil referred to in the former class, that is, they are intended to let the air out and then close tightly and stay closed until the letting out process is again required. Of this latter the writer must confess some ignorance notwithstanding the claims made for them. They may apparently work



well for a little while, but one thing, however, is certain—that no two opposing forces of equal power can create anything but an equilibrium or else destroy each other, even as the Kilkenny cats who are said to have had their tails tied together and thrown over a clothes line, whereupon their opposite views caused them to fight until nothing was left but the tales (told). In any event, notwithstanding the new styles of these devices (not cats) that are doled out every year when old ones fail to work, generally speaking, it will be seen that they are not adapted to the purpose and are but one of the exhibitions of the crudeness employed in steam heating systems. If this is doubted it might be well to examine and take note. You will find them the cause of more broken jack-knife blades than anything else, due to the fact that the knife blade is the handiest thing to use in place of a screw driver when the air valve fails to work; or go into some public place or office building, watch them sputter or exude steam into the room. If perchance they dribble water on the floor, spoiling the carpet or ceiling below, then you will probably find a convenient cuspidor underneath, or if the occupant is not pos-



INDUCER

sessed of such an article he generally resorts to a tin pail and hangs that underneath.

Steam should flow in pipes and radiators precisely as water flows in a ditch, that is, it should flow down hill. If there are any pockets these will collect the water so that the radiator or steam pipe, assuming the figure reversed, becomes the pocket for the air. If this air is entirely extracted by some means the flow will be positive and the maximum of 1,500 feet per minute be obtained. To accomplish this in factories and other large institutions a vacuum or air pump is resorted to, driven by steam or electricity. This is not convenient, however, in homes or apartment buildings having what are commonly called low pressure heating plants. It is the object, therefore, of this article to describe a simple method by which this result may be obtained in the class of steam heating plants last referred to.

If you will partially fill a wash bowl or bath tub with water, then pull out the plug, you will soon notice that the water passing out through the pipe has displaced a volume of air and to fill this space the air rushes in, which accounts for the hole in the water directly in the center of the drain pipe. If you wish to get an idea of its force put the plug in gently. As it nears the opening it will draw the plug to its seat with much force. In fact this force is great enough to create a vacuum in the bath tub for instance (if it were a closed vessel) to the extent of thirty-two inches, providing the height from the bath tub outlet to the sewer be 2.31 feet for every pound pressure or its equivalent vacuum required. Upon this principle condensers are made by a heating company of Chicago, the condenser being a device for the purpose of extracting air and condensed steam from pipes connecting with steam engines, vacuum pans and like heat apparatus. Some years ago application was made of one of these condensers in a large factory to a steam heating system. The result was not only satisfactory at that time, but it has been done a number of times since. The objections, however, to these applications were that the cold water used for injection purposes mingled with the hot water condensed by the heating apparatus resulting in the waste of the heat which might otherwise have been conserved by returning it to the boiler. Therefore, application was made whereby air only was extracted from heating systems, which has been highly successful. We enclose herewith a sectional view showing a modified form of this same device made by the writer, working under the permission of this company, and adapted to small heating plants as above described, wherein it will be noted that the water from city water mains is received into the device and flows over and down a discharge pipe, the quantity being nominal and regulated by the screw valve above. The air passes down the center of the opening through the valve and is discharged with the water precisely as in the illustration of the bath tub.

In another view the application of this apparatus is also shown usually placed in the basement of the building, directly under the joists at the high point so that the height may be sufficient to create some slight vacuum. The small vent valve is placed upon the radiator, as shown in the sectional cut, in place of the air valve. It has no opening or cannot discharge anywhere but into the small pipe leading into the basement, this pipe being the discharge air line. At the end of this air line the inducer is placed which lifts the air from a dirt trap so arranged that if some little condensation should occur it will discharge that also. The small gauge is placed on the pipe showing the amount of vacuum or pressure that may be used. In operation, after the vent valves are set slightly open and steam turned on, the cock and screw valve on the top of the inducer are properly adjusted, after which anyone can open the main valves both in the discharge and water supply and set the apparatus in operation for a short time or continuously. The effect, therefore, is to draw all air from the radiators and discharge it to the sewer, saving all annoyance of leaky valves and producing a perfect means of circulation. In addition to this, if a vacuum of some extent be created, it is a known fact that the water in the boiler would boil at a much lower temperature, hence the vapor arising to the radiators in mild weather would furnish sufficient heat to do the work of heating without the extra expense usually incurred in getting up two or three pounds of steam pressure which is common in this class of apparatus.

Cleaning Furniture

For varnished furniture dampen the cloth with kerosene, but for genuine polished surfaces a different treatment is required. When the polished surface of the piano is soiled and dull looking wet over with paraffin oil and let it remain for two hours. Apply this oil sparingly, and at the end of the time polish with linen and chamois. Always use two cloths for dusting, one in each hand. Then every time the left hand rests on a polished surface there will not be left trace of soiled fingers and perspiration. For carved furniture that is dusty use a fine paint brush dipped in kerosene oil, brush over the carvings, and they will appear bright as when new, or dip the brush in a good furniture polish.

Imitation Sandstone

The Prussian government is erecting at Stettin a building composed of imitation sandstone, granite and marble. The sandstone forms the greater part of the exterior. The framework is of brick. All the blocks, window frames, sills, columns, roof, balcony and portal ornaments are of imitation stone and are so exactly cast and numbered that they can be fitted together and set with little or no chiseling. The pressing or stamping of the molded pieces is done by hand. From three to four weeks are required for drying. The cost is said not to exceed half that of natural stone, and the durability is equal.

Best Ever

"The August copy of the AMERICAN CARPENTER AND BUILDER has been received. It is the best magazine for carpenters and builders I have ever seen and should be in the hands of every carpenter."—John Hunt, 910 North Beville avenue, Indianapolis, Ind.

Leads Them All

"I think more of the AMERICAN CARPENTER AND BUILDER than of all other journals combined. While all are good, the CARPENTER AND BUILDER certainly ranks first."—M. H. Drapen, 1215 West 18th St., Bedford, Ind.

PAINTING

EDWARD HURST BROWN

Painting the New House

V. WATER PAINTS USED EXTENSIVELY FOR EXTERIOR AND INTERIOR WORK—WHITEWASH AS A PRESERVATIVE OF WOOD—WHY IT IS SO GENERALLY USED

A CLASS of paints that has come into considerable use within the past few years, should be considered here, since they are not only used for interior work but also, to a great extent, for the cheaper class of exterior painting. These are the so-called water paints, because they are mixed with water in order to reduce them to the proper consistency for application. But they are not water paints in the sense that ordinary paints are linseed oil paints, for in these latter the oil not only serves the purpose of thinning the paint to working consistency but it also acts as the binding medium, and the dried or oxidized linseed oil holds the particles of paint together and holds the paint film tightly to the wood. Water paints depend for their binding medium upon some other substance, the water serving merely as a "thinner," the same as turpentine or benzine acts in oil paints. When a water paint has dried, the water has completely disappeared—evaporated—and left the particles of paint held together by the binding medium which the paint contained. When a linseed oil paint dries, the oil hardens by uniting with oxygen to form a tough, leatherlike mass, and remains in the paint to hold the particles of pigment together.

Water colors have been used by artists for a long time, and are made by grinding up the pigment very fine with gum, and pressing it in cakes, or else this ground mass is kept moist by the addition of glycerine, making the ordinary "moist colors," that are put up in tubes or in small china "pans." But these water colors are used only for painting pictures upon paper and possess no weather resisting properties. Another class of pigments that are ground in water are the distemper or fresco colors, used for painting upon plaster or tinting ceilings or walls. The binder, in this case, is usually glue, which is added when mixing the paint. Such paints can readily be washed off; are valueless for outside painting; and will be considered in connection with the painting of interior plastered walls.

Whitewash is the oldest form of water paints, although it is not strictly weatherproof. Still ordinary whitewash is much used on the outside of farm buildings, fences and the like, as well as for the interior of stables, cellars, factories and similar places, and even when used outdoors a good coat of whitewash will last for a number of months and is so cheap and involves so little labor in the application that its renewal is a matter of comparatively little moment. Whitewash is made by a simple mixture of unslaked lime with water, and is applied to the surface in the consistency of thin cream. It will naturally adhere better to a rough surface like brickwork or unplaned lumber than it will to a smooth board. When dry the water evaporates and a coating of lime is left upon the whitewashed surface. This does not serve to waterproof the wood to which it is applied, since rain will soak into whitewash, but a newly whitewashed house is neat in appearance, and this neatness is retained for several months. Moreover whitewash, being disinfectant in its nature, is sanitary and acts as a wood preservative. And what is even more important, whitewash is one of the best fire retarders that has yet been discovered. Indeed, if the joists and studding of the newly built house were well whitewashed, and then if the rough sheathing were whitewashed inside and out and the under side of the floor boards were given a good heavy coat of whitewash, there would be little opportunity for a fire to gain much headway before it could be extinguished, since fires usually spread in the air spaces that are left between the studs and the floor joists. The expense of such a method of fireproofiing is very slight indeed, compared with its effectiveness. If one of the paint spraying machines is used by which the whitewash is thrown on by air pressure in a thin spray, similar to the spraying machine used for ridding trees of insects the whitewash can be applied much thicker and will penetrate the cracks between the boards and all the nooks and crannies in the bridging of the joists much better than it can be made to do when applied with a brush, rendering it even more valuable as a fire retardent.

The chief objection to whitewash is its lack of durability for outside use, as it will, in a few months begin to be washed off by the rain and it consequently requires frequent renewal. Besides this it is apt to powder off on one's clothes, if you lean against a whitewashed surface. The following method will serve for preparing a whitewash for inside use that is reasonably free from this defect. Take good builder's lime and slake it by soaking it with warm water, allowing it to fall into a fine powder in the open air. Make it very thin by the addition of water and to every pailful add a pint of flour previously made into paste, or better still add a solution of one pound of ordinary alum in hot water to every gallon of whitewash. The first coat should be applied very thin, so as to bind to the wall. The addition of alum will prevent the second coat from rubbing up the first coat and thereby make a more uniform surface.

To make whitewash that will stand the weather reasonably well, add one part of salt by weight to three parts of lime.

Another method of preparing a whitewash for outdoor work, so that it will stand the weather fairly well is to take one pound of lime, and slake it with warm water as before mentioned. Then take one-quarter of a pound of Burgundy pitch and dissolve it by gentle heat in a pint of linseed oil. Add to the hot lime one gallon of skimmed milk, and then pour in the mixture of pitch and oil, a little at a time, stirring constantly. Finally add three pounds of bolted whiting. If too stout to work evenly, add more skimmed milk. This, however, ceases to be a true whitewash, and partakes more of the nature of a paint, since it depends for its binding properties upon the milk, the linseed oil and the pitch.

Some years ago the United States government had a formula for a cheap water paint that was used on the outside of lighthouses and which seemed to stand fairly well. To prepare it, one-half bushel of lime is slaked with boiling water, and kept covered during the slaking to retain the steam. When cold it is strained through an ordinary sieve or paint strainer and then one peck of salt, dissolved in warm water, three pounds of rice flour stirred in water and boiled to a thin paste, one pound Spanish whiting and one pound pale glue dissolved in water, are added to the strained lime mixture, thoroughly stirred and allowed to stand, well covered, for several days before using. This wash must be warmed in a kettle before using and applied with wall brushes as hot as it can be done without injuring the bristles. Such a paint wears well on wood, brick or stone. If a buff tint is desired, French ochre, ground dry, may be used as a coloring, and if a reddish tone is desired, Venetian red should be used. A reddish buff is obtained by a combination of ochre and Venetian red. Chrome yellow should not be used, since this pigment is affected by lime.

A red wash can be made by mixing dry Venetian red, to which whiting or quicklime is added, with skimmed milk. The addition of a half gallon of linseed oil to each gallon of this wash will render it waterproof, but even without the oil it will stand for years.

It will be noted that some of the washes mentioned above depend partially for their binding properties upon skimmed milk. In 1879 the New York Evening Post published three formulas for paints or washes made up chiefly from lime or cement and skimmed milk. At the time, in commenting upon this, a leading paint periodical said: "Common lime whitewash has some preservative qualities, but skimmed milk has none, though it is not bad diet for swine." Yet nevertheless a very large class of water paints for outside use are made and sold to-day, and answer the purpose of cheap weather resisting paints very well indeed, that are dependent for their binding properties upon a product of this same skimmed milk—casein. Casein paints are usually sold in powdered form, the casein being dried and added to the lime, whiting or powdered cement that is used as the pigment base. The coloring matter is also added to the dry powder and the whole thoroughly mixed by machinery, so that the addition of water is all that is required to produce a paint that is used in the same manner as oil paint, and covers fairly well. Such paints dry with practically no gloss, and when dry, a second coat of paint can be applied the same as with any other paint. These casein paints are generally known to the trade as water paints, and are manufactured by a number of firms, all of whom, however, are required to pay a royalty to the owners of the basic patent. They are useful for all sorts of outbuildings, for painting brick walls and especially for the interior of factories, warehouses and sheds. While they cannot be said to be weatherproof, in the sense that linseed oil paints are, still, they will stand considerable exposure to the weather, and on old weatherbeaten woodwork may be used as a priming under an oil paint, provided the very best results are not looked for.

Still another class of water paints have been long extensively sold in England, and are to some extent sold in this country. These are put up in paste form, the same as ordinary oil paints, and require thinning with water to reduce them to working consistency. They depend upon silicate of soda or water glass as the binding agent. These paints have given good satisfaction wherever used, especially on brickwork, but are more expensive than the casein paints and hence have not come into such general use.

Better Every Issue

I have just finished the last issue of your magazine. It is the best magazine of its kind published, and my only regret is that it is not a weekly. It gets better every issue.—F. Kirby, Columbia, Mo.

Don't think the money thrown away that you pay to a skilled architect. It will pay better returns than any money you put into your house.

CEMENT BUILDING CONSTRUCTION

FRED W. HAGLOCH

Curing Stone With Steam

VARIOUS REASONS WHY HARDENING STONE BY STEAM IS NOT PRACTICABLE—RESULTS OF TESTS MADE WITH STEAM-CURED STONE

MANY have recently begun curing (hardening) stone with steam, and being always ready to learn any improvement that may arise, I have the past few months made several tests, none of which were, in my opinion, satisfactory.

Hollow blocks taken from the molding machine and placed in a chamber and subjected to 80 pounds steam pressure for two, four, six, eight and ten hours, were all hardened according to the time, viz., the ten-hour block being the soundest. But I found that it was the easiest injured by acids and that the lime in the cement had drawn towards the surface, which will cause disintegration in a few years just the same as blocks made in the ordinary way with cement containing an excess of lime, only that in the steam-cured block its interior would remain sound.

Blocks cured by steam are also less absorbent, which may lead to their use, but I feel confident a reaction will set in, as the strongest blocks made are those which absorb freely.

As the steam curing acts in the nature of baking the cement I find that such blocks are lacking in fireproof qualities, viz., blocks made with cement 1,200 degrees fireproof when steam cured, discolor at 450 degrees and crumble at 700 degrees, which is certainly a great reduction, and does not look well for the sand lime brick industry, but I have not had the time to make tests of the latter.

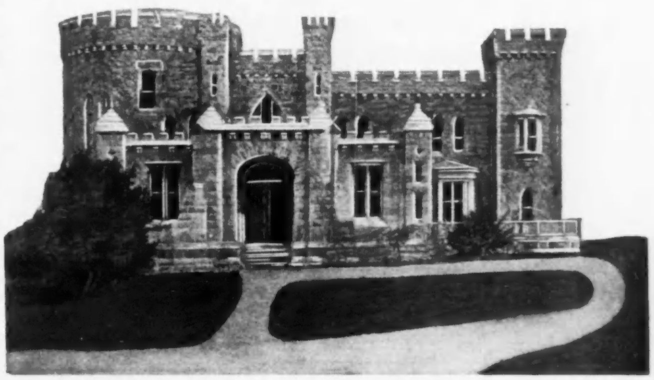
Blocks made of crushed furnace slag and cement can be more successfully cured by steam, as these did not show the least injury by heat and were unaffected by acid, but why, is the question I hope someone better versed in chemistry than I will answer.

The recent heavy advance in the price of Portland cement has done much to introduce cement made of furnace slag, sometimes known as Puzzalon cement. Heretofore I have condemned all slag cement for exposed work, but I have always known that a very great difference exists in this cement, hence I have given it much attention of late with very severe tests, and find that any cement containing much magnesia cannot be used in block work, but that cement made from slag that has a small per cent of magnesia is better than some Portland cement, as it is much stronger, but does not endure exposure.

A College of Concrete Construction

The building illustrated herewith, for which the preparatory work was begun at Cleveland, Ohio, Aug. 1st, will be completed about Sept. 1st, 1906, and will no doubt be one of the greatest examples in artificial stone construction in the world.

The walls will be of hollow blocks from at least eight different machines; all blocks will imitate dark



blue granite, the sills, lintels and trimmings being of a granite finish finer than the product of any natural quarry; the interior finish will be that of various colored artificial marble, the floors of marble tile and the roof covered with concrete shingles; the construction work will be of concrete steel, the door and window frames being of reinforced marble.

The building will be utilized as a school for concrete engineering, and will also conduct correspondence courses. The school has secured temporary quarters in the Cuyahoga Building, located on the public square, and opens Sept. 1st. The leading spirits in this enterprise are Joseph A. Anders, a man of much business experience, who is secretary and treasurer, and Fred W. Hagloch, who is designer of the structure and who will personally superintend the instruction.

The vast difference between work in the abstract and work in the concrete is realized to the fullest only by those who have laid a sidewalk.

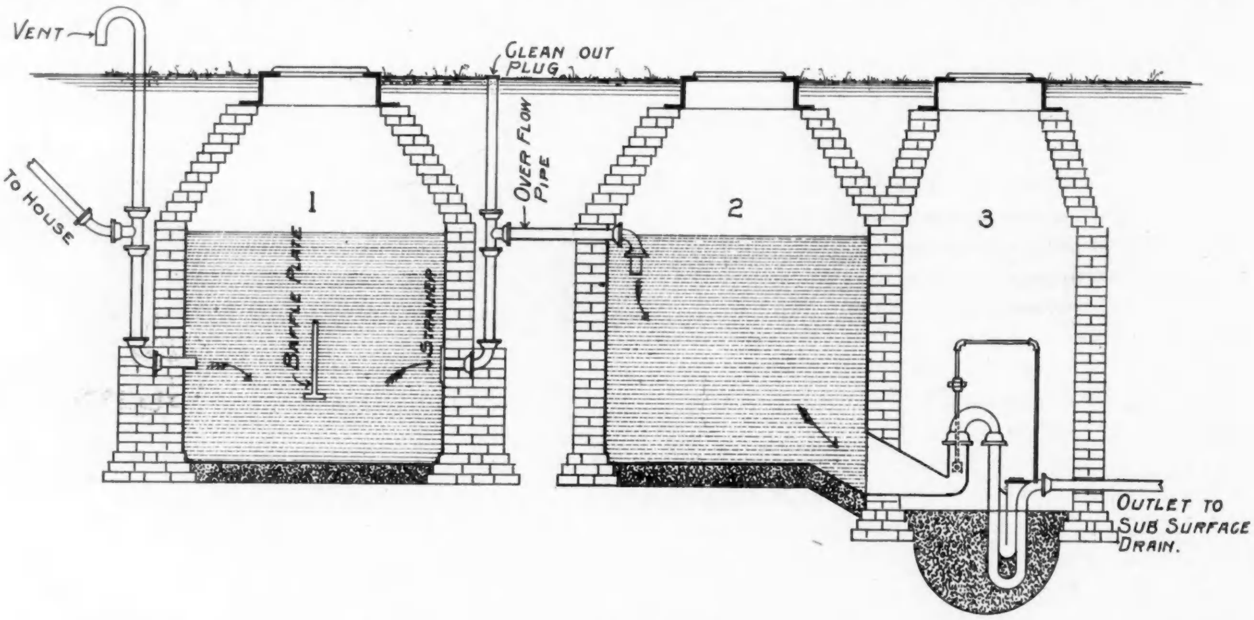
Plumbing

WM. R. MARSHALL.

Disposal of Sewerage in Country Districts

A COMPLETE DISCUSSION OF HOW TO BEST DISPOSE OF SEWERAGE WHERE THERE IS NO GENERAL SYSTEM—HOW TO CONSTRUCT CESSPOOLS TO AVOID CONTAMINATING THE SURROUNDING SOIL

THE disposal of sewerage in districts where there are no public sewers at hand is often a matter of some difficulty. Formerly, it was believed that as long as a running body of water, river or creek, or even a slough, was at hand, into which the sewerage could be emptied, the question of adequate sewer systems was solved for all time to come. Frequent epidemics of diphtheria and scarlet fever and other numerous diseases, have called forth careful scientific investigation, which has proven, beyond all question, that the polluting of streams contiguous to domestic water supplies with putrescent sewerage, is one of the greatest dangers to health. This subject is being more closely studied by our country residents every year, which is probably due to the wide publicity given it by the press in discussions and reports of health departments. It is our purpose to consider in these articles, some of the best sanitary systems and appliances applicable to the convenience and health of our country districts. To write an article advising or advocating any one particular system is to deal with one condition. A system which is adaptable for one place will not prove an adequate or effectual system for another. It is up to the plumber or builder to study the conditions as they exist, and to exercise a little good common sense.

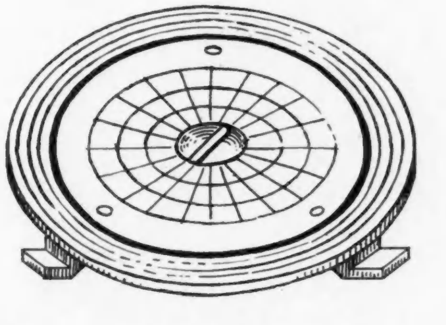


The old privy vault, with its revolting stench and inconvenience, is rapidly disappearing. Private and public water service have made it possible to install a modern equipped bath room, even in the country, but the sewer disposal in most cases, is a puzzling proposition.

LEACHING CESSPOOL

The primitive method of installing a leaching cesspool, which is a hole dug in the ground deep enough to allow five or six feet of space below the inlet end of the house drain pipe, and five or six feet wide, walled up with loose stones, the bottom left loose and filled with about a foot of small stones and the top walled over with a tight arch, and the earth filled in to the grade level thereby depending on the liquid to ooze away through the porous strata, has a great many disadvantages. In the first place, in communities where the neighbors depend on wells for their water supply, it is very dangerous, as it invariably pollutes the sub-soil in the neighborhood and contaminates the well water supply. On a farm where plenty of ground is available, if located at a good distance from the dwelling, and at a lower level in the opposite direction from the well, it may be used without causing any harm. In case such a cesspool is used, always build the arch up to an opening, twenty inches in diameter, and run it to the surface and close it with an inspection cover hermetically sealed by a rubber gasket between the lid (which is bolted down) and the rim, and you will probably be saved the trouble and expense of digging down to the arch and breaking it open some day.

This summer, in a small, country town, I witnessed the blank look of despair of a local sprinkling cart man, who was called upon to pump out a cesspool (which, on account of its being built in clay, refused to drain) when he lost his suction hose down into the cesspool through the small vent pipe through which he was pumping, with the alternative of digging down and breaking the arch open, or buying a new hose. He bought a new one, and "cussed" the plumber and owner for "skinning" the job by omitting the manhole.



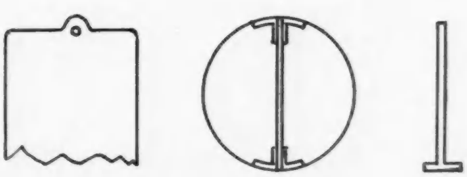
IRON INSPECTION MAN-HOL COVER WITH BOLTED LID.

SUB-SURFACE IRRIGATION FOR SEWERAGE DISPOSAL

The system of sub-surface irrigation for sewerage disposal has been very well thought of by our best sanitary engineers, and used quite extensively by them, the origin of which is attributed to the Rev. Henry Moule of England, and greatly improved upon by some of our eminent engineers. Realizing that the soil next to the surface, to a depth of from eight to fourteen inches (which is impregnated with oxygen necessarily essential to the development of bacteria of the earth and supplemented at least during a part of the year by vegetation) was the ideal condition for destroying organic matter buried in it until the subsurface system was conceived, consisting of two absolutely tight cesspools or concrete receptacles, as shown in sketch, built circular in shape, arched over, and with extended manholes to surface, with tight inspection covers, also provided with vent opening for the escape of gases, one tank to receive the drain from the house and to retain the solids and grease; the other for the liquid sewerage, connected together with an overflow pipe in such a manner that the first basin is drained into the second, without disturbing the grease and scum in the top of the first one, with a baffle plate, as shown, to prevent an underflow current from carrying the solids through to the second basin.

In the sketch, we show an inspection basin with the syphon for emptying the liquid outside of the second basin. The advantage of this is that in case of the syphon failing to work properly, it is accessible without disturbing the other two tanks. Another very frequent construction, which, of course, avoids the expense of the inspection basin, is to place the syphon in the second tank and protect it with a wire screen. The advantage of having the inspection basin, of course, is obvious, and hardly needs to be further commented upon here. The opening from the syphon is now run with a four or six-inch (depending upon the amount of sewerage) vitrified salt glazed sewer pipe with tightly cemented joints, to a point down grade, where it is connected with four by two-inch "Y" branches to a series of two or three-inch porous drain tile, which should be laid in a trench about ten inches deep, never deeper, on boards, with a very small fall about three or four inches per hundred feet, tiles to be laid with open joints, and joints to be covered with a half ring of vitrified clay or cup, to protect same from filling up when buried. The liquid tank can be emptied in several ways, either with a sluice valve or a gate valve, both of which necessitates personal attention. The advantage of using the syphon is that it is automatic.

There are a great many different kinds of syphons on the market, and it is sometimes a matter of personal opinion as to which is the best. The one shown in the sketch is what is known as the Rhodes-Williams' syphon. The liquid tank should not be emptied more often than once every twenty-four hours, which allows plenty of time for the ground to thoroughly drain, and to breathe in more oxygen, and then in a volume sufficiently large enough to fill all the drain pipes at once, to insure an even distribution. This system is, of course, preferably adapted to a porous or gravel soil; in places where clay soil conditions exist, the soil should be drained at least four feet below the level with porous drain.



DETAILS OF BAFFLE PLATE.

SCEPTIC TANK SYSTEM

Another system, which is now being used in a great many country towns, villages, public institutions and country residences, is the sceptic tank system of sewerage treatment. This system consists of a tank of suitable dimensions from which light and air are excluded. The sewerage enters this tank through submerged inlets, so that the contents are disturbed by the inflow as little as possible. The outlet is also submerged, and consists of a slotted pipe through which the effluent passes to a system of filters, which by an ingenious device are filled and emptied automatically. The filter effluent, if run into any available creek or river, is of high quality and perfectly inoffensive, and it remains so. This system of effecting the purification of sewerage by bacterial agencies, while very ancient, is attributed to Mr. Donald Cameron of Exeter, who, after years of study, conceived the idea of changing the polluting method of sewerage to a harmless and inoffensive condition, solely by the operating of natural agencies.

Briefly summarized, the liquification of the solids in the tank is the work of anaerobic germs under conditions favorable to the development of the anaerobic germs and the purification of the effluent from this tank, by oxidizing the polluting matter, is the work of the aerobic germs, which differ from the anaerobic germs, which only thrive in the absence of air and light, requiring plenty of oxygen to enable them to perform their functions.

Three Attractive Houses

DESIGNED FOR VARIOUS PARTS OF THE COUNTRY—ERECTED AT A MODERATE COST—MATERIALS USED IN THEIR CONSTRUCTION

THIS month three attractive houses are shown which can be erected at a moderate cost. The floor plans and the dimensions of the various rooms are given. This will be a great help to the carpenters and builders who may get some suggestions from these plans.

The house on page 395 was designed by a southern architect for a small southern family. It is in the form of a bungalow and is very popular throughout the south. There is no basement under the house and all the rooms are on the first floor. The entire house is constructed and finished with southern yellow pine. The outer wall is covered from the ground to the window sills with rough undressed boards which were dipped into creosote stain before being nailed in place. The living rooms are on one side of the hall, while the bedrooms and bath room are on the other. The wide hall extends through the entire house and connects the two large porches which add very materially to the comfort and appearance of the house. All the rooms and the hall have large open fire places which are a source of comfort on cool evenings. The large projecting eaves are a great help in protecting the windows from the sun, thereby making the house cooler.

The house on page 396 was designed for a small family. Although the house is small, it shows what good arrangement will do to make all the space available. A pleasant feature is the open stairway in the hall. In a house of this size it is always well to have the rooms as square as possible, for although little nooks and dens are pleasant features to have in a house, the space in a small house like this one does not warrant them. It will also be noticed that on the second floor, instead of using part of the bedroom for a clothes closet, that part of the second floor which has a slanting ceiling is used for that purpose. The size of the house on the ground space is twenty-five by twenty-seven feet.

The house on page 397 is constructed of cement and wood, the lower part being cement while the upper part is of wood. The roof is shingled. The living room and parlor are finished in oak while the rest of the house is finished in yellow pine. The cellar extends under the entire house and contains store and fuel rooms. The living room is the most important one in the house, and the others are built around and with reference to it. A brick fireplace helps to make the living room a pleasant place for the family to congregate. The second floor contains three bedrooms and a bath room. The bedrooms are all equipped with clothes closets.

A Japanese Farmhouse

Now that the interest of the world is centered upon the country of Japan it will be interesting to the carpenters and builders to know of the kind of houses these people live in.

We are publishing on the cover page of this issue a typical Japanese country village. The farmers live in villages and their farms are sometimes two or three miles away from their homes. There houses are always picturesque, with their high roofs, which are covered with bark of trees. The thickness of these roofs can be plainly seen in the picture, also the novel ridge upon each house which both protects the roof and holds it together.

How to Clean Paint Brushes

To clean paint brushes first soak the brushes in turpentine and afterward wash in soapy water in which a little soda is dissolved. For brushes that have been used for varnish use spirits of wine or methylated spirit instead of turpentine.

Better and Better

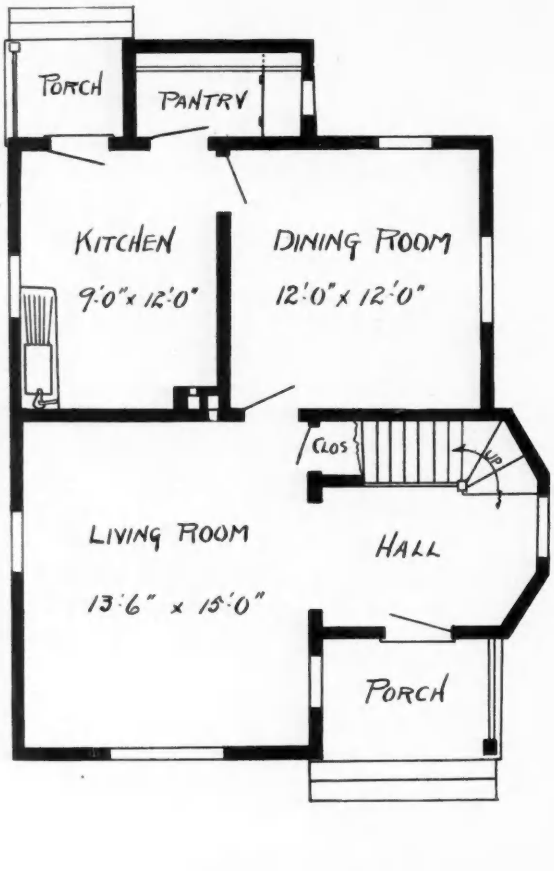
"I really can't express the value of your magazine. Every issue grows better and better. I don't see how any carpenter's kit can be complete without the AMERICAN CARPENTER AND BUILDER."—W. J. Lacone, Greenwood, Miss.

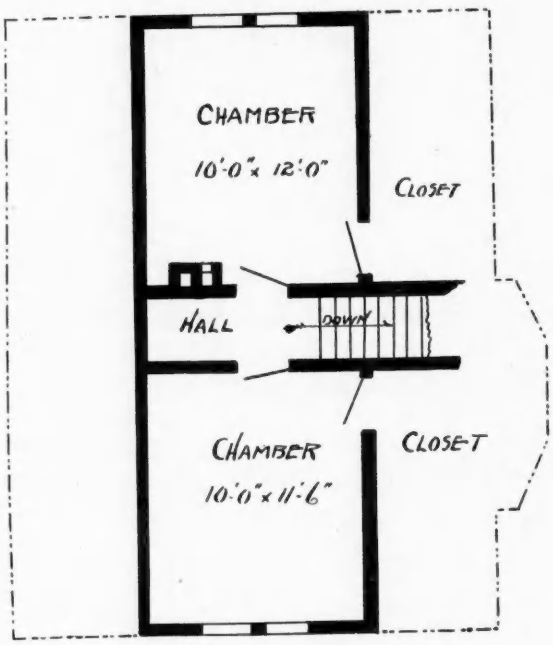
Would Not Be Without It

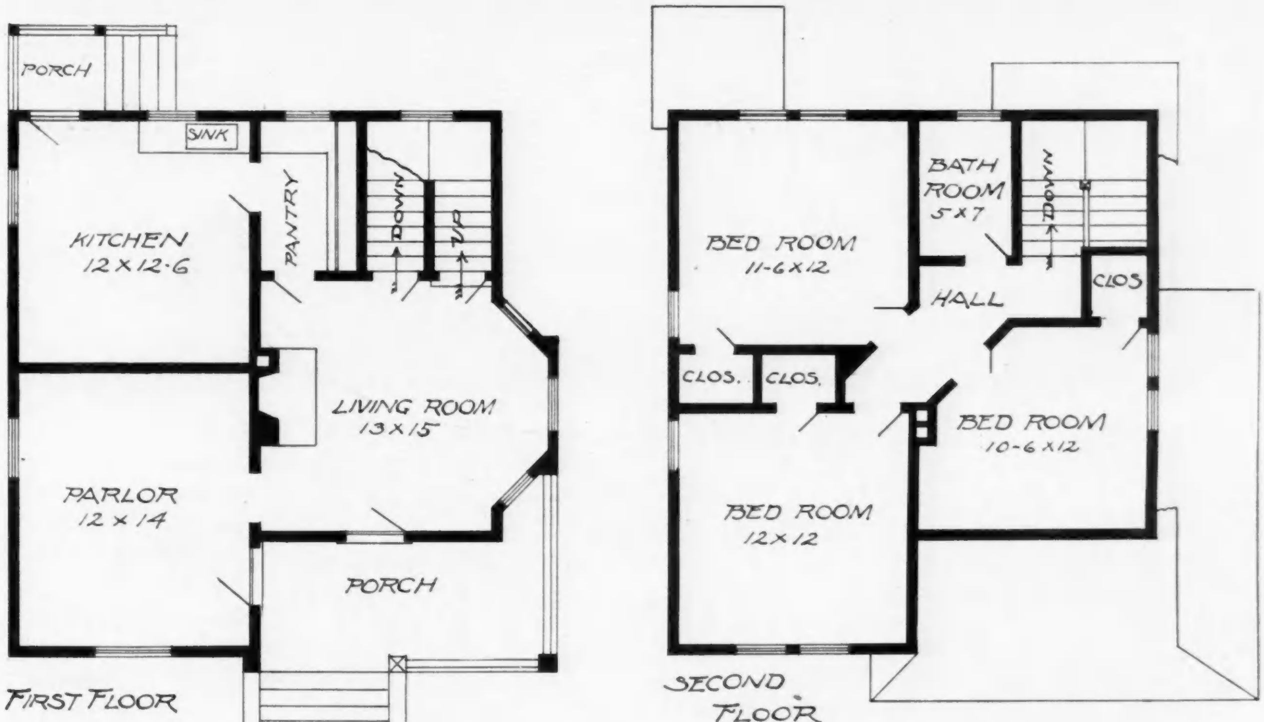
"I can always speak a good word for the AMERICAN CARPENTER AND BUILDER. I would not be without it for twice the price. Wishing you much success." —A. S. Hinton, McComb City, Miss.


PORCH
KITCHEN
11-6 X 15-0
PANTRY
CLOS.
CLOS.
BED ROOM
13-0 X 15-0
DINING ROOM
14-0 X 18-0
CLOSET
BATH ROOM
6-0 X 10-0
CLOSET
HALL
BED ROOM
13-0" X 15-0"
LIVING ROOM
15-0 X 15-0
PORCH

FIRST FLOOR


PORCH
PANTRY
KITCHEN
9'-0" x 12'-0"
DINING ROOM
12'-0" x 12'-0"
CLOS
UP
LIVING ROOM
13'-6" x 15'-0"
HALL
PORCH


CHAMBER
10'-0" x 12'-0"
CLOSET
HALL
DOWN
CHAMBER
10'-0" x 11'-6"
CLOSET


PORCH
SINK
KITCHEN
12 X 12-6
PANTRY
DOWN
UP
LIVING ROOM
13 X 15
PARLOR
12 X 14
PORCH
FIRST FLOOR
BATH ROOM
5 X 7
DOWN
BED ROOM
11-6 X 12
HALL
CLOS
CLOS.
CLOS.
BED ROOM
10-6 X 12
BED ROOM
12 X 12
SECOND FLOOR

FARM BUILDINGS

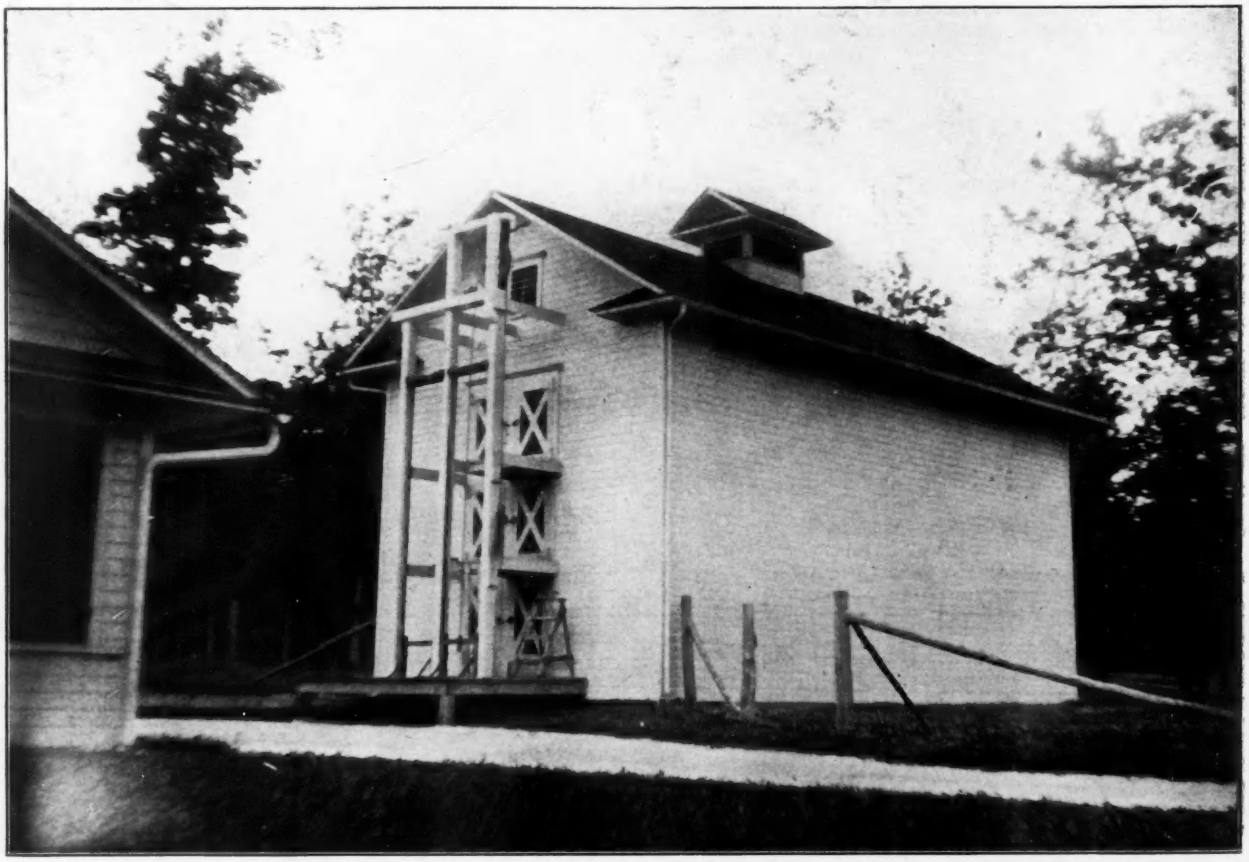
HENRY H. NIEMANN

A Modern Ice House

ONE OF THE MOST IMPORTANT BUILDINGS IN CONNECTION WITH A DAIRY FARM—HOW TO BEST CONSTRUCT THEM TO PREVENT ICE FROM MELTING

THIS month we are illustrating the third of the group of farm buildings built on Geo. B. Robbins' farm near Hinsdale.

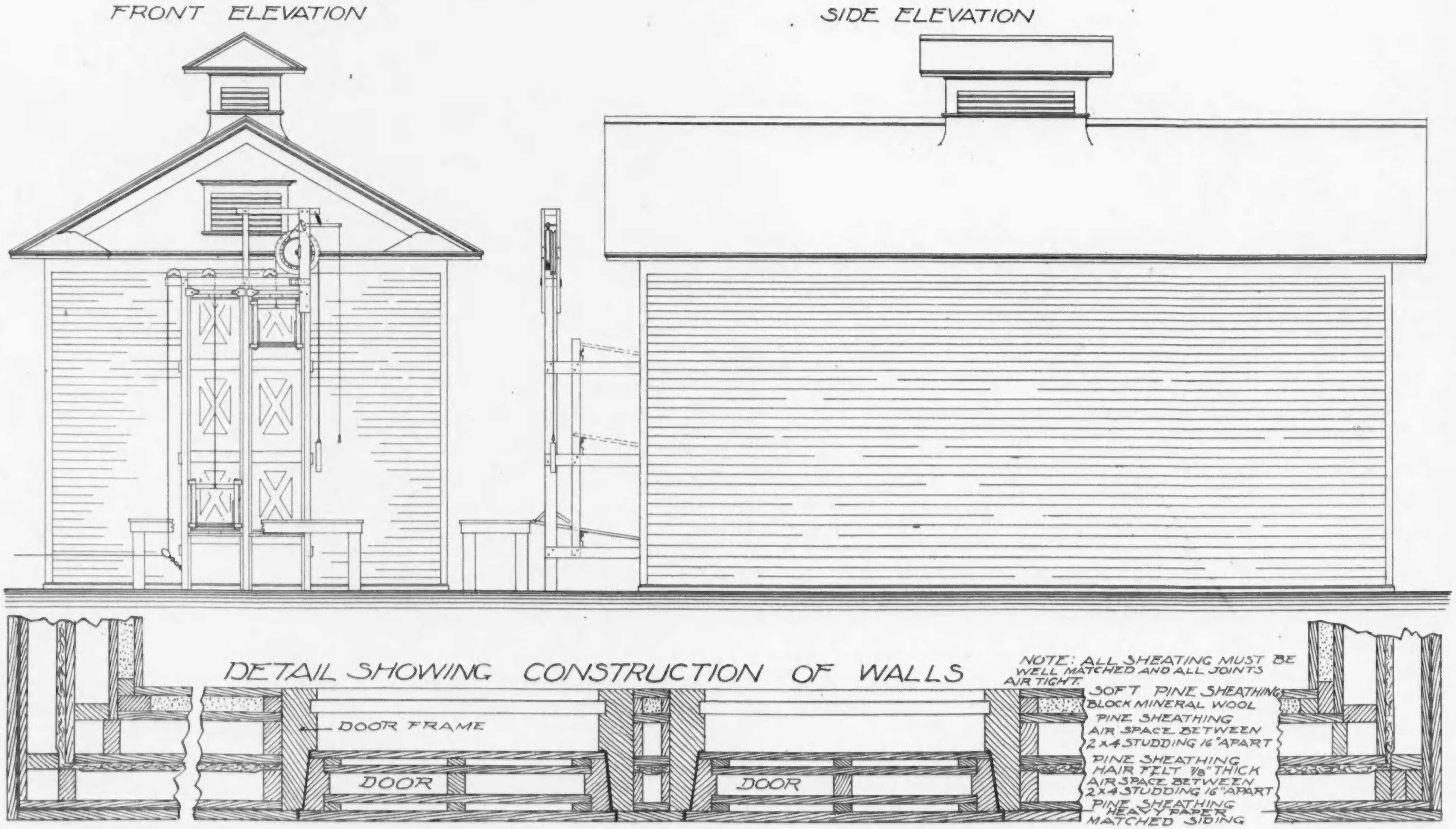
The building illustrated in this article is the ice-house, and as this building is indispensable in connection with a dairy farm, too much attention cannot be given to its construction.



Most ice-houses are built adjacent to the ice field for the convenience of filling the house by drifting the ice up to the elevator, hoisting and sliding it into place without the need of additional handling which is required when the building is some distance from the shore. This is good economy when its contents is to be distributed to various places of consumption; but as in this case all its contents is to be used in the dairy building, it has been located directly opposite the ice bunker doors of the cold storage room in the dairy building, for convenience in filling the bunkers without the use of teaming from the ice-house, saving time and shrinkage of ice due to handling in warm weather.

Ice-houses are built for utility and to be profitable all unnecessary work for exterior looks is avoided as much as possible, but the walls and ceiling of the house must be very carefully constructed, making all joints tight and of a material that will not readily absorb heat, in order to avoid a large percentage of shrinkage of its contents. In order to check the continuous and never ceasing leakage of heat through its walls, windows, doors and ceilings, an insulation of the highest standard should be used, and although it is impossible to stop the leakage entirely, the saving

DESIGN OF AN ICE HOUSE HAVING A CAPACITY OF 200 TONS



produced by improving the insulation justifies the investment spent for the purpose.

Air is one of the best non-conductors of heat, providing it is not in motion, but as soon as it is allowed room to form currents it will carry a large quantity of heat from the outer to the inner wall by convection, since rapid currents are formed when air is free to move between walls differing only a few degrees in temperature.

From these facts it is concluded that a wall having

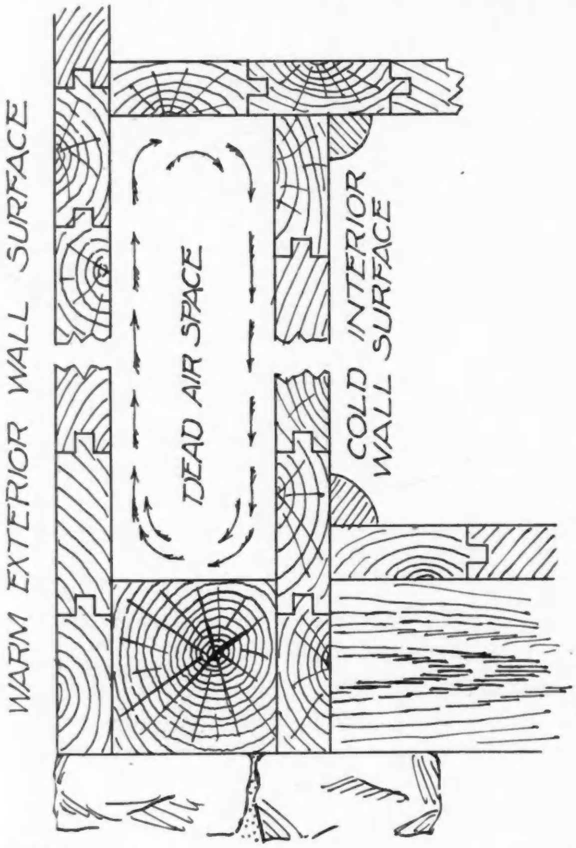


FIG. 1. SHOWING CIRCULATION IN DEAD AIR SPACE

the largest number of dead air spaces will admit the least heat, regardless of the size of the air spaces; an air space one-half an inch wide is just as effective as one six inches wide and as there may be several degrees difference between the outer and inner surface of the air space, a current may be caused by the air expanding and ascending against the warm surface and contracting and descending against the cold surface as illustrated in Fig. 1. To check this circulation of air the spaces are sometimes filled with a fiber or powdered material which is also a non-conductor of heat and which will not completely replace the air but stop its circulation by friction. The materials generally used for this purpose are fine cinders, hair felt, mineral wool, granulated cork, charcoal, sawdust, etc., certain materials being preferable to meet certain requirements.

In order to prevent the air from circulating from one air space to another it is necessary to build the partitions between air spaces absolutely air tight and this can best be accomplished by building the partitions of two thickness of tongue grooved sheating boards with a layer of air-tight building and insulating paper between, with the joints well lapped and returned around all angles and corners.

The herein illustrated detail drawing will give the reader a very clear conception of the wall construction which is quite similar to that used by Armour & Co. and some of the leading packing, railroad and cold storage companies.

This building has a double set of doors and a double gig elevator, so arranged that when the ice-house is being filled, one gig will ascend while the other decends, the latter acting as a counter balance. The elevators are operated by horse power transmitted through a cable, so that while the horse travels in one direction one elevator will ascend and the other descend, and when the horse goes in the opposite direction the elevators will also travel the reverse. In summer months, for unloading, the horse cable is detached and one elevator is attached with a cable over a large sheave to a counter weight, which pulls the empty gig up and the weight of the ice when the gig is loaded will cause it to drop again, the drop being controlled by a friction brake attached to the sheaves and having a lever and cord so it can be operated from the lower platform.

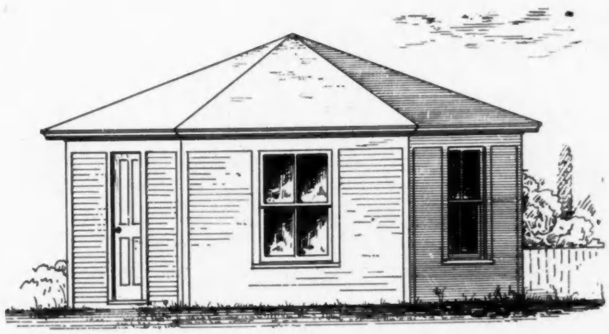
The floor of the ice-house is constructed from two-inch plank laid two inches apart on sleepers, laid two feet apart and bedded in crushed stone. The water from the melted ice will find its way through the crushed stone to drain tile which carry it to a trapped catch basin connected with the sewer.

This building is twenty feet wide by thirty feet long and sixteen feet high inside and has a capacity of about 225 tons. The exterior is finished with drop siding and a stained shingle roof.

Poultry House Construction

BY R. B. SANDO

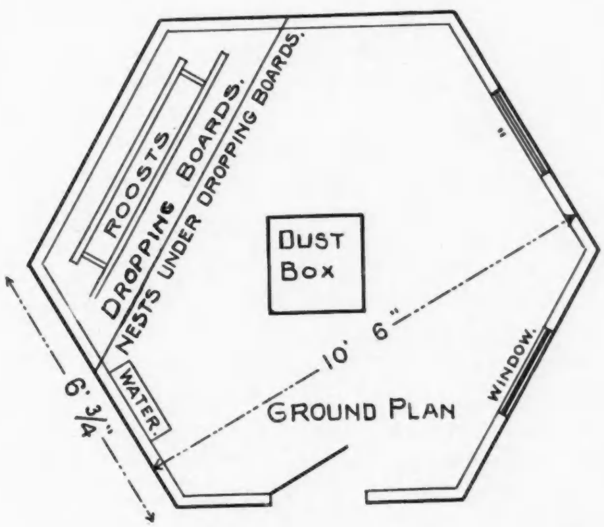
This is the first of a series of articles by the writer on poultry house construction which will appear in future issues of the AMERICAN CARPENTER AND BUILDER. The plans will be suited to the requirements of all classes of poultry keepers—from the man in the city, who keeps a dozen fowls in his backyard, to the man who produces thousands annually and devotes his entire time to the business. All the designs that will be given are modeled after, or adapted from, plans used and approved by practical poultrymen. The buildings described have been selected as furnishing typical examples of different styles of poultry houses. As a comparison of the plans will show, many of the details may be applied in any or all of the various styles of houses. Having selected the style of house which suits him best, anyone intelligent enough to build a poultry house can adapt to it such minor features of other designs as his situation demands and his means allow. All the drawings show neat buildings, devoid of ornament. In nearly all the plans given it is designed that the ground floor shall be of earth, which is, in most cases, the most



ELEVATION.

satisfactory floor material, and should be used whenever practicable. Cement floors are also good, however; where they are used the poultry house will generally present a more attractive appearance and can be kept cleaner, with less labor, than a house having earth or wooden floors. Wooden floors should not be used if they can be avoided.

The house here shown is in the shape of a hexagon and makes a very handsome and convenient house,



and is just the thing for the city lot, where space is limited. The ground or floor plan will show you the interior arrangement. The size of this house is ten feet six inches, and each of the sides is six feet three-quarters inch in length. The corner posts are six feet long and the center of the house nine feet from floor to peak of roof. The house should be built with one window facing directly south and the other one facing southeast, thus allowing an abundance of sunlight to enter the building in the morning, when it is most needed.

Building Material From Waste

From Liverpool comes the idea of disposing of city rubbish by burning it and building houses of the residue. The cinders left from the burning of rubbish at the municipal "destructors" are crushed and moulded with cement into great wall slabs, each with the door and window openings moulded in place, and even an interior iron framework for putting the whole together. The slabs, some of them weighing eleven tons, are handled by derricks. When set up, the iron frames are bolted together and the joinings closed with cement.

An entire block of buildings has thus been erected upon a site of a dilapidated quarter which was destroyed as a matter of necessity. The new houses are described as neat, healthful and very cheap and are expected to yield the city a good per cent upon its investment.

Our cities are yearly paying large amounts to have our rubbish carted away to some out-of-the-way place, where it is scattered over a large area of ground, which is thereby rendered almost valueless. There is no reason why the idea put into practice by Liverpool cannot be followed by our American cities, thereby solving the problem of disposing of our waste material in a more effectual manner, besides opening a new field in the line of building material.

If Bureau Drawers Stick

When a bureau drawer sticks and refuses to pull out comfortably, take it out and rub common yellow soap freely on the lower edges, on the pieces on which it slides and on the wide front piece. Return the drawer to its place, pull it back and forth a few times and you will have no further trouble.

Paper Floors Next

Paper floors are growing in favor in Germany. They have no joints to harbor dust fungi, or vermin, and feel soft under foot. They are also cheaper than hardwood floors. The paper is spread in the form of paste, rolled, and when dry is painted to imitate wood.

Could Tell Him in a Moment

Mr. Munn E. Baggs—"Now, then, you know what kind of house I want. What will it cost to build it?"

Architect—"Well—um—what was the amount you originally intended to put into the building?"

"Now," said the teacher, who had been giving an elementary talk upon architecture, "can any little boy tell me what a 'buttress' is?"

"I know," shouted Tommy Smart. "A nanny goat."

MANUAL TRAINING

IRA S. GRIFFITH

Something the Boys Can Make

A COMPLETE DESCRIPTION WITH ILLUSTRATIONS SHOWING HOW TO MAKE A COAT HANGER AND HANGING SHELVES—EVERY STEP TO BE TAKEN IS GIVEN IN DETAIL WITH THE KINDS OF TOOLS TO USE

FIG. 1 represents a coat hanger. Its use is so common that every boy will recognize it at once.

As was said in the first of this series of articles, every piece described for beginners is given for a

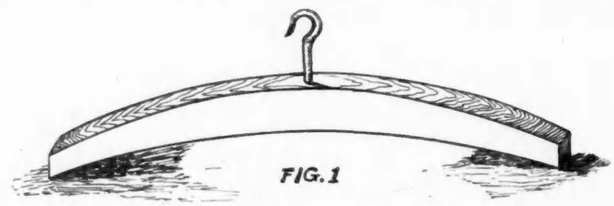


FIG. 1

purpose aside from that of its usefulness. The coat-hanger is useful, but in addition to its usefulness it requires certain new tool operations in its making with which the beginner needs to become acquainted.

Heretofore I have said select a piece of stock for the thing which was to be made, taking it for granted the boys would be able to find in the scrap pile of the shop about the size needed. Where the boys work in classes, as at school, the stock for the first few pieces is usually prepared for them by the teacher or his helper. It is cut so that but one kind of saw is needed. Most boys have probably had occasion to

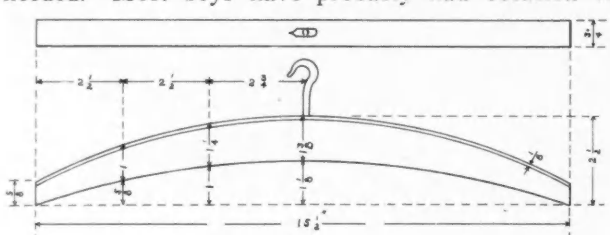


FIG. 2.

learn by this time, if they have been unable to find stock of the approximate size, that all saws do not work equally well in whatever direction they are used with reference to the grain of the wood.

The back-saw, which has been suggested for use, is usually filed so as to cut either across the grain or with it. There are certain limitations, however, to its use. The iron back prevents its use except on small work. It does not cut so rapidly nor well as the saws which are filed to cut in one direction or the other only.

Fig. 3 shows the way the teeth of the rip-saw look when viewed from two directions, the side and the edge. It also shows a cross-section of the saw blade.

Select from your tools the saw whose teeth are shaped like those of Fig. 3. Upon a piece of waste wood try cutting, first across the grain, then with the grain. You cannot fail to notice the difference in the way the saw cuts. In fact, you will probably be unable to make it cut at all in one of the directions.

Now select a saw whose teeth are shaped like those of Fig. 4. This saw is called the cross-cut saw. Try the same experiment as with the rip-saw. You will find that it will cut in one direction much better than the other. This saw cuts better across the grain, and the rip-saw cuts better with the grain.

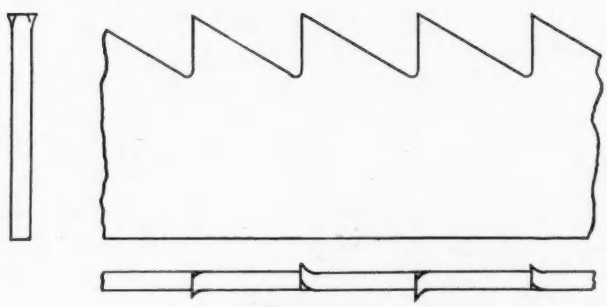


FIG. 3.

There must be a reason for this, and it is found in the manner of shaping the teeth. The rip-saw is but a blade of steel having a great many little chisels so arranged as to cut one after another as the saw is pushed forward, the cutting edges, like that of the chisel, being on the end of the teeth and at right angles to the side.

To prove that this kind of a tooth is best suited for

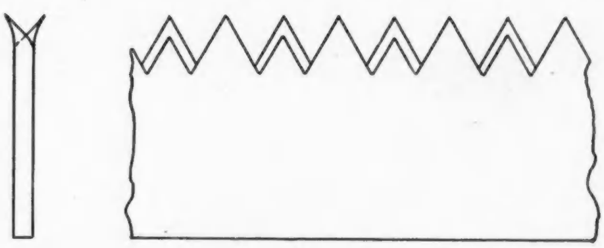


FIG. 4.

cutting with the grain, take a small chisel, and, holding the cutting edge across the grain, make a number of cuts, one back of another. The fibers of the wood are neatly cut. Now hold the cutting edge parallel with the grain and the first cut will split the wood on

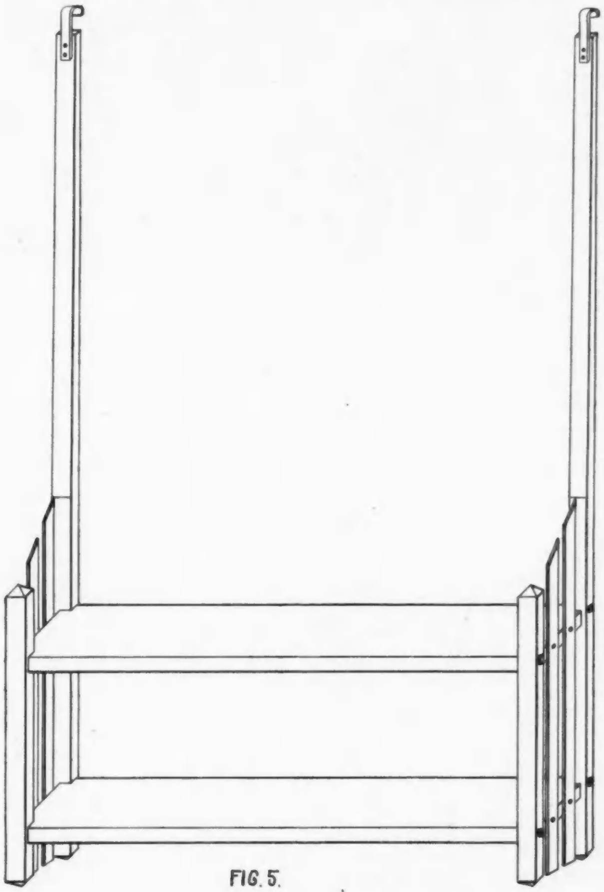


FIG. 5.

either side of the chisel, showing that such a saw tooth is not suited for cutting across the grain of the wood.

The cutting face of the tooth of the rip-saw is usually filed so as to make a right angle to the tooth-edge of the saw. This angle is called the pitch, or hook, of the tooth, and depends upon the kind of wood in which the saw is being used.

The teeth of the cross-cut saw are shaped so as to cut on the sides, and are like knife points rather than chisel edges. This effect is obtained by filing with a three-cornered file, across the cutting edge, at an angle to the blade, instead of filing straight across, as in the rip-saw.

The pitch of the teeth of the cross-cut saw vary according to the kind of wood to be cut, but are usually filed to an angle of about sixty degrees.

The cross-section of each saw shows that the points of the teeth are bent out from the sides of the saw. This bending of the teeth is called the set, and is obtained by bending the teeth alternately, first to one side, then to the other; the object being to cause the teeth to make a cut or kerf somewhat wider than the blade, so that the blade can pass through easily. In wet wood, saws require much set to keep the spongy wood from pinching and holding the blade.

In sawing, hold the saw in one hand, and in such a position that the cutting edge, or the tooth edge, will make an angle of forty-five degrees with the board. See that the sides of the cut shall make right angles with the surface. At first, it may be necessary to set a trysquare alongside the saw occasionally as the cutting proceeds. If the saw fails to follow the line, a slight but constant twist applied to the handle, as you saw, will bring the blade in position. Always have a line to which to work, when getting out stock in the rough, and saw to the line. It will be good practice for the work which requires accurate sawing.

The stock for the coat-hanger should be ripped two and three-quarters inches wide, and cut to a length of sixteen inches with the cross-cut saw.

Plane one surface for a working-face; then one edge for a joint-edge. Care should be taken to measure occasionally while planing for the joint-edge, to see that enough stock is left out of which to get the extreme width of the coat-hanger, two and one-half inches.

Mark one end around with the trysquare and knife-point as close to the end of the stick as possible. Plane it up square to the joint-edge and working-face. Measure the length, fifteen and one-half inches, and repeat at the other end, sawing if there be more than one-eighth of an inch to be taken off.

In planing the ends, plane away from the corner, which is on the joint-edge. Should the corner which contains the joint-edge break or splinter, the piece would be ruined; but should the other corners split, it would not make so much difference, as they are cut off later. The ends need not be splintered at all if the end planing is done from each edge a little over half way, as described in the June number of this magazine, in this department.

Gauge for the thickness, gauging from the working-

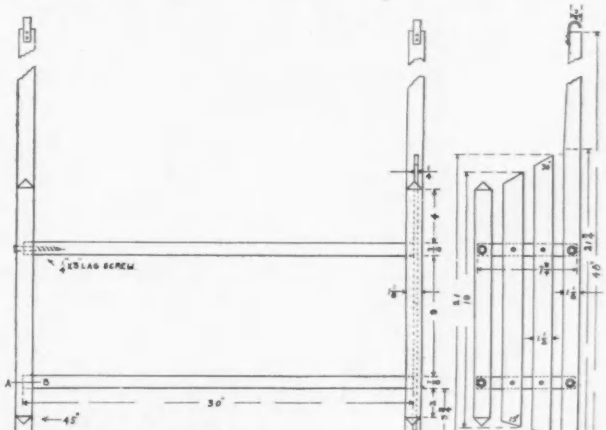


FIG. 6.

face. Set the gauge to three-quarters of an inch and gauge on the ends as well as the edges.

Plane to the gauge lines.

One step in the operation of squaring up has been omitted. One of the edges was not planed. Not only is it not necessary to plane the stock to the right width, two and one-half inches, but it is better not to do so, as the outer curve can be more easily sawed when this is not done.

To lay off the curves, begin by marking on the working-face, along the joint-edge, a point two and one-half inches from one of the ends of the piece; another point two and one-half inches, measured from the point just located; then two and three-quarters of an inch from this point. This last point should fall in the middle of the stick. The remaining half of the stick should be similarly marked.

With the trysquare and pencil, square lines across the piece at these points.

Measure up from the joint-edge, on each of the ends, five-eighths of an inch and mark. Measure up five-eighths of an inch on the cross line next to the ends, and mark. From these points continue the measurements one inch along the same cross lines. On the cross lines next to the ones just measured

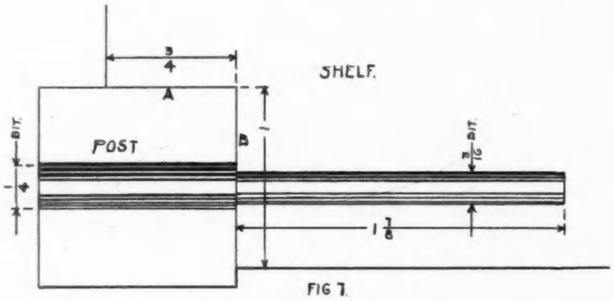


FIG 7.

mark off points one inch from the joint-edge; then, along these same lines, measure one and one-quarter inches. Along the middle cross line lay off a point one and one-eighth inches up from the joint-edge; then from this point, on the same line, measure one and three-eighths inches. Trace smooth flowing curves through these points.

Another way to mark curves approximately the same as these is by means of the sweep arc. Drive two small nails, twenty-four inches apart, into a stick of wood. This makes a sweep for the lower curve. In another stick drive two nails sixteen and one-half inches apart. The nails should extend through the wood, so that one may act as a marker while the other acts as a center.

To use the sweeps, fasten the coat-hanger block so it cannot move. With the square, draw a line at right angles to the joint-edge at its middle. Place one nail of the twenty-four-inch sweep so it will rest on this line, while the other nail touches a point measured one and one-eighth inches up from the joint-edge, on the cross-line at the middle of the coat-hanger block. This sweep gives the lower curve. The other curve is similarly drawn, using the sixteen and one-half-inch sweep. One nail is placed on the line extended at right angles to the joint-edge at the middle, while the other touches a point one and three-eighths inches above the lower curve at the center cross-line.

Saw along these curves with the turning saw. This saw is quite like the common buck-saw, used in sawing cord-wood, but is much lighter and the blade is much thinner. The teeth are filed with considerable hook, like the rip-saw; but at an angle to the blade, like cross-cut saw. It will saw, therefore, quite well in any direction. It is called a turning saw because the blade is fastened to handles which can be turned in the frame, thus allowing the saw to cut ordinary curves quite readily.

Keep the cut a little outside of the line, so as to allow a small margin for smoothing up. In sawing, be careful to so hold the saw that the surfaces cut shall be at right angles to the working-face.

Smooth to the lines, using the spoke-shave, testing with the trysquare as the work proceeds. The action of this tool is similar to that of the plane. It is a plane with handles on each side; and, like the plane, should be set so as to take a thin shaving. On the concave, or inside, curve, it will be necessary to shave from the ends of the stick toward the middle, to avoid roughing up the wood. On the convex curve, shave from the middle toward the ends.

Gauge, with the pencil gauge, lines one-eighth of an inch from the convex curve on each side; and, with the spoke-shave, gradually round the top surface to these lines. Use the scraper to complete the rounding.

Bore the hole for the hook just to one side of the middle line. Use a bit which will make a hole of sufficient size to take in the screw without the thread.

Sandpaper, using a block for the vertical sides and the under side, but hold the paper free while working the rounded top. Where the top joins the sides there should be a rather sharp angle. Hold the sandpaper so as not to destroy this angle.

The coat-rack can be stained with an oil stain or

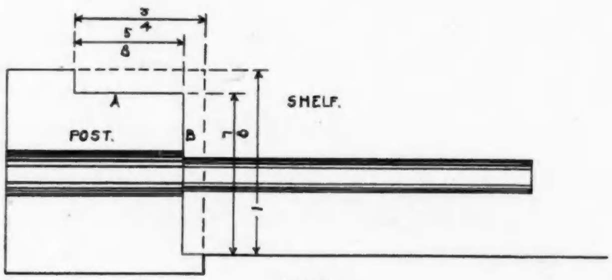


FIG. 8.

given two or three coats of shellac. The shellac should be applied evenly with a brush, and each coat be allowed time to dry thoroughly before applying the next. Very fine sandpaper is frequently used on the first and second coats, after they have dried, to insure a smooth surface. Care needs be taken in doing this sandpapering not to rub so hard or long in any one place as to cut through the shellac. To patch up such places is no easy matter.

HANGING SHELVES

The hanging shelves shown in Fig. 5 have been found very useful. They may be used as book-shelves, china rack, or for anything usually placed on shelves. Their chief advantage lies in the ease with which they can be put up and taken down. The hooks on the ends of the long arms are intended to fasten over the picture moulding, so that no holes need be made in the plaster of the wall.

Square up two shelves, each seven-eighths of an inch thick by seven and three-quarters inches wide by thirty inches long. Get stock at the mill dressed to seven-eighths. The broad surfaces must, nevertheless, be smoothed by hand with plane, scraper and sandpaper, to secure a smooth surface.

Two kinds of joints are shown. The one shown in Fig. 7 is the easier to make, but is not so good as that shown in Fig. 8.

To make the joint shown in Fig. 7, measure from the end of the shelf along an edge three-quarters of an inch. With the trysquare, square a sharp line at right angles to the edge of the board at this point a little over one inch long. Set the gauge to one inch and gauge a line parallel to the edge along which the measuring was done. Repeat at every corner.

Inasmuch as nearly all surfaces will show, it matters little how we place the face marks when putting the parts together. Whatever way is decided upon at first must be maintained throughout. Let us allow the XX marks to face upward and outward.

The manner of laying out shelves for the joint shown in Fig. 8 is similar to that described for Fig. 7. The measurement from the end along the edge is but five-eighths of an inch, however, and the gauge is set to but seven-eighths of an inch.

Saw along these lines, using the buck-saw. Test with the trysquare when through sawing, and touch up any irregularities with the chisel. These surfaces must be square with the working-faces and true to the lines, if the framework of the shelves is to square itself properly when put together.

The supports can best be ripped from one and one-eighth-inch stock, dressed on two sides. Straighten and square up one edge; gauge to one and one-eighth of an inch, and rip, allowing a little for planing. Plane to the line. Repeat until the required number are obtained.

The two forward supports are sixteen and three-quarter inches long without the mitered points. Square a line around one end far enough back to allow for the point, and lay off the miters from this line. Measure the length and repeat at the other end.

The supports for the back are forty-eight inches long. They are mitered at the lower end only. The upper part of the back supports is beveled, or sloped, on the face side beginning at a point measured up from the lower end twenty-one and three-quarter inches. The tops of the back supports measure three-quarters of an inch by one and one-eighth inches.

On one of the forward supports, measure from the bottom, on the side which is intended to face outward, on the end of the frame, two and seven-sixteenths inches. Square a pencil line across at this point. Again, measure up nine and seven-eighths inches, measuring from the line just drawn. Square a line as before. Now place the other forward support, also both back supports, together, so that the side intended to face out, on the ends, when the framework goes together, shall be up. With the trysquare, even the lower ends of the front supports. Also, even the lower ends of the back supports, but allow these to extend one and three-quarter inches beyond those of the forward supports. With the trysquare, square lines across the four supports to correspond with those placed on the one forward support.

Set the gauge to nine-sixteenths of an inch and gauge these lines so as to locate the middle of the pieces. Gauge from the sides which shall be against the shelf when in place. Bore holes at these points with a one-quarter-inch bit.

This completes the work on the supports, if the joint shown in Fig. 7 is used. Scrape and sandpaper, planing the mill marks, if necessary, in order to remove them. If the joint shown in Fig. 8 is used, gains to receive the shelves must be cut in the supports.

To lay out these gains, measure and square very sharp lines seven-sixteenths of an inch on each side of the lines used in locating the auger holes. Do this before the holes are bored, and place the lines on those sides which will be next the shelves when in position. Set the gauge first to one inch and gauge every piece between these lines for the length of the gains. Gauge from the inside of the supports, on the sides which face to the right and left when in position. Next set the gauge to three-quarters of an inch and gauge the gains from the inside of the supports; on the sides which face backward on the short supports, and on the sides which face forward on long supports. These gains are to be chiseled one-eighth of an inch deep.

The holes in the shelves which are to receive the lag screws should be bored with a three-sixteenth-inch bit, two inches deep. Gauge lines seven-sixteenths of an inch from the faces to locate the position with reference to the thickness of the shelves. If the joint, Fig. 7, has been used, measure along these lines from the side A a distance of nine-sixteenths of an inch. If joint, Fig. 8, has been used, proceed with the gauging as before, but measure seven-sixteenths of an inch from A.

The slats are best got from stock dressed to one-quarter of an inch. Square up and straighten one edge and rip, after gauging to one and one-half inches. The longest are twenty-one inches from long point to long point. The shortest are nineteen inches. The angle at the upper ends is thirty degrees, and at the lower ends is fifteen.

The slats are fastened to the ends of the shelves with three-quarter-inch round head brass or blued screws. Holes must be drilled in the slats, to allow the screws to pass through easily. They are to be placed in position after the shelves and supports have been put together. Their location and spacing can be seen from the drawing, Fig. 6.

The hooks at the top are made from extra heavy picture hooks, by straightening the lower half and drilling two holes in each, through which to put round-head screws.

A dark finish, such as weathered oak or black Flemish, will look best with the lag screw construction.

Next Season's Wall Papers

THE VARIOUS DESIGNS AND COLOR EFFECTS THAT WILL BE PUT ON THE MARKET THIS COMING SEASON—NEW IDEAS TO BE INTRODUCED—PREVAILING COLORS WHICH ARE GOING TO BE USED

By Sidney Phillips

"YOU can generally tell what kind of wall paper a woman will like by the way she is dressed," said a well known retail wall paper dealer. "If she wears quiet and subdued colors, then there is no use showing her strong colorings and flashy designs, but if she is loud and gay in her dress, then she will buy wall paper that will fairly scream at you." And the same rule will hold good in regard to the prevailing decorative colors. Wall paper men, who are in a position to know, say that the general trend in colors follows the fashionable colors for dress goods, for the women always select colors for their background that they think will harmonize well with their dress and themselves. For the next season, the prevailing colors will undoubtedly be browns and grays—not the cold pearl grays, but soft, warm gray tones, such as the French grays and colors midway between brown and gray. Greens will also be popular, but they will not be strong, rich green, but duller shades, and gray greens. There will also be some demand for certain shades of dull blue and for some of the yellow tones. But it seems pretty well indicated that the strong reds that were such favorites a few years ago will be comparatively little used. As a rule, the deeper and richer colors are always in demand in the soft coal burning cities, such as Chicago, Cleveland, Cincinnati and Pittsburg, while the lighter and more delicate colors are sold in the East, where hard coal is almost universally burned and where wall papers are practically never cleaned because they do not get soot begrimed.

Some of the manufacturers are showing patterns that strongly remind one of the parlor wall papers of thirty years ago—delicate ivory and white papers, or pale yellows, with stripes and floral figures in gold, and there will undoubtedly be some demand for this class of goods. Then there are always a great many people who will not have anything else but the commonplace gilt papers with medallion figures and set patterns, with eighteen-inch friezes in the West, while nine-inch friezes are more popular in the East.

Most of the better class of the new wall papers are refined in coloring, artistic in design and calculated to serve as admirable backgrounds for furniture and pictures. A few freaks, of course, will be seen, but these are adapted for special uses and are so well designed that they will prove acceptable to persons of the best taste. For example, one of the new wall papers shows a forest scene, through which one catches glimpses of a distant landscape; the frieze showing a park like effect between tall trees. Then there is a bold Art Nouveau paper, having a tree-like design, forming stripes between which we see small classic temples. Another paper shows countless flocks of sheep wandering up and down the wall in zig-gag lines, with apple trees here and there, while Little Boy Blue blows his horn and Bo Peep seeks for her wandering sheep. Still another paper shows pictures of Dutch windmills and canals with quaint boats. Then there are papers in which large poppies run riot over a well covered foliage background; forest scenes, as well as tapestry designs, all of which are specially well adapted for the popular upper third treatment, in which these papers of striking design are used for the upper part of the wall and plain ingrain paper, a burlap or a quiet two-toned paper is used for the lower part of the wall.

Some very handsome papers known as "tekkos" are shown in metallic colorings and in silk effects, in which the design is embossed upon a background of the same color, but of a different texture, such as one finds in woven jute fabrics or in silk tapestries. These are particularly rich and elegant for panel treatments.

Among the moderate priced papers, one notices many clothy effects in quiet tones, well adapted as an excellent background for furniture and pictures. Some of them are very perfect reproductions of fabric and grass cloth matting. Among them are many striped patterns suitable for panelling by mitering.

Some novel tile papers for bath rooms will be offered. Among them is one with flying sea birds that is very attractive. There are conventional orange trees in oblong tiles, and one tile paper shows tiny little birds.

A number of the manufacturers show special papers for panel treatment, and there is a revival of architectural cornices and narrow binders to represent carved mouldings. Some of these are provided with corner pieces and breaks to use where the lines of the panel are very long. One paper gives the effect of marble pilasters with intermediate oblong panels of darker marble.

Special picture friezes to be used with plain walls, either of ingrain paper or burlaps, or to be used in connection with two-toned papers, are shown by a number of the manufacturers. One of the most beautiful shows fishing boats at anchor upon a quiet sea. This is shown in quiet gray and green tones and in a sunset coloring that is particularly effective. Then there are friezes of distant landscape with lakes or rivers, that one sees between tall trees in the foreground. Here is another frieze where old-fashioned maidens engage in playing croquet; while in contrast to it one finds in another a series of Japanese Geisha girls dancing beneath festoons of lanterns. Another shows quaint English cottages with thatched roofs and stiff and formal grass plots in front. A frieze in the Watteau style, with pensive swains and tender maidens playing at shepherds and shepherdesses is characteristically French in treatment and very beautiful in design. A frieze that is capable of many variations is the work of R. Outcault, the creator of Buster Brown, and this represents a series of dogs in grotesque attitudes behind the footlights of a theater, some of them engaged in dancing, while others sit gravely looking on. These dogs can be cut out and used as separate figures in panel treatments. A deep frieze, which requires two widths of paper, is a marine picture, with distant lighthouses and islands and yachts in the middle distance. A frieze that is now in course of production will have twelve foot repeats, and will represent a road with a procession of automobiles. The firm making this have something entirely new in wall papers, whereby they obtain effects heretofore scarcely possible with the most expensive hand prints, but they are now made upon a machine. Heretofore the greatest length of pattern between the repeats was limited by the small wooden roller upon which the pattern is engraved. But by this new process a cylinder eight feet in diameter is used, capable of producing two lengths of paper, each twelve feet long. The designs will be printed in twelve-foot lengths and will be so made that they are capable of cutting off, either at the top or the bottom to adapt them to the height of the room. Decorations will be obtained by this method that have never been attempted before except by the use of stencils or hand work.

Another entirely new thing is a series of friezes printed in washable oil colors. These are produced by a lithographic process, and come in sections of five feet, the entire design being thirty feet long without a repeat. Any two of the sections match up, so that the decorator may arrange them in any order he prefers, and an elastic section is provided by means of which the frieze may be adapted to any size room without in any way mutilating the design. Among the friezes of this kind that are already shown is a beautiful hunting scene, with dogs and deer; a wonderful Indian frieze, with the characteristic coloring of the Southwestern country, and with groups of Indians on horseback. Then there are more conventional designs that will appeal to the decorator as being suitable for dining rooms or libraries or for public halls. A bath room paper, made by the same process, is seven feet wide and is intended to run from wainscot to ceiling. It depicts nude female figures disporting themselves in the waves, and would make an unusually effective bath room decoration. After being put up, these decorations may be varnished, if desired. The foregoing is a brief survey of some of the most noteworthy features of next season's wall papers, as shown by the advance display made by the manufacturers in New York City last month.

Height of Buildings in St. Petersburg

In answer to an inquiry of a western architect concerning the local laws governing the height of buildings in St. Petersburg, Russia, United States Consul General Ethelbert Watts, under date of May 12, 1905, gives the following information procured from the municipal board:

1. The height of private buildings erected in this city, regardless of the number of stories, must not exceed the width of the street on which they are erected. Height is limited by the distance from the sidewalk to the point where the roof of the building begins. In public places and open spaces, as well as streets having a width of over 77 feet, private buildings for living purposes must not be higher than 77 feet.

2. In case a building is erected on the corner of two streets of different widths the height of such building can be the same on both streets, even if such height should exceed the width of one or the other street.

3. The smallest height permitted for any building regardless of the width of the streets on which they are erected, is limited to 12 5-6 feet on the following basis: (a) In those parts of the city which were not inundated during the flood of 1824, or where the water did not rise to the height of over two feet from the sidewalk, permission is given for the erection of one-story buildings to the height of not more than 12 5-6 feet, counting the distance from the sidewalk to the beginning of the roof; counting from the sidewalk to the beginning of the floor, 2 1-3 feet, and from the floor to the roof, 10½ feet; (b) in those parts of the city where the water stood over two feet from the sidewalk, the foundation must be carried to the height of 7 inches above the water line of the floor, and the story of the building must have a height of 10½ feet, counting the distance from the floor to the roof.

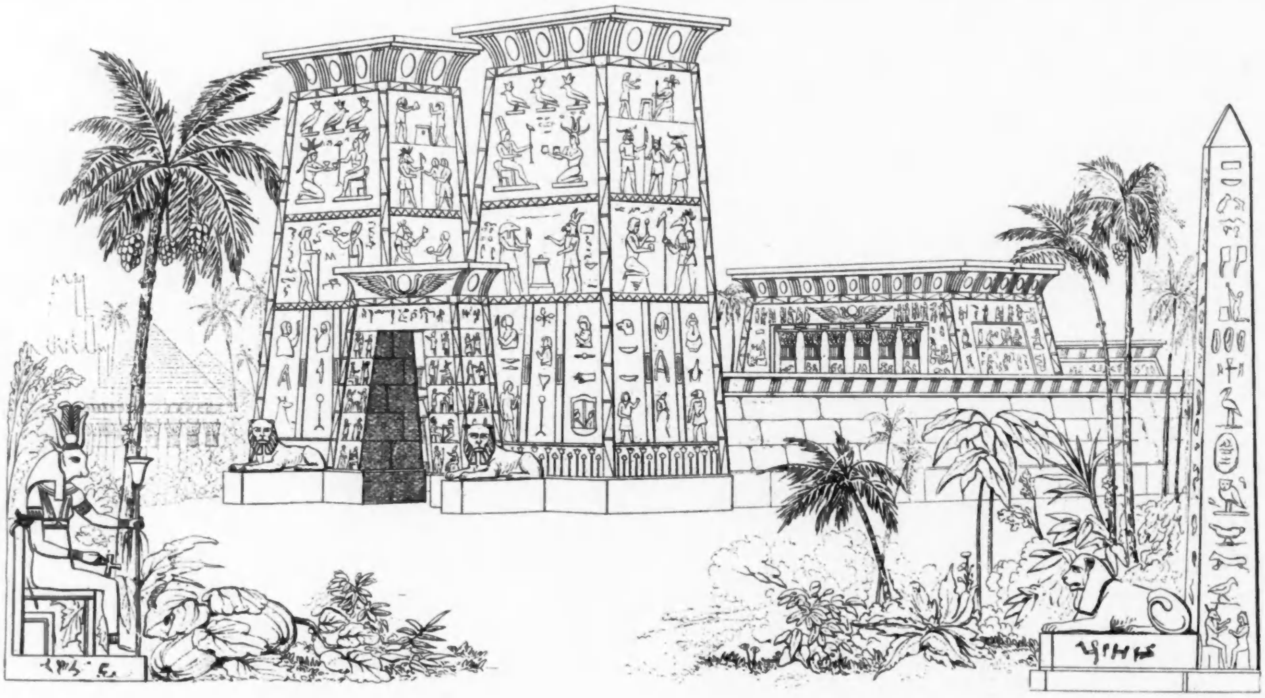
There may come an occasional time when you are led to think for a minute that strict honesty is something of a handicap to getting certain business, but the only man who is seriously handicapped in this respect is the man who loses his honesty.

A Glimpse of Egyptian Architecture

CONSTRUCTION IS TOO SOLID AND MASSIVE, MAKING IT APPEAR HEAVY AND MONOTONOUS—PYRAMIDS AND TEMPLES WERE BUILT OF RED THEBAIC GRANITE, MAKING THEM ALMOST INDESTRUCTIBLE

By William Reuther

THE early history of Egypt, like that of the other primæval nations, has a mystery about it which is not easy to penetrate, and while their buildings remain to the present day the manner and time in which they were built will probably always be a partial mystery. The character of Egyptian architecture is that of massy grandeur and severe simplicity, almost appearing heavy and monotonous. It is further characterized by the want of profile, the enormous diameter of the columns employed, the omission of roofs, and the ignorance of the use of the arch, in fact it lacked all that which imparts character to a work of art. We find great want of proportion or that suitable ratio which different parts of a body should bear to each other or to the whole. In all organized beings their parts so correspond, that, if the size of a single part is known the whole is known. Nature has thus formed them for the sake of dependence on and aid to each other. In works of art, the nearer we approach a similar formation the more refined and elegant will be the production. In Egyptian art the massiveness and solidity were abused, the means employed always were greater than were necessary. The monuments are doubtless admirable for the grandeur and solidity; but the preponderance of the latter, when carried beyond bounds, becomes clumsiness; art then disappears, and character becomes caricature.



In analyzing the architecture of Egypt, three points offer themselves for consideration—construction, form and decoration. In construction, if solidity be a merit, no nation has equalled them. Notwithstanding the continued effect of time upon the structures of the country, they still seem able to stand another three or four thousand years of combat with the weather. The material used in their construction was a red Thebaic granite, large quarries of which are found in the valley of the Upper Nile. The pyramids, which are a good type of almost indestructible structures, are the result of a monarchial form of government. They were tombs built for the kings, who, thinking that the palace was nothing more than a mere stopping place, which at his death would be occupied by his successor, wanted an eternal dwelling, sacred to themselves. Hence they spared no expense in erecting edifices which after three to four thousand years are still standing intact. Their temples were also built to endure; with these people the idea of immortality of the Deity is presented by the eternity of his temple. The illustration here given is of the temple of Apollinopolis magna located at Edfou on the Nile river. It shows the rectangular, symmetrical form which is a characteristic of all Egyptian temples, the hieroglyphics or picture writings on the walls, giving fragments of history, are also shown.

The decoration may be considered under two heads, that which consists of objects such as statues, obelisks, etc., and that which are actually affixed to them, such as carving on the friezes, bas-reliefs, etc. The obelisks are too well known to need much attention, they were tall rectangular pillars erected in honor of the Sun, and their statues, which are mostly in a sitting posture, are noticeable because of their large dimensions. Among the ornaments affixed to their buildings, or rather forming part of them, are the hieroglyphics and bas-reliefs. The custom of cutting the former upon almost every building, was for the purpose of record and ornament. The figures that were sculptured on the walls of the temples are mostly in low relief and have no proportion. Painting was another mode of decoration but their taste in this either in drawing, coloring or composition, was no better than their sculpture.

The private houses of the Egyptians were from one to five stories high, and regular in plan, the rooms usually occupying three sides of a court yard which was separated by a wall from the street. The roofs were flat and on the top of these were terraces, which during the cool evenings, so characteristic of this climate, served for exercise and repose.

Details of Construction

SHOWING THE CONSTRUCTION OF A STAIR, SIDEBOARD, CORNICE AND PORCH—DIMENSIONS FOR THE VARIOUS PARTS GIVEN

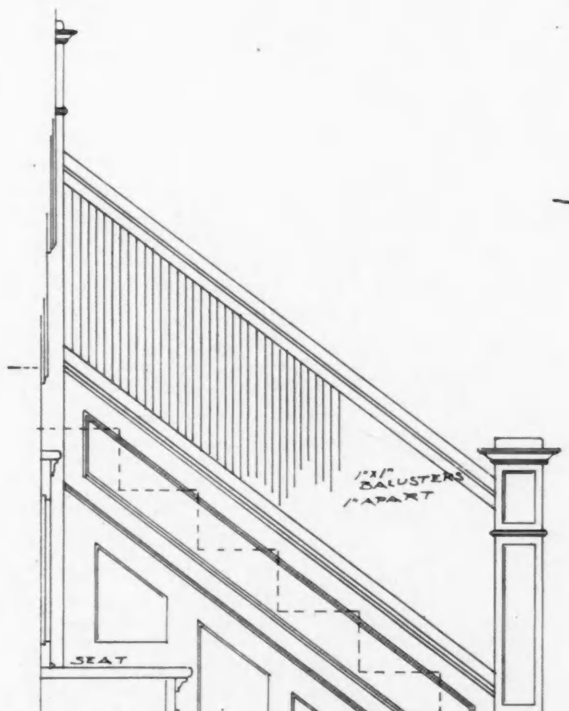
By Henry H. Niemann

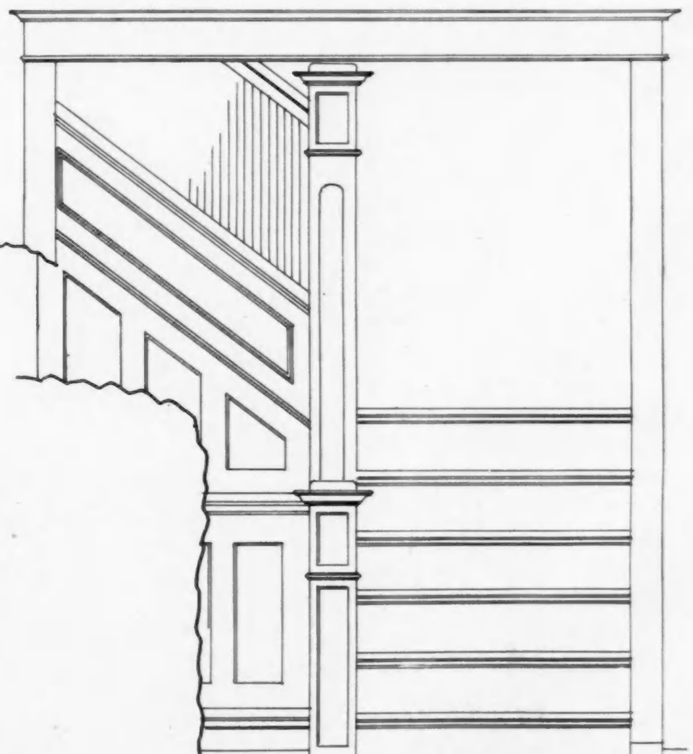
THE sideboard, the detail of which is here shown, can be constructed by any practical carpenter and builder. When it is being made be sure to have it of the same wood as the woodwork in the dining room, so that it will harmonize. A very attractive and servicable wood is quarter-sawed white oak, but any other good wood can be used just as well. This makes a very desirable addition to any dining room as it affords a good place for all the silver and glassware.

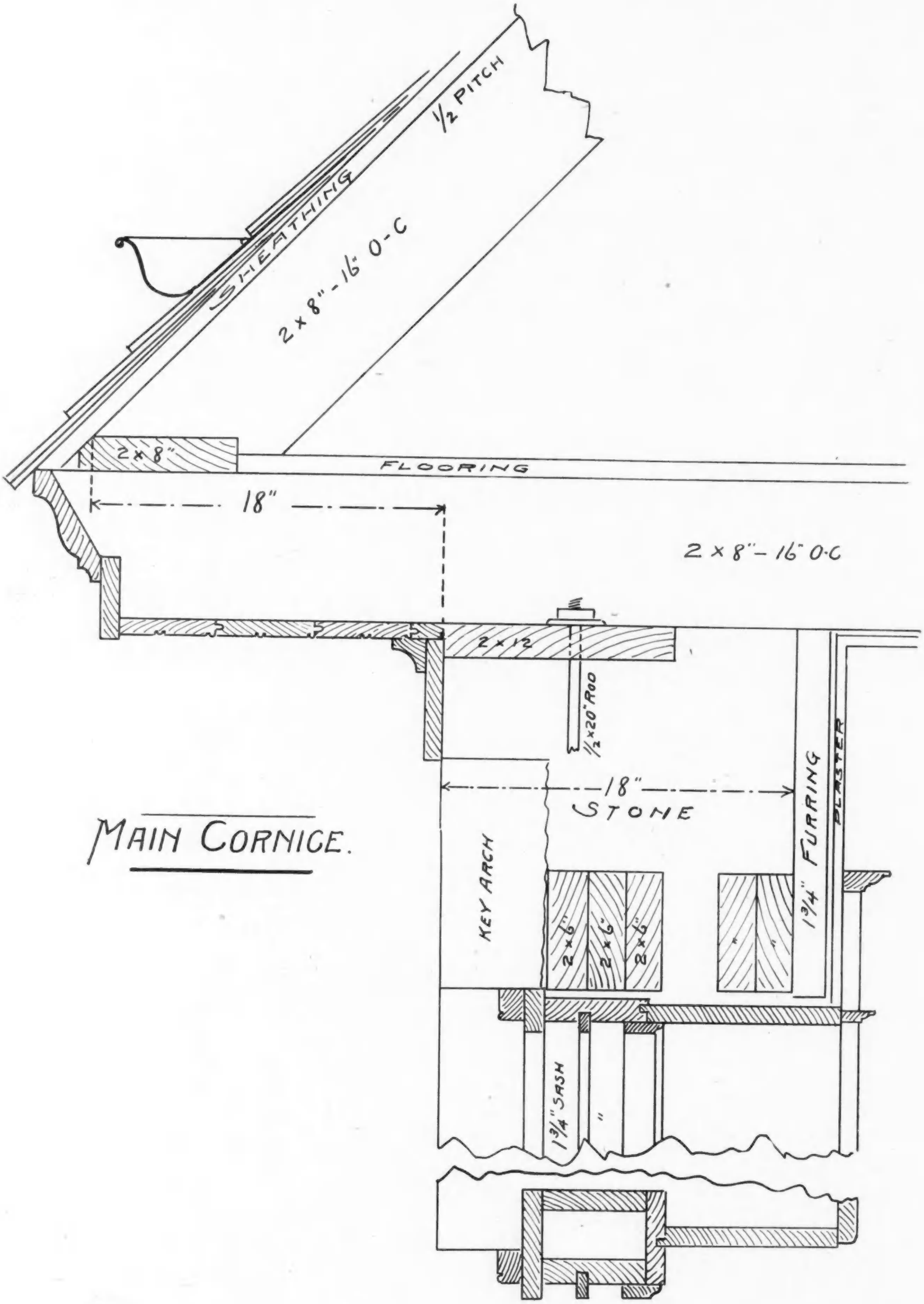
The two views given of the stair give one a good idea of how they are to be constructed. The detail of the main cornice is one used on a stone house and shows how the woodwork is fastened to the stone. The size of the various parts are given and their position with reference to each other.

The porch is one used on a house with a shingle roof. The round shaft with the square abacus and Tuscan cap are shown. The rails are wide and panelled, giving it a more stable appearance.

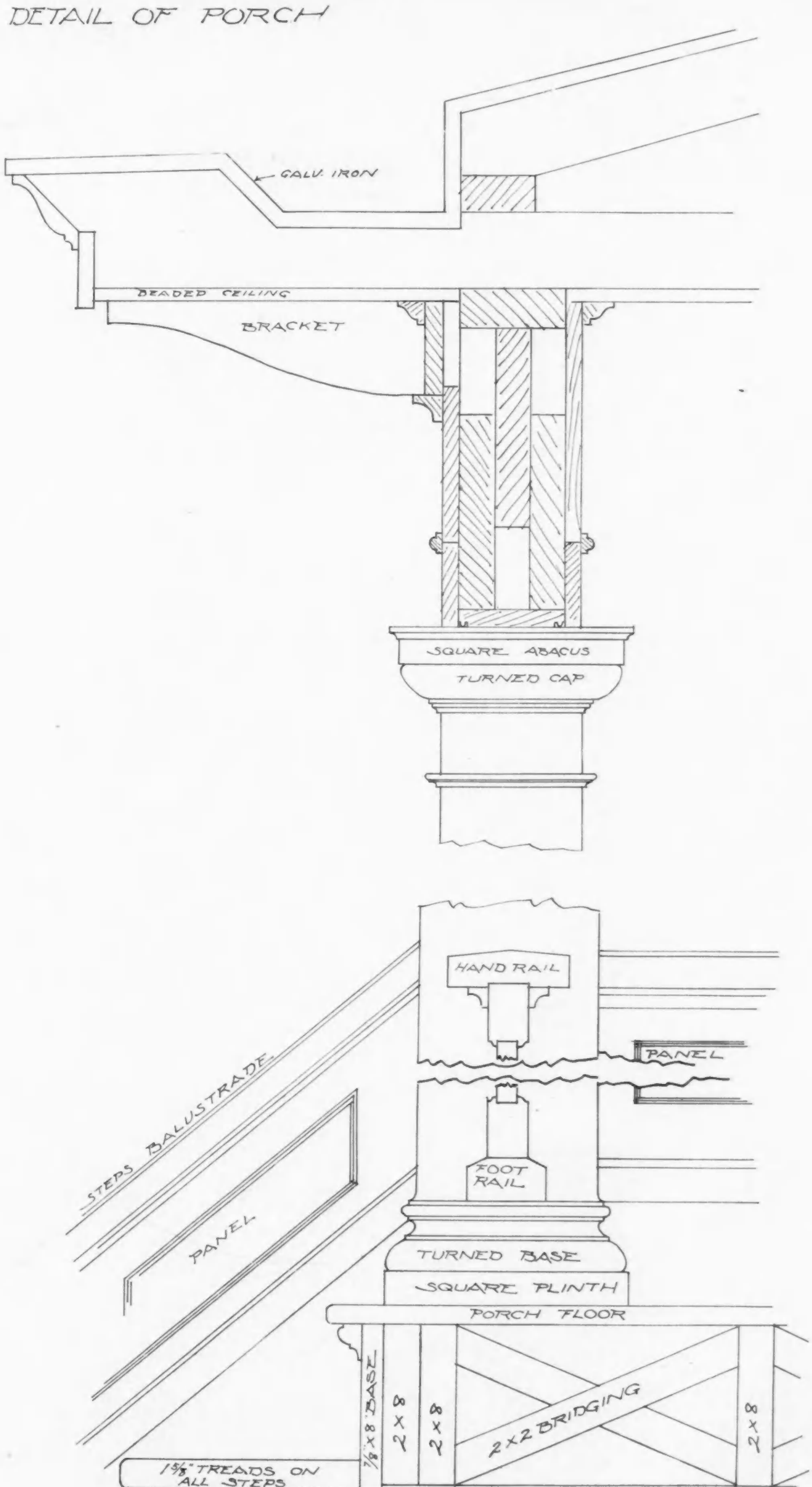
In the future all the details will be of some part of the various houses which we are publishing that month. This will be a great aid to the carpenter and builder as it will show him the detailed construction of the various parts of specific houses, which will be more useful than a general detail.







MAIN CORNICE.


DETAIL OF PORCH
GALV. IRON
BEADED CEILING
BRACKET
SQUARE ABACUS
TURNED CAP
HAND RAIL
PANEL
STEPS BALUSTRADE
FOOT RAIL
PANEL
TURNED BASE
SQUARE PLINTH
PORCH FLOOR
7/8"x8" BASE
2x8
2x8
2x2 BRIDGING
2x8
1 5/8" TREADS ON ALL STEPS

Correspondence.

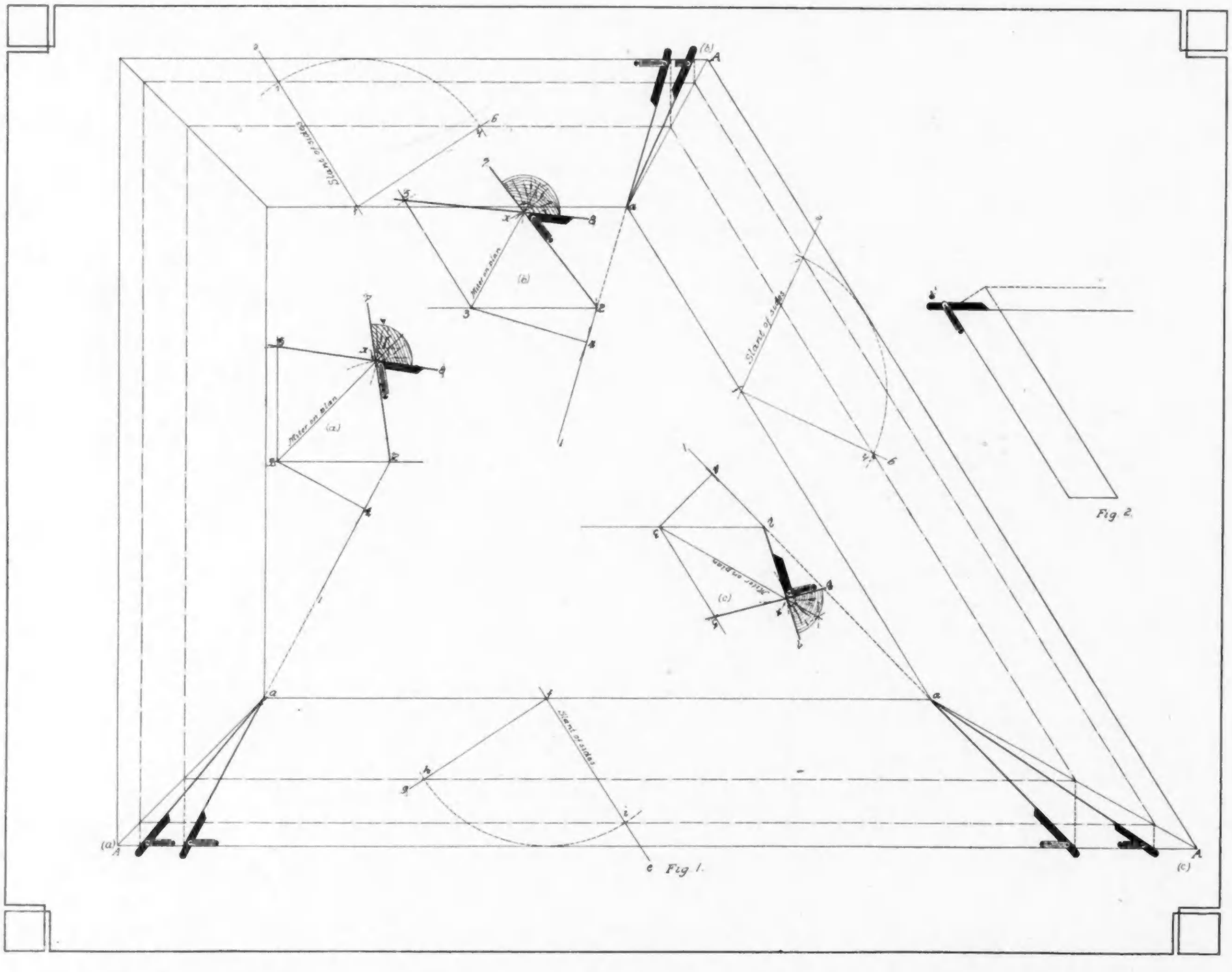
Hopper Joints

To the Editor: Somerset, Mich.

The methods of finding the side, miter or butt cuts for hoppers and like class of splayed work seem almost endless, and all this is so confusing to the young joiner that his progress in this direction is usually slow, especially when he is shown one method for a square angle, another for an acute, and still another for an obtuse angle, when the work is to be mitered at the angles, and, perhaps, a separate method for each of the angles when the work is to be butt jointed.

It is the purpose of this article to present to the reader ways and means of obtaining the correct cuts for this class of work, showing two simple methods, one for mitered angles and one for butt joint angles, and covering all classes of work, so long as the slant to the sides is uniform, whether it is a square, an acute, or an obtuse-angled corner. The careful student will readily see that this means triangular, square, pentagonal, hexagonal, heptagonal, octagonal, or any other "gonal" kind of splayed work, whether for hopper, spire, column or other purpose.

To make all plain, we will refer the reader to the drawing in which Fig. 1 teaches the whole art. The same reference letters are used in representing the same line in each of the angles for which the cuts are desired, so the directions will answer for any one. Just pick out your own angle, whether it be the square angle shown at (a), or the acute angle shown at (c), or the obtuse angle shown at (b). First, draw a plan of the angle as at A; these lines we will call the base lines. Parallel to these lines, at any convenient distance, the greater this distance the more accurate will the drawing be, draw other lines as shown which will form an angle, as at a, which will correspond to the angle A. Connect A-a and the miter on the plan is found, which would be the proper one to use if the edge of the side was beveled to lie in a plane with the plan, as in Fig. 2, but if the miter across the square edge is desired, we would proceed as follows: From the base line on either side of the angle draw a line corresponding to the slant of the work, as e-f; from f, with a radius equal to the distance across to the base line, draw an arc intersecting e-f at i; and through i parallel to the



base line, draw a line to point of intersection with miter line, A-a, on plan; square over to the base line and connect to the interior angle a, and the miter is found, as shown by the bevel.

To find the bevel for the cut across the sides, draw from f, previously found; f-g at a right angle to e-f, and intersecting the arc i-h at h. Through h parallel to the base line draw a line to point of intersection with the miter A-a on the plan, square over to the base line from this point, and connect with the interior angle a, and the angle formed by this line and the base line is correct for the bevel.

Let us now consider the scheme for developing the lines for a butt joint for the square corner, as at (a); or the obtuse corner, at (b); or the acute corner, at (c), shown on the interior of the diagram, in which the same reference figures refer to corresponding lines in the different diagrams, as before. First, we will draw a line 1-2 corresponding to the bevel cut across the sides, which will be the same as found before, the work having the same slant to the sides. From 2 draw 2-3 corresponding to the edge of the board or base line. At a right angle to the line 1-2 from any point draw 3-4, and from 3 draw 3-5, which, with 2-3, will form a plan of the angle for which the bevel is desired. Make 3-5 equal to 2-3, and from 2 and 5, with a radius equal to 4-3, strike arcs intersecting at x, and from 5 and 2, through x, draw 5-8 and 2-7; then the angle formed at 2-x-8 or 5-x-7 will be the angle for the bevel sought, and 7-x-8 will be the correct bevel for a corner strip to fit the angle formed by the sides.

These methods have been in use for years—long, long before I learned to saw to a line—but because of the simplicity and that the principle of either answers so well for all purposes of the problems involved in the case, I have deemed them of value to all workmen, especially the beginner.

E. E. SANFORD.

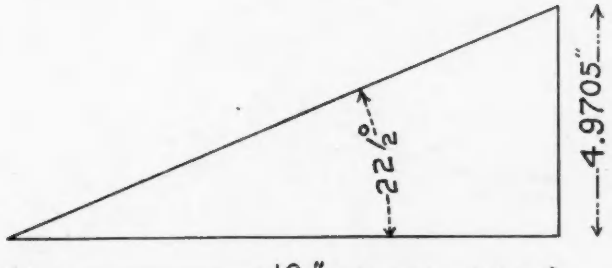
What One Degree Equals

To the Editor: Enumclaw, Wash.

In your May number on page 71 in the table of degrees and tangents, you say that 1 degree equals .2095. How do you get that number? You say that 45 degrees equals 12. Why, then, 22½ degrees would equal 6. You do not show the half degree there, but you have 22 degrees and that equals 4.8484.

THOS. JOHANSEN.

Answer: In answering the above we refer to the article in question to the illustration in connection with same, showing the lengths of the tangents with a base of twelve inches,



are given to the ten thousandth part of an inch for each degree up to forty-five. The half degrees are not given for want of space, as it will be seen that the lines are about as close as they could be for illustrating purposes. However, by taking the scale at half-way between the degree lines, and this at the point of intersection on the blade, will be near enough the length of the tangent for most working purposes.

The fact that the tangent for 45 degrees is 12. is no reason that the tangent for 22½ degrees should equal 6. By referring to the table it will be seen that the tangent for 22 degrees is 4.8484 and that for 23 degrees is 5.09 inches. It so happens that when the tangent is equal 6 it falls into fractions between 26 and 27 degrees. These fractions are called minutes, of which there are 60 to the degree, and in this case the degrees are resting at 26 degrees and 34 minutes. As to the question of how the lengths of the tangents are obtained, that is a question in trigonometry or higher mathematics in the measurement of triangles. Knowing ones have prepared standard tables on a basis of unity, not only for each degree and its complement up to 45 degrees, but for each minute, and there being 60 minutes to the degree would make a total of 2,700 tangents. The length of the first minute is too small for recording, and of the whole number not one outside of the 45 degrees is without fractions.

Taking, for example, the 22½ degrees, the tangent is given as .41421+. This, multiplied by 12 (because we are working on a basis of one foot) equals 4.9705+, or practically 4 31-32 inches, as shown by the accompanying illustration.

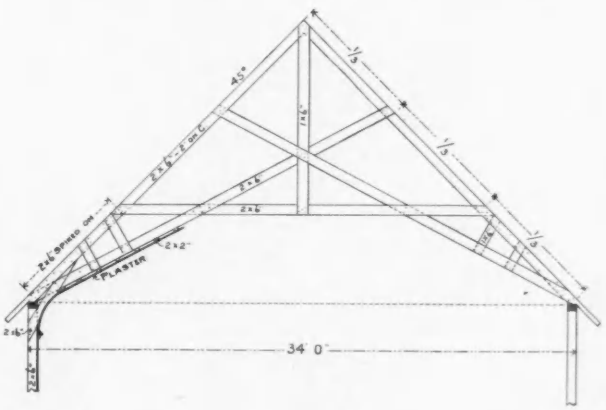
The above tables referred to are published in books on engineering and can be had of most any up-to-date book store.

A. W. WOODS.

Trussing a Roof

To the Editor: Hesper, Ia.

What would be the proper way to truss a roof on a span of thirty-four feet, using two by six for the rafters, with roof to have a pitch of forty-five degrees, the ceiling to raise six feet above the plate? This is for a church and would like very much to have a diagram of the trussing of the roof. Want



it sufficiently strong to keep the plaster from cracking. Also what is your opinion about using two by four for the studding, which are to be fourteen feet high?

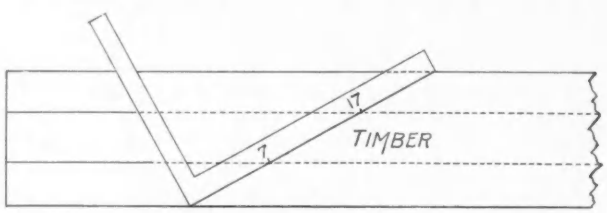
W. H. CAMP.

Answer: In answer to the above we herewith inclose a diagram of the truss as per the dimensions given, which we presume is for a common shingle roof. The timbers required will be twenty-six feet in length for the common and tie rafters and twenty-four feet for the collar beam. At the seat of the rafters we use a two by six piece circled out to form a cove as shown. This piece should be thoroughly spiked to the studding and to the side of the tie rafter and to the under edge of the common rafter. However, only one-third of these pieces will catch the rafters, owing to their being spaced on twenty-four inch centers, thus requiring the other pieces to be framed in between the rafters. Other timbers in the truss are of one by six fencing plank. All parts should be thoroughly spiked together. Cross pieces of two by two stuff are used to receive the lath, for which we would recommend using expanded metal lath. The level ceiling will lack a few inches of being six feet above the plate, but the timbers will work to a better advantage and will make a stronger job. As to the last question, we would by all means recommend using two by six studding for a building of this kind. What is called two by four is really only three and five-eighths in width, which is too narrow even if stout enough to give the proper width at the window jambs to receive the sash and other trim. A. W. Woods.

Forming an Octagon

To the Editor: Morrisburg, Ont.

Enclosed find drawing and description of how to form an octagon from a square timber, which is obtained by laying the square as shown and follow back seven inches from either end, and from that point to the corner of the timber set your gauge and size to that, and you will have an octagon timber.



If it be a tapering column, get the size at each end and apply the square by the same rule and take your points at each end and strike a line instead of gauging.

Remember it does not make any difference as to size of stick up to twenty-four inches square. B. S. Wickware.

Filing Saws

To the Editor: Granite Falls, Wash.

As I find a great many helpful things in your paper which I think is a great success, I would like to contribute an article on saw filing which I think will be helpful to some. I file a great many saws, not only for my men, but for the public, and, for a young man, am considered an extra good filer. In my experience as a carpenter and contractor I found it slow work cutting any heavy angle, so I began to study how I could improve on a saw for that purpose, with what I think good results. I think it will be new to some of your readers, as I have never seen anyone else try it. I take a cut-off saw, say No. 6 or 7, file it square across with the file level, then I start on the back corner of the tooth, say one-third to one-half way down, and file it to a point on the set side, which gives it a bevel point, but leaves the face square. I don't think it can be beat for the cuts I have mentioned. I file all my rip saws the same way, as it only takes a trifle longer, and if the timber is curly or knotty it cuts just as easy as if it was all straight grain, and it cuts just as fast and much smoother.

A. C. Robe.

Oiling a Floor

To the Editor: Passaic, N. J.

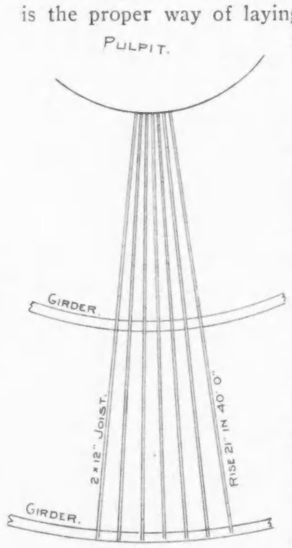
Will you kindly tell me what to use to dry a floor on which two coats of linseed oil and dryer (turpentine) have been used? The first coat of oil dried all right; by mistake the second coat was put on and it has taken over three weeks to dry; in fact, is sticky and tacky yet. Can you advise me how to make a good finish? Frank Wentink.

Answer: It is practically impossible to get two coats of linseed oil to dry hard on a floor, in any reasonable time, if it will ever dry entirely. The only really satisfactory thing to do with the floor in question would be to remove the oil with ammonia or soda, afterward thoroughly washing the floor to remove the alkali, and neutralizing any traces that remain with vinegar. Then the floor should be sandpapered and the work begun anew. For an oil finished floor the best method to pursue is first to fill it with a good paste filler, which is allowed to set and then rubbed with burlap across the grain of the wood, to make it smooth. The best way is to take a strip of, say, five or six boards wide, and apply the filler; then go back and rub well with the burlap. After the filler has hardened for at least twenty-four hours, the floor should be oiled with crude oil or one of the specially prepared floor oils or rubbing oils, applying it with a rag and allowing it to remain for at least thirty minutes and then rubbing it well with a dry cloth. Such a floor can be maintained in good condition by an occasional oiling, in the same manner, which can be done by any one and is no more trouble than wiping up the floor with water. If it is considered undesirable to remove the linseed oil with alkali, or some of the paint removers that are on the market, a coat of grain alcohol shellac might be tried, but this is at best only an expensive experiment. Edward Hurst Brown.

Laying a Church Floor

To the Editor: Lenox, Ia.

Find inclosed a sketch of a bowl-shaped church floor. What is the proper way of laying the flooring? We will use two floors, a rough floor and a top floor. William E. Ginn.



Answer: We herewith reproduce the inclosed sketch mentioned above. As the incline in this floor is only slightly over one-half inch to the foot, it will be a very easy matter to spring the boards to the required shape. The finished floor should all run one way, but the under floor should run diagonal to the upper one to prevent the shrinkage from showing up in the finished floor. The joists being laid fan shape will require the under floor to be laid at different angles. For this floor would recommend using surfaced one by six boards laid close and well nailed. A. W. Woods.

Measuring Sand for Cement

To the Editor: Cummings, Iowa.

Referring to your article on artificial stone in the May number. In portioning the cement, sand and gravel would you measure your sand or weigh it; and how would we determine the exact amount when our sand is sometimes wet and other times dry? J. J. Oliver.

Answer: Always measure your sand and aggregates (gravel, crushed stone, etc.). Cement may be weighed, but I find that measuring is the most practical to recommend unless all materials are absolutely dry. Fred W. Hagloch.

We all desire the confidence of those with whom we come in contact in a business way, and this is as it should be, but don't forget that the first and most important essential is to have confidence in yourself.

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

A Complete Line of Grilles

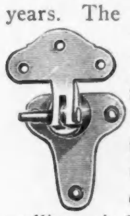
The Northwestern Grille Works, 1454 Milwaukee avenue, Chicago, have just issued a new catalogue, filled with attractive designs, illustrating their complete line of modern styles of grilles. They wish to call particular attention to the many new designs contained in this catalogue, and to strongly emphasize the fact that their facilities for furnishing all kinds of grille work are unsurpassed. They state that they are prepared to furnish special designs also, or to make estimates

on architects' plans and specifications. Small orders receive the same careful attention from this firm that large orders do, and they aim to make any one that deals with them a satisfied customer. Prompt response is made in person or by mail to any correspondence.

The wood used in the construction of their grilles is of carefully selected, thoroughly seasoned, and perfectly kiln-dried stock; workmanship is guaranteed to be of the highest order and at prices that must command the patronage solicited. Subscribers of the AMERICAN CARPENTER AND BUILDER who are in need of this line should write for a catalogue.

New Hinge For Blinds

A hinge that will hold a blind so that it will not rattle or slam is something to be interested in. The Hale & Benjamin hinge is a comparatively new article on the market, but has already met with most gratifying success. It is an improvement over the Streeter hinge, which has been sold for several years. The spring is enclosed and the hinges are screwed to the casting, obviating the necessity of boring holes They are strong, durable and warranted not to break, being made of malleable iron. A house can be trimmed with them in the shortest time of any hinges on the market, and by their use a blind can be held either open, half open or closed. They are especially adapted for bay and mullion windows, as they hold a blind straight out.



This concern has also a similar pattern of a hinge for brick buildings, and an advertisement of this hinge will be found on another page of this magazine, or by sending to the manufacturers, The Parker Wire Goods Co., Worcester, Mass., and by mentioning this magazine, they will give you full particulars upon request.

The Ideal Bevel-Try Square

This is a combination of a bevel and try square. Before this invention was patented the carpenter was compelled to have a try square and also a bevel square.

By using the Ideal Bevel-Try Square a carpenter can accomplish more in laying off work. He can mark the square and bevel cut with one continuous stroke of pencil without having to change square. It is easy to change the bevel blade to any angle, as the slot in the bevel blade will allow shifting so it will always come to corner of try square blade. By setting bevel blade at right angle to try square blade he can get both marks without changing position of square. For beveling a board on edge, swing bevel blade over to back of handle, which gives a straight surface on handle. When bevel blade is not needed, close same in handle, and he then has a regular try square. The try square blade is graduated in eighths, and the figures are stamped very plain; all parts are made of the very best of steel, except the handle, which is a composition metal and will never rust.

Bear in mind that by having this combination square you save the price of one tool. It is manufactured by Nicholls Manufacturing Co., Ottumwa, Iowa.

Miracle Sidewalk Tile Machine

The Miracle Sidewalk Tile Machine, herewith illustrated, consists of a square mold, planed perfectly smooth and square inside, attached to an iron stand which is fitted with a foot lever for raising the tile after finishing, as will be seen from the illustration. The different sizes, 12 inches, 14 inches, 16 inches, 18 inches, 20 inches and 24 inches square, are made on the same machine, it being necessary only to change the mold, which operation can be accomplished in a very few minutes.

The machine is strong and well made, all bearing parts being planed to fit accurately, while the mechanism is so simple that there is absolutely nothing to get out of order or wear out.

The molds can be used separately if desired, by making a wooden stand or table, but considering the low cost of the iron stand, its durability and its adjustableness to all sizes of molds, it is much cheaper and more satisfactory than a home-made affair.

The molds are cast in one piece, are heavy enough to be perfectly rigid, and, being planed perfectly true and smooth inside, insure a tile perfect in every respect. By having a

different mold for each size of tile, a perfection is obtained which cannot be attained by machines using fillers in a large mold or wood or other material.

Miracle cement tile walks are now being used in preference to any other kind in a great many places, for several reasons. It is contended by some that, where the temperature is subject to extreme changes, the tile walk is superior, inasmuch as it will heave in blocks and is not liable to crack. Then, again, the tile can be made in winter when labor is cheap. Another great advantage in laying a walk of Miracle tile is that it is not necessary to stop traffic. A soft or surfaced-in-place walk must be enclosed for several days to cure, while a Miracle tile walk is ready for use as soon as laid.

The Miracle Company makes these molds in 12, 14, 16, 18, 20 and 24-inch sizes. However, it is not necessary to have all of them. The more popular sizes are 20 inches and 24 inches, as with the 20-inch tile laid three wide one can make a five-foot walk, and with the 24-inch one can make a walk of any width in even feet.

The Miracle Company has been engaged in the construction of cement walks in the Northwest for the past eight years, and this machine is evolved from their experience in the business.

With each machine are furnished complete specifications for the manufacture and laying of cement tile walk. A letter addressed The Miracle Pressed Stone Company, Minneapolis, Minn., will bring full and specific information about this tile machine, or, in fact, any tool or machine used in the concrete business.

A New Shingle "The Imperial"

Those of our friends and subscribers who have used a 14x20 size Metal Slate, or Gothic Pattern, will doubtless be particularly interested in a new shingle which is to be known as "The Imperial."

The dies for making this new pattern are all completed, and by the time this number of the American Carpenter and Builder is delivered the Cortright Metal Shingle Company will be ready to make prompt shipment of any order that may be placed with them.

The important features which have made their metal slate and Victoria shingles so popular and successful have been retained in this new shingle, viz.: An absolute lock, which cannot become unhooked after being laid, and cannot be pulled apart, at the same time providing amply for contraction and expansion of the metal. Three steps or corrugations are formed at the top of each shingle, and are raised or stamped high enough to prevent any rain or snow from driving up under the shingles after they are laid.

For the present this pattern will be made in one size only—14x20 inches. Samples of actual goods, either painted or galvanized, will be forwarded to anyone desiring them.

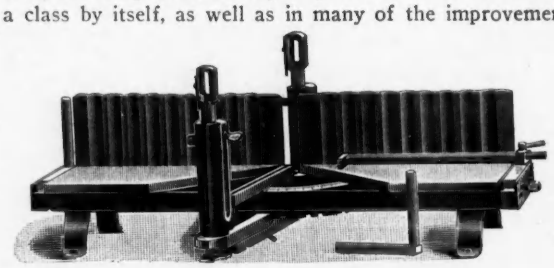
Continuing the established policy of furnishing the highest quality at lowest possible figures, they make the announcement that the price of the new shingle "Imperial," 14x20 size, will be the same as the metal slate, 14x20 size. For further particulars, see their advertisement on another page.

Ives Patent Window Ventilating Lock

The H. B. Ives Co., New Haven, Conn., John H. Graham & Co., No. 113 Chambers street, New York, selling agents, are meeting with great success in the sale of their newest patent, the Ives window ventilating lock. It is a simple device that requires neither mortising nor the boring of holes to apply, it being fastened by screws. Being a permanent fixture, it affords extra security, in addition to the usual sash fastener, and also safety for ventilating rooms. It is a sure safeguard, quickly applied and operated, insuring sure protection against intruders; children are kept in and burglars are kept out; and, therefore, it should be used on all windows in flats as well as sleeping apartments. That this old established firm manufactures this and other specialties for windows is a sufficient guarantee of the utility of the article mentioned. A miniature forty-page catalogue of window hardware specialties will be mailed free upon application, if mention is made of the fact that the writer is a subscriber of The American Carpenter and Builder.

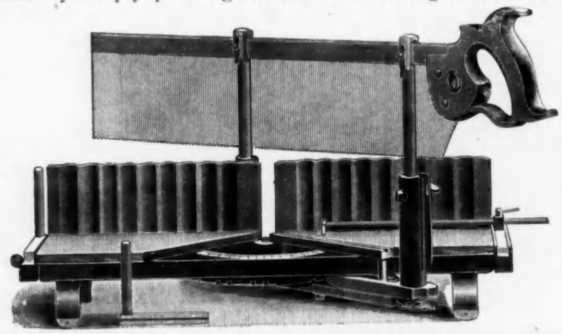
Goodell Steel Mitre Box

In designing this mitre box the manufacturers say they have aimed to see how good a one they could make, regardless of cost, and they believe in quality it will be found entirely in a class by itself, as well as in many of the improvements.



In the first place, the box is made of Bessemer steel, thus doing away with all liability of breakage, and making it strong and firm. It will last a life-time, and will be greaty appreciated.

The backs are made of cold rolled steel, corrugated to one-fourth inch in depth and one-half inch in width, allowing perfect clearance for saw-dust. Besides the angles used on regular boxes, by simply turning the lever, it can be instantly set and locked at any desired angle. It is graduated, by means of which much time is saved in making changes, especially if two opposite cuts are wanted at exactly the same angle. It has automatic stops to hold up the saw, allowing the operator to use both hands in placing the work. These are not complicated in using, but simple, instant acting, the saw being released by simply pressing down on it. The guides are made



long, thus holding the saw very steadily when raised to the highest capacity. These boxes give ten and one-half inches width at right angles and seven and one-quarter inches at mitre. Both sizes can be furnished with extra angle attachments to increase angle above forty-five degrees, and there goes with these a gauge for sawing duplicates of any length up to twenty inches. These, being placed on the ends, can be put on old or new boxes at any time and are sold separately when desired. Write them for catalogue.

For Manufacturer and Builder

Simplicity is a cardinal feature of high character in all things. The high grade work in every business is the kind which yields the best profits.

Simple and practical machinery for the manufacturer of cement stone adaptable to all sizes and styles of buildings is

Send Your Name For This Book

It's FREE

So great has been the demand for this interesting book that we have been compelled to publish a brand new, enlarged and very elaborate edition, six months sooner than we anticipated. Don't delay—write today.

Our new book is now ready. Larger size pages and more of them, better illustrations than our last book, and greatly improved text. If you want to improve the appearance of your floors, furniture and woodwork, this book is worth $25.00 to you.

Have you tried our Polishing Mitt? If not, you are missing a great deal. Read about it below and send in the label.

Write for above book — "The Proper Treatment for Floors, Woodwork and Furniture." It tells about wood, wood finishing, wood cleaning and wood polishing for the home. It is good, practical, labor-saving advice from a wood-finishing expert of twenty-three years' experience. Tells how to produce all the latest artistic, natural and artificial finishes in oak, ash, birch, maple, beech and pine floors, furniture and woodwork. Explains how you can finish pine to look almost as beautiful as hardwood. This book sent free by the manufacturers of

JOHNSON'S PREPARED WAX

"A Complete Finish and Polish for all Wood"

For Floors, Furniture and Woodwork

It produces a lasting and artistic finish to which dust and dirt will not adhere. It does not crack, blister, peel off or show laps. Heel marks and scratches will not show. Johnson's Wax contains more polishing wax, and of the hardest quality, to the pound than any other. That is one reason why it covers the most surface, produces the best, most lasting, sanitary finish and polish with the least effort, and is the largest selling wax in the world.

Johnson's Polishing Mitt is our latest device for polishing furniture and woodwork with our wax. Made of sheepskin with wool on, is open across the back and slips on hand. Sent FREE for label for one pound or larger can of Johnson's Prepared Wax. Remove label by placing can in steam or hot water.

SPECIAL. We are large manufacturers of ornamental hardwood floors and will be pleased to send you upon request our free catalogue, showing many beautiful and new designs. Hardwood floors are far ahead of other floors—they are sanitary, durable, attractive and in demand. Don't delay—write us today. We carry a large stock and can ship promptly, anywhere.

Johnson's Prepared Wax is sold by all dealers in paint. ½-lb. can, 30 cents; 1 and 2-lb. cans, 60 cents per pound; 4, 5 and 8-lb. cans, 50 cents per pound. If your dealer will not supply you, send to us.

Write today for book and mention edition ACB 9. Don't forget the label either.

S. C. JOHNSON & SON
Racine, Wis.

"The Wood-Finishing Authorities."

desirable. The factory that produces something better than any one else can always get plenty to do, no matter how dull business may be.

The National Building Block Molds are simplicity itself. Being a two piece proposition, they give the builder an artistic material with which to overcome any ordinary difficulty in the constructions of walls, no matter how complex the architect has drawn his plans.

The usefulness of this cement stone made with the National process for veneering purposes must not be overlooked. Many unsightly old frame structures may be vastly improved by the process of veneering with very little expense.

Cement stone grows stronger with age, while natural wood and stone decay. There is no expense for painting. It is the best of fire proofing material. The house is warm in winter and cool in summer.

There are many more things that may be said for this material that is rapidly growing in favor from the standpoint of the owner and contractor, and with satisfaction to the manufacturer. As yet some architects very reluctantly make plans at their clients' request. Many say it is new and has not been tested; yet if they stop and think of the vast quantity of Portland cement that is used in varied conditions and for various purposes, and by all enterprises, in stupendous proportions, they could not help but come to the conclusion that it is a valuable adjunct to the building industry.

Before purchasing your cement block machinery examine into the merits of the National System. Address National Building Block Machinery Co., 211 Grand Ave., Milwaukee, Wis.

Handsome Sash Bars and Posts

Next only to strength and safety, light is the great end aimed at in our modern construction, and the proper setting of plate glass presents quite a problem to the architect and builder. In accomplishing this end the "Petz" corner post and transom bar has made a fine record and won distinct recognition. This does away with big, unsightly and obscuring pillars and posts. It possesses great strength, holds the largest and heaviest lights of glass securely and firmly in position, takes up small space, does not obstruct the light and leaves the entire window for purposes of display. These posts and bars are made from one and three-eighths to two and one-half inches in diameter, in many styles and finishes, to cover every possible need of the contractor or builder. They are finished in copper, brass, bronze, German silver, nickel plate, oxidized copper, antique brass and gun metal. The "Petz" corner post and transom bar is made only by the Detroit Show Case Co., Detroit, Mich., but can also be obtained from the Pittsburgh Plate Glass Co. at their warehouses in New York, Boston, Chicago, Cincinnati, St. Louis, Minneapolis, Detroit, Pittsburg, Davenport, Cleveland, Omaha, St. Paul, Atlanta, Ga.; Savannah, Ga.; Kansas City, Birmingham, Ala.; Milwaukee, Wis.; Rochester, N. Y.; Baltimore, Buffalo, N. Y.; Brooklyn, Philadelphia, etc.

A Boy Can Handle It

Mr. W. H. Davis, of 1827 Sandusky avenue, Kansas City, Kansas, has a concrete cement block machine which for simplicity of operation and adjustment is remarkable. It is so simply built that a boy can handle it and it is said to be capable of turning out blocks that no other machine can. It makes all blocks (of any shape) that go into a building, rock or smooth face, from two inch to eighteen-inch wall. It makes two twenty-four-inch "L" at the same time, or it will make three sixteen-inch rock face at once. It makes two kinds of window sills to a length of fifty-two inches. The blocks have both vertical and horizontal air spaces, which give good facilities for wiring, piping or ventilating.

His Specialty

Boy—"Father sent me here to ask you if you could give him a job."

Boss—"Does your father understand circular work?"

Boy—"Oh, yes sir! He was discharged from his last place 'cause he couldn't saw straight."

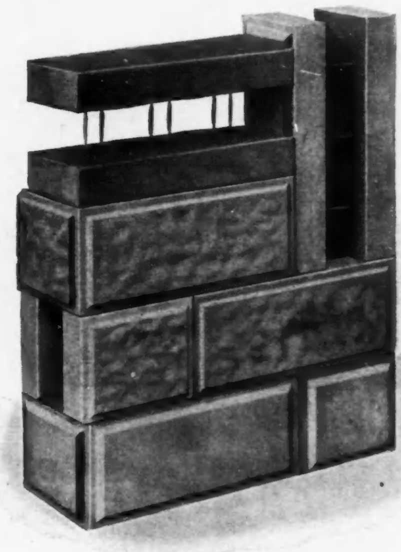
Originality in Construction

Reports from the rural districts indicate a desire for originality and individuality in the construction of homes that is more pronounced than it has ever been before. As a result of this, there is more call for special work in the shape of house trim and sash and doors than heretofore, which means, among other things, that opportunities are increasing right along for village carpenters to make use of a little woodworking machinery. Apparently this is not merely a fad or a temporary spurt either, but is the result of development in prosperity and in taste and a desire on the part of the rural population to build more permanent and artistic homes.

HERE IT IS AT LAST!

WHAT?

The Coryell Cement Block Machine



In last issue we showed you how the Coryell Cement Block Machine looked with all its parts.
In this issue we show you a sample of the block made on the machine, and we do not believe that you will find anything better or nicer if you looked the world over, and better than all, they make a hollow wall.
Will say farther that we are sorry for you, and you will be sorry later on if you do not look into the merits of our machine before you purchase.

Our Catalogue can be had for the asking.

Write, The Kells Foundry & Machine Co.
82 N. Main Street : : : : : ADRIAN, MICH.
WHO MANUFACTURE AND SELL THE MACHINE

CEMENT BRICK

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LARGE CAPACITY — 5,000 BRICK PER DAY
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Seaman's Cement Brick Machine Co.
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Scaffold Bolts

also Structural Bolts, all kinds. Rods, Double and Single Timber Stirrups, Cast Washers, Plates, Turn Buckles, Lag Screws.

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Portable Steel Frame Buildings

For Summer Cottages, Galleries, Churches, Stores, School Houses, Shops, etc. Made in any size with steel frames, sheet-iron roofs, sheet-iron or wood sidings, single or double walls. Light, strong, substantial and weather-proof. Can be moved repeatedly with ease and without injury.

Write for full information and prices

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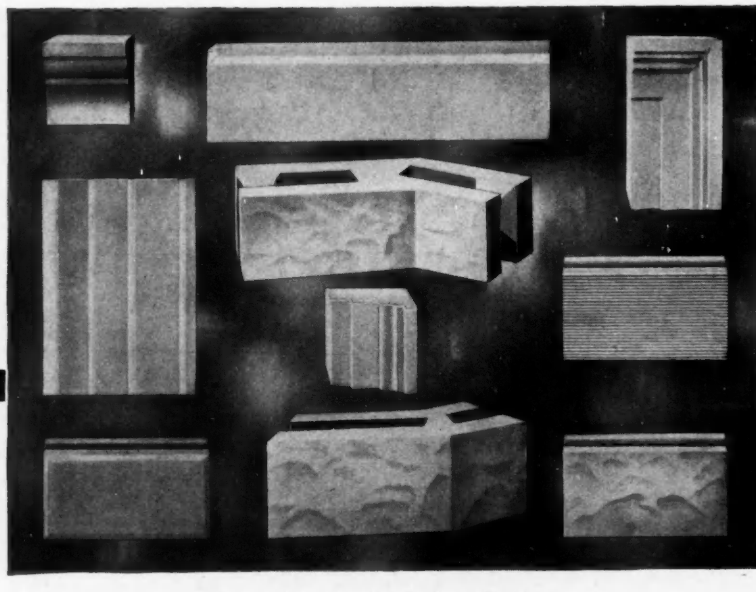

Cement Blocks Made With a Battjes Machine

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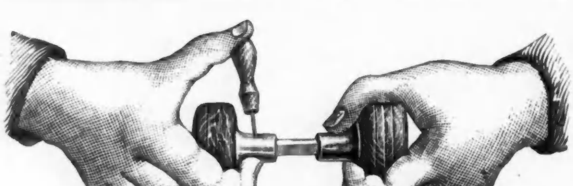

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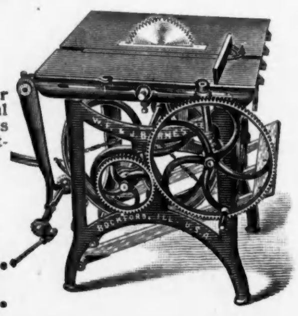

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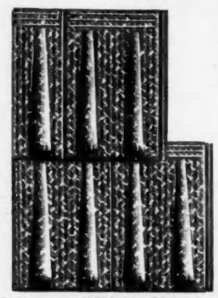

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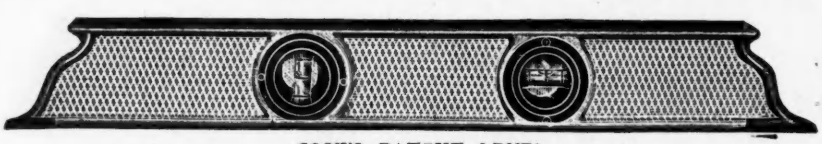

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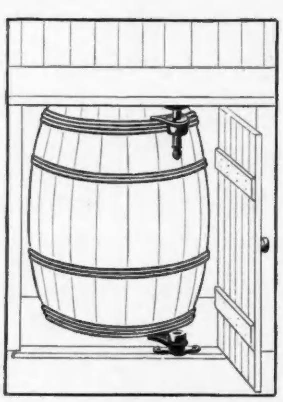

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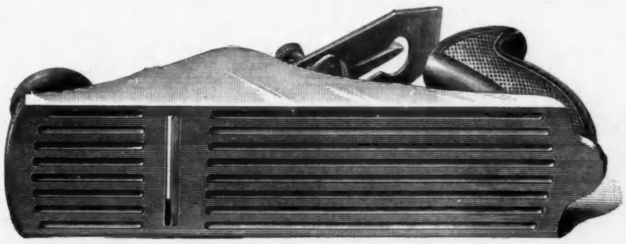

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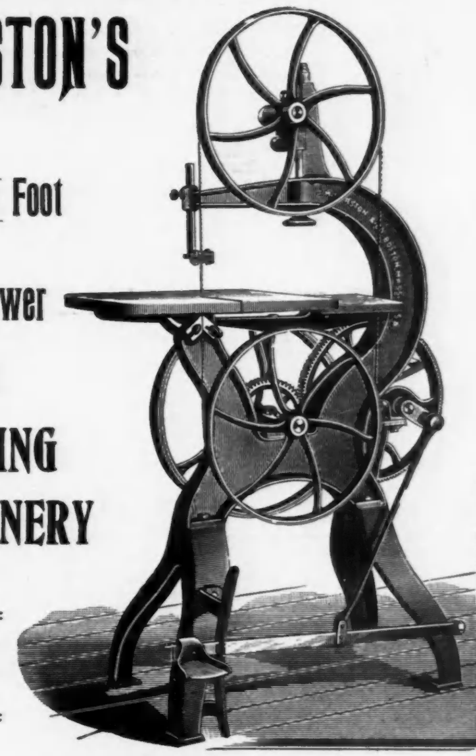

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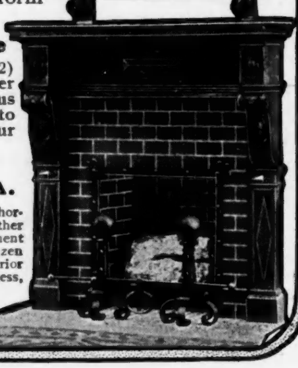

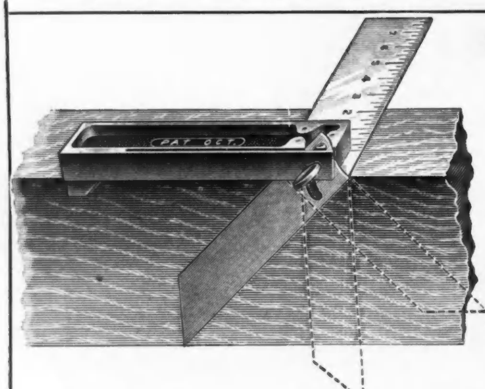

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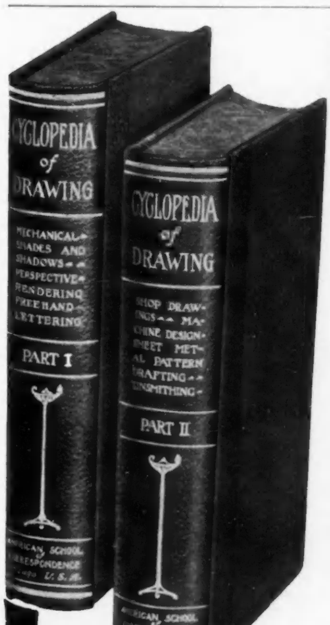

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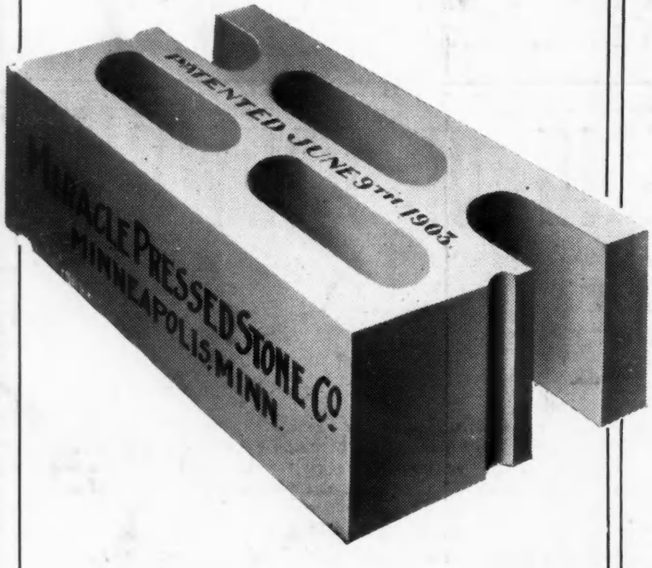

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