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Number of Subscribers		Pages of Advertising	
APRIL, 1905	16,737	APRIL, 1905	5
MAY	19,435	MAY	7½
JUNE	23,266	JUNE	14
JULY	23,763	JULY	23
AUGUST	23,980	AUGUST	26
SEPTEMBER	24,174	SEPTEMBER	27
OCTOBER	25,119	OCTOBER	29½
NOVEMBER	25,334	NOVEMBER	37
DECEMBER	25,607	DECEMBER	48
JANUARY, 1906	25,988	JANUARY, 1906	47
FEBRUARY	26,623	FEBRUARY	54½
MARCH	28,083	MARCH	60

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SPECIAL ANNIVERSARY NUMBER

Built of Miracle Double Staggered Air Space Cement Blocks

212
577
16

30

Residence of L. S. Dobson, Nora Springs, Iowa, size 32 x 44 feet. Thoroughly modern. Richly finished.

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For full particulars of the Miracle Machine for making the famous Miracle Cement Block, send for catalog K 2.

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Minneapolis

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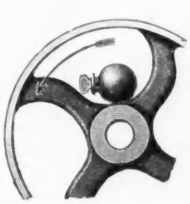

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They do not waste or throw oil—can be used on almost every size and speed of pulley. Tried and tested 15 years. 7 sizes, all brass. Ask for price list 26Z.

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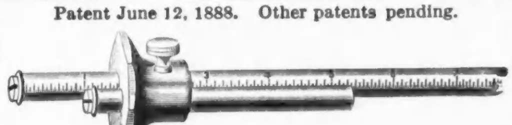

over all others. It is quickly adjusted with only one screw direct from the center, fastening both beams in their proper place. A simple device holds the beams in position while being adjusted. Accurately made and finely finished. Insist upon having the improved style adjusted by one screw.

The Leavitt Machine Company

Sole Manufacturers *Orange, Mass., U. S. A.*

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from whom you get the fullest value of the money you spend for hardware, and where the service (prompt shipments, careful packing, etc.) cost you nothing. A page from the catalog this one firm issues is shown below. The page can only give you an idea of the excellence both of the catalog and of the line behind it. Get the Catalog No. 37C and see for yourself—it's free. **We extend credit** *on 30-day terms to all responsible contractors,* making it possible in many cases for you to get your money before paying us. Prices shown are net. 9

ORR & LOCKETT HARDWARE CO., CHICAGO

DESIGN "A,"

ALL CAST IRON.

1746
1746¾

1746 INSIDE DOOR SET, consisting of: One mortise lock No. 100, 3½x3¼ in., steel face, nickel plated steel key, one tumbler, as shown on page 88; one pair knobs 2¼ inches; two escutcheons 8¼x2½ inches. Sand Blast Copper. Per set $0.60

1746¾ INSIDE DOOR SET. The same as Set 1746, but packed with three tumbler lock. Per set .... .75

1911½ SLIDING DOOR SET, for single doors, consisting of: One lock 5½x3½ inches, steel face, similar to No. 204, as shown on page 94; two cup escutcheons 8¼x2½ inches. Sand Blast Copper. Per set 1.25

1911 SLIDING DOOR SET, for double doors. The same as 1911½ Sliding Door Set, but with four escutcheons. Sand Blast Copper. Per set 2.00

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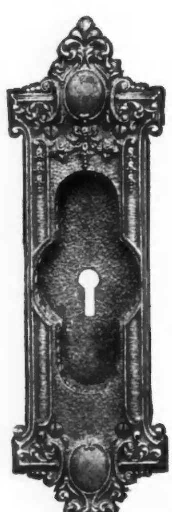
2017 FRONT DOOR SET, consisting of: One mortise lock 4¾x3½ inches, three nickel plated steel keys, one tumbler on dead bolt, one tumbler on night latch, similar to No. 109S, as shown on page 89; one pair knobs 2¼x2¼ inches; one rose; one escutcheon 11⅛x3 inches; one escutcheon 2½x1⅛ inches. Sand Blast Copper. Per set 1.75

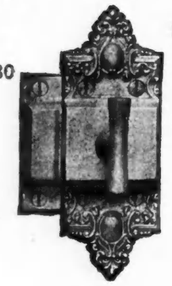
2018 VESTIBULE DOOR SET, consisting of: One mortise latch 3¼x3½ inches, two nickel plated steel keys, one tumbler, similar to No. 110S, as shown on page 90; one pair knobs 2¼x2¼ inches; one rose; one escutcheon 8½x2½ in. This set to match 2017 Front Door Set. Sand Blast Copper. Per set 1.50

2017



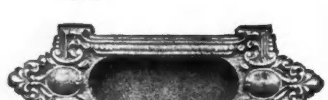
1911½
1911

114 PUSH BUTTON, 6x2½ in. Sand Blast Copper. Each ... $0.30



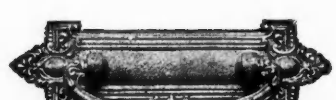
394 CUPBOARD TURN, 4¼x2¼ in. Sand Blast Copper. Each $0.25

114



183

394



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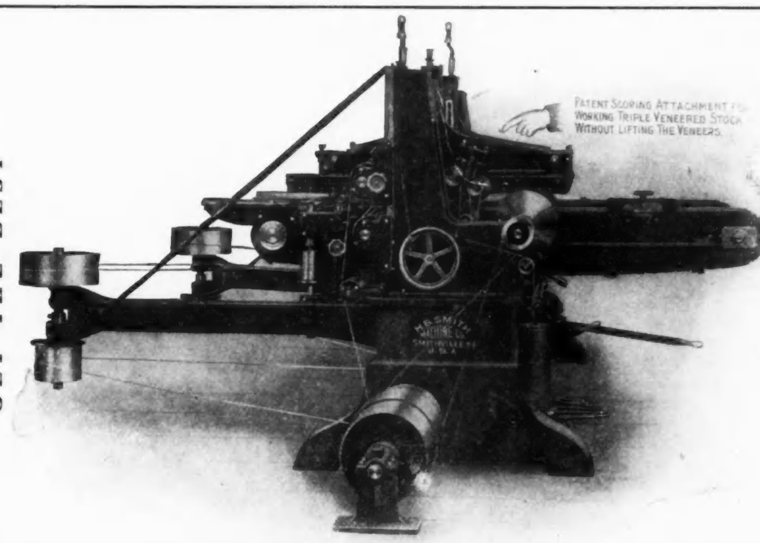

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One of my

Painting or Whitewashing Machines

does the work of **20 men with brushes,** and does it better. If you have not received my book yet, drop me a postal and you will receive it by return mail. It explains and illustrates painting and whitewashing machines and a number of other interesting labor and money saving devices. **Write for Catalog No. 9.**

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MARSTON'S

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Hand and Foot
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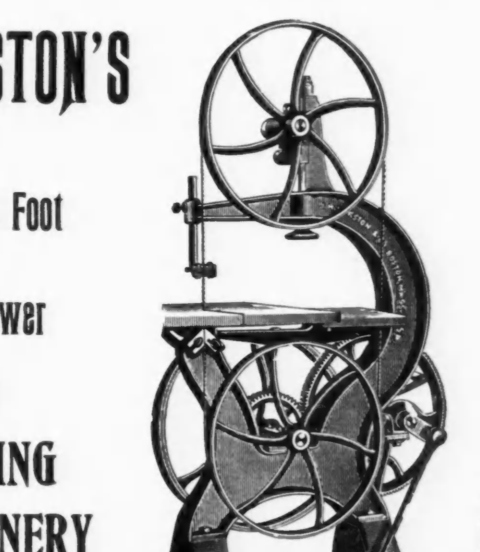
Steam Power
WOOD WORKING MACHINERY



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Bore a Hole Anywhere

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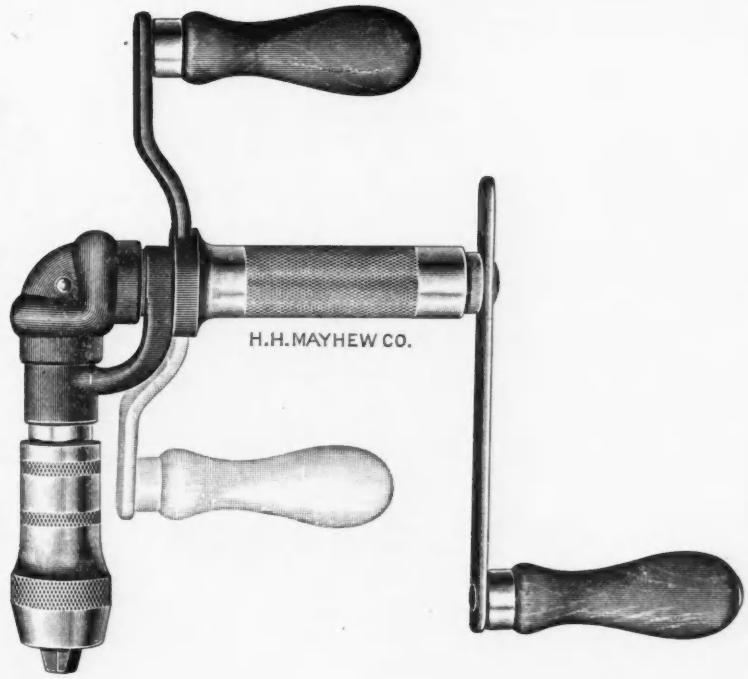

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80c

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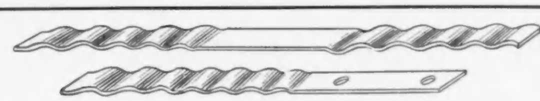

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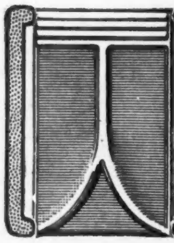
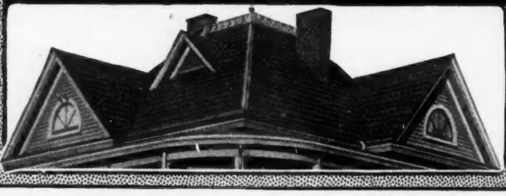


CORTRIGHT METAL SHINGLES



Since it's only a matter of hands, hammer and nails, why shouldn't any carpenter make money laying Cortright Shingles?

CORTRIGHT METAL ROOFING CO.
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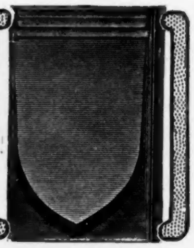
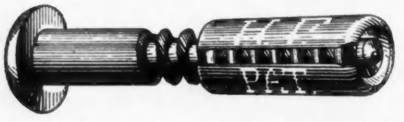


FARRINGTON EXPANSION BOLT



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STAR EXPANSION BOLT

Made of Iron

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Carpenters and builders who have not used these simple expansion bolts do not know what solid fastening to brick and stone means. The Shields can be used with the smallest Wood Screw and the largest Lag or Coach Screw.

We will send prices, samples and catalogues upon request.

STAR EXPANSION BOLT COMPANY
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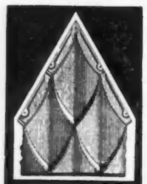
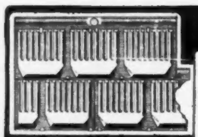


GOTHIC TILE

MONTROSS METAL SHINGLES



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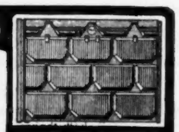
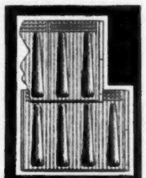
Hadn't we better send you our catalog now?

MONTROSS METAL SHINGLE CO. Camden, N. J.



EASTLAKE SHINGLE



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BREAK THE LEAST
MARK THE CLEAREST

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JOSEPH DIXON CRUCIBLE CO.,
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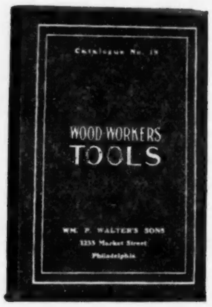

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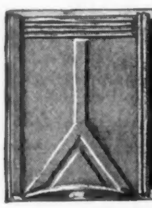

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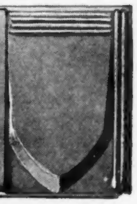

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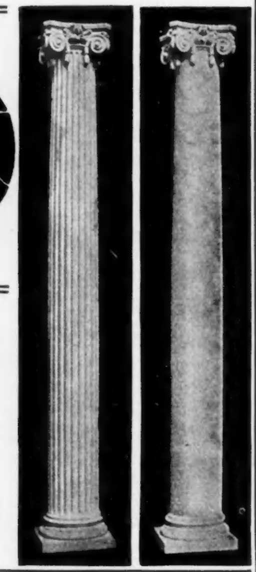

Besides carrying regular stock sizes from 6 to 12 inches in diameter, complete with caps and bases, we make Special Large Columns up to 44 inches in diameter, according to architectural drawings, together with a general line of

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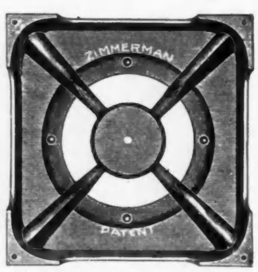
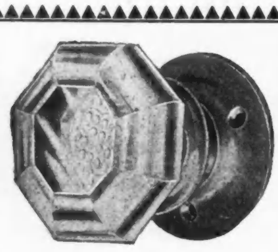


C. E. ZIMMERMANN, : Syracuse, N. Y.



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

American Carpenter and Builder

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

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

Published monthly by
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196 FIFTH AVENUE, CHICAGO.
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E. L. HATFIELD, Assistant Manager.

NEW YORK OFFICE, 253 BROADWAY
EGBERT DAYTON, Manager.

VOL. II. APRIL, 1906 No. 1

The AMERICAN CARPENTER AND BUILDER is issued promptly on the first of each month. It aims to furnish the latest and the most practical and authoritative information on all matters relating to the carpentry and building trades.

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

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ADVERTISING RATES.

Furnished on application. The value of the American Carpenter and Builder as an advertising medium is unquestioned. The character of the advertisements now in its columns, and the number of them, tell the whole story. Circulation considered, it is the cheapest trade journal in the United States to advertise in. Advertisements, to insure insertion in the issue of any month, should reach this office not later than the twentieth of the month preceding.

Past, Present and Future

THE AMERICAN CARPENTER AND BUILDER has just finished its first year and has been phenomenally successful, and as we look back upon it, it does not seem strange that it has developed into "the world's greatest building paper." The object of the publishers in getting together writers who treat the topics and questions that come within the experience of the carpenter in the most practical and intelligent manner, has been accomplished. These writers have given you the latest and most reliable methods of construction, and as you have profited by their instructions so have they been helped by your kindly suggestions.

We base our success largely on your hearty co-operation and on the active and helpful spirit in which you have taken hold to make the magazine the best of its kind in the world.

The future depends wholly upon what we make it, and as we all profit by the experiences of the past, the benefits which will be derived during the coming year will be cumulative.

Graft and the New York State Capitol

IT would be hard to find a more appalling record of fraud and graft than that now being brought to light by the crumbling of the foundations of the New York state capitol at Albany.

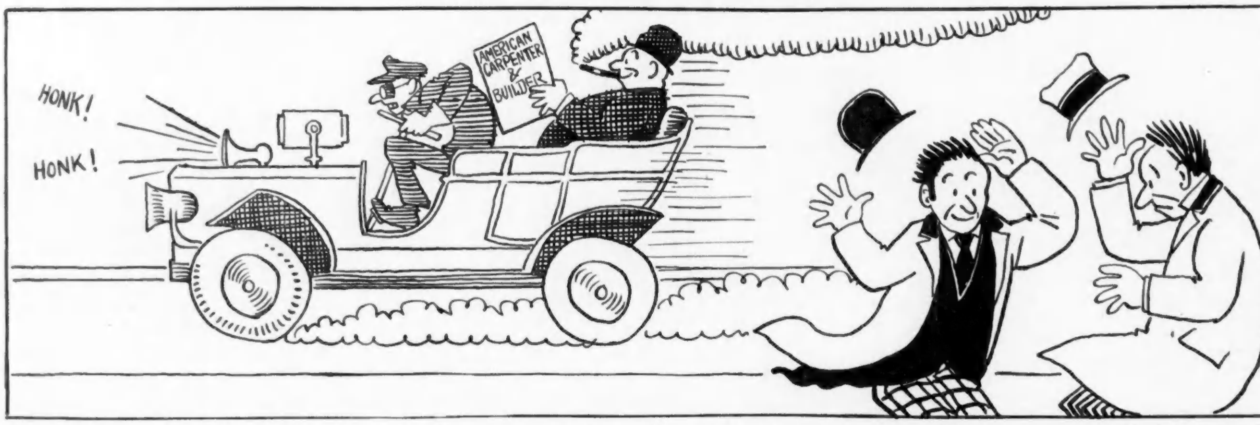
In 1867, contracts covering the entire construction were signed, with the sum of $4,000,000 as the consideration. Today, after $25,000,000 have been spent on it, the work is as yet unfinished and the building is falling to ruin.

Robbed of the important features that would have combined to make a beautiful edifice, it is an architectural aberation, an eyesore to the public, and a monument to graft.

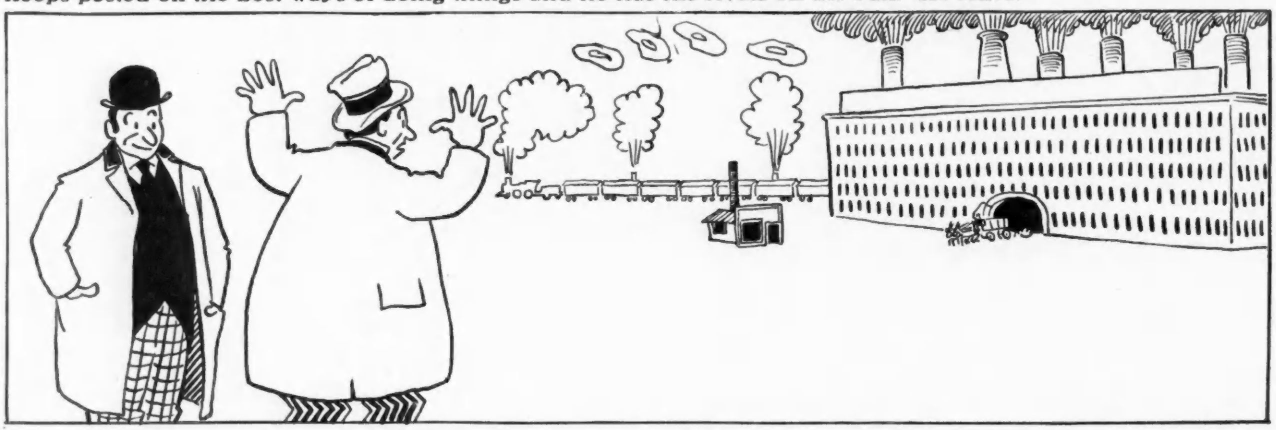
Built upon a foundation of clay overlying quicksand, it was soon found that the enormous weight of the building exerted too great a pressure on the soil, consistent with safety. It was after this discovery was made that it was decided to omit the large central dome and the four flanking towers, all of which were to be of stone, and were important architectural features. Relieved of this weight, it was thought that no further difficulty would be encountered, but year after year brought to light more instances of defective work and more money was spent in a vain effort to remedy them. The discovery now, that the walls are crumbling in several places and that the grand assembly staircase and some other sections have been boarded up for public safety, causes little or no surprise to those in any way familiar with its previous records.

What a poor showing this government building makes, when compared with the beautiful and massive structures erected by our large commercial corporations!

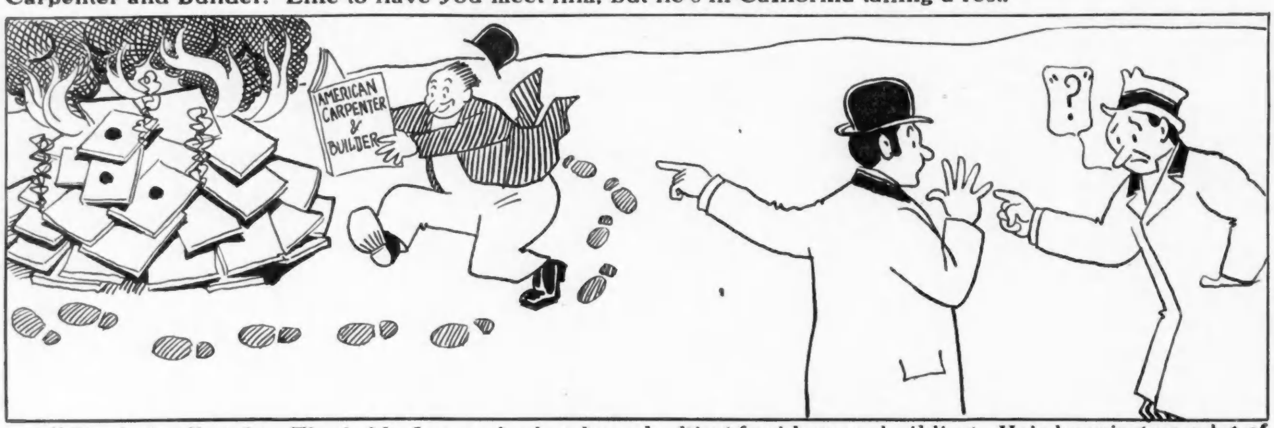
Some of Our Readers



"There goes Mr. Smith, the prominent contractor. He reads the American Carpenter and Builder and Keeps posted on the best ways of doing things and he has his rivals on the run. He rides."



"Mr. Publicity's factory. The small building was all he had before he began advertising in the American Carpenter and Builder. Like to have you meet him, but he's in California taking a rest."



"Oh, he's all right. That's Mr. Jones who has been looking for ideas on building. He's burning up a lot of other magazines he bought in his search for what he wanted. He found it in the American Carpenter and Builder."

"Come on and meet Mr. T. Square, the successful architect, the gentleman going to the bank. He reads the American Carpenter and Builder."

Opening of a Question Box

BY J. CROW TAYLOR

"TO judge from appearances this clear water club is trying to turn itself into an interrogation point," was the opening comment of J. B. at the third monthly meeting of his local club. "There is an element of disappointment in it to me, too, for I had hoped that we would all come loaded with thoughts and suggestions for our mutual benefit, while instead of this I have a lot of questions that the various members want answers to. In other words, everybody is seeking for something instead of bringing something to offer."

"That," said Lefty, "sounds like we did not get much out of Uncle Rural's object lesson with the empty bowl where he showed us that we could only expect to get out of a thing of this kind according to what we put into it. What we are putting into it looks like nothing but interrogation points. I notice it is a good deal that way with all kinds of associations, the majority of people come to ask questions or find out something, get information on some specific subject, seeking something of some kind, while very few start out with the intention of primarily furnishing something beyond their own presence and their desire to take something away with them."

"May be it is not as bad as that," Mosby put in. "It looks to me like muddy water, water that we cannot see through, we are putting in now, and I remember that Uncle Rural in his study of waters said he found that there were several methods by which water could be cleared. Which one of the clarifiers do you think we should use, Uncle Rural?"

"If I remember right," Uncle Rural replied, "it was my desire to apply the purifying logic to ideas and not questions, and the ideas usually come in the form of answers to questions. In other words, questions are generally the forerunner of information and signify that the one asking them is seeking for something. Now, as seeking is the mainspring of progress let us not discourage it, but rather let us turn to and see if we can't make this spring put some works in motion. First, therefore, let us have the questions."

Referring to some memorandums before him, J. B. read off some questions, as follows:

First. "What effect is the growing scarcity and the high price of lumber going to have on the carpenter trade?"

Second. "I want to know something about red gum for flooring."

Third. "How much of an architect should a carpenter be?"

Fourth. "How is the best way to manage a man you are building a house for when he is not of the same mind any two days, and keeps altering his plans as the work progresses, making extra trouble and expense for the carpenter?"

Fifth. "How can we create more demand for our work, or promote building so that we may all have plenty to do and not get in each other's way too much?"

"That first one is so easy that I want a chance at it," said Mosby. "The growing scarcity of lumber means less quantity and more quality. I figured this all out before I bought my boy some tools to learn to work wood, and the conclusion I came to was: while the days of the rough workman do not look so flowery ahead, the era of the real skilled wood worker is just beginning, and the future holds more for the skilled workman than the past has given. There won't be so much framing and heavy work, but there will be more finish and fine work. The next question is comparatively easy, too, and merges to a certain extent into the first one, because successful use of gum as flooring depends considerably on the knowledge of how to handle it. The secret of any wood for flooring to make a nice job is to have it in small units. In other words, gum used in 6-inch widths might not prove satisfactory, but if it is put into units of half that size, 3-inch strips or 2½ or 2¼-inch face, will give good service, but it requires more care in putting it down than in yellow pine, because it splits and chins off if one is not careful in nailing, especially near the end."

"I protest that Mosby is getting more than his share of glory, so I want the next question," said Lefty, "especially since I've got a borrowed wise saying that I think will fit it exactly, and that is: 'Measure out to every man according to his ability.'"

After this there was silence for quite awhile and finally old Pete Tully, who was nominally acting as chairman of this informal gathering, cleared his throat and said, "Well, what's the matter here? You have been trying to start off all in a bunch and now we seem to be balked. Why don't some of you try to answer the other two questions?"

"I guess we can't," said J. B., after waiting awhile longer and hearing no response from the others.

With this old Pete turned to Uncle Rural and said: "What do you think of that? Is it not a pity we have such a word as can't in the English language?"

"Can't," said Uncle Rural, "is not such a bad word when we understand it right. It is to the mental physical man something like what the limit of vision is to the eye. We can only see a certain distance, some can see farther than others, of course, but the average man can see lots of the world by changing his viewpoint, even if the distance is limited. In other words, the limit keeps the same distance in front of him as he progresses. That's the way it is with mental vision when we tackle a knotty problem. The can't or the limit of capacity, while it is present all the time, keeps moving forward as we make progress, so while we may not be able to remove the word or the limit there is really no need for it, because if we will keep progressing it will continue to push on in front of us and get out of our way.

"As to the last two questions which the boys seem to balk at, one answer with variations will fit both of them, and that answer is to furnish something worth while and create a desire for it, or rather furnish the idea, create the desire and then supply the article. You have heard me speak before of old Deacon Street and his peculiarities, and this thing of creating a desire reminds me of another incident in which he was a prime factor. He had some hogs up fattening them for market and it was his ambition to have them the finest and fattest hogs ever taken to the local market, so he not only fed them well, but bounteously. The hogs would only get so fat, however, then they would mince around and not eat much of the most tempting things he could put before them. Finally this got to worrying him and he began to scratch his head and put on his thinking cap, and by and by he got an idea that made him smile. He had an old brood sow that was one of the most voracious eaters in the country, could never get enough and was always poor. He put this old sow in the pen next to the one where he had the fattening hogs with a draw gate between. Then he would feed his fattening hogs, let the old sow go hungry until the hogs ate what they would and begun to mince around and lose their appetite, when he would raise that draw gate and let the old sow get into the pen where the fattening hogs were, and the way she would go after their food would create a fresh desire on their part for more of it and they would turn to and eat heartily."

At this point Uncle Rural rested awhile with a twinkle in his eye that implied there was something else coming, and Mosby stepped into the pause and said: "I don't just exactly catch the point, Uncle Rural; what's the answer?"

"The answer is, there is nothing serves more to create a desire for things among people than to see other people possessing and enjoying things. In other words, this whets the appetite, and when it is absent the desire wanes until we do not enjoy the best of things. When a man has you building a house for him and goes to finding fault and altering plans from day to day, it is generally due to lack of specific desire, he is simply mincing around and has no appetite for anything and it's up to the carpenter to show him something good about the plans and the work to get him whetted up to the point of enjoying these things so much that he will not be turning aside for other things every day, but will get real enjoyment out of the work as it is being done. It is the desire for things that makes us enjoy them, or as the philosopher puts it, it is not so much the things we have or the things that happen that affect us as it is our opinion of them.

"Now, to apply the same idea to the last question, I might say you can look all around you and see the answer you asked for. Look in the show windows of the stores, the advertising pages of your own trade paper and you will get some idea of how the desire for some things is created and a trade built up. They display things temptingly in the show window, write about and illustrate them in the papers, and even at times employ people to adorn themselves with wearing apparel to create a desire in others for something of the same kind. What most of us need to study in this connection is the art of salesmanship. The average carpenter is no salesman at all, because it don't take salesmanship to sell a man something he wants and comes seeking, but it does take salesmanship to devise something, and then create a want for it, or make a man want and sell his man something he thinks he don't want."

Old Pete Tully looked thoughtful awhile and then said: "I am an old man, but this is a new one on me, and I would like to hear more about it, but I think it will do us good to think for ourselves awhile on the subject of how to study salesmanship before asking further advice. We have got enough now for one mental meal, I think, so the meeting is adjourned."

As the meeting adjourned J. B. scribbled this memorandum: "Good rules work both ways and thereby prove themselves." "As a question precedes an answer, so an answer generally follows every question."

Seasoning Wood

Small pieces of non-resinous wood may be perfectly seasoned by boiling four or five hours. Sash frames of Spanish chestnut have been "wedged up" within six weeks after the tree was felled, and have stood to admiration. The boiling seems to take the sap out of the wood which shrinks one-tenth in the process.

It is also well worth knowing that trees felled while in full leaf, in June or July, and allowed to lie with their tops and lops on until every leaf has fallen, are then very nearly dry, as the leaves will not drop of themselves till they have drawn up and exhausted all the sap in the tree. The time required is from a month to six weeks, according as the weather is dry or moist. Trees so treated will never push again or show leaves, as the stocks of winter-felled timber invariably do if allowed to lie, and thus prove that they have lost that vitality which the latter retain.

The floor of a mill laid with poplar so treated, cut up and put in place less than a month after the leaves fell, has never shown the slightest symptom of shrinkage or other indication of not being perfectly seasoned.—Cabinet Maker.

Don't be afraid of a strict boss. You'll never learn anything from an easy one.

Steel Square

Alfred W. Woods

How to Use the Steel Square

FACTS AND FIGURES ABOUT PITCHES—HOW TO APPLY THE STEEL SQUARE FOR UNUSUAL OR STEEP PITCHES—DEGREES IN CONNECTION WITH SAME AND THEIR RELATION TO ONE ANOTHER

IN the lengths of the rafters taken from 12, 13 and 17 on the tongue to the figures designating the rise on the blade, (see Fig. 55 February number), only three are absolutely without fractions and they are for the common rafters as follows:

12 to 5=13 inches; 12 to 9=15 inches and 12 to 16=20 inches. However, the length of the hip in several cases is so nearly without fractions that we have given them as such.

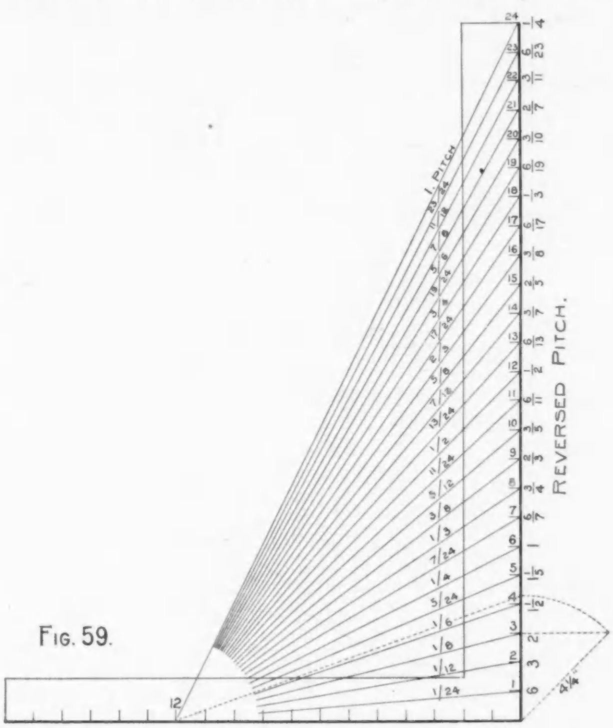


FIG. 59.

The rule 6, 8 and 10, so generally used for squaring up buildings, is the same as the angle taken on the steel square from 12 to 16=20. Of course, any of the other angles could be used for this purpose, but the above being without fractions are easy numbers to remember. The length of the common rafter doubles its run, when it has a rise of 60 degrees, which taken on the steel square is at a little over 20¾ inches rise to the foot. The same occurs of the octagon hip when it has a rise of a little less than 22¾ inches and that for the common hip at nearly 29½ inches rise to the foot.

In the illustration at Fig. 59 we show the pitch lines up to the full pitch, also the reversed pitch. That is, by letting the blade represent the run and the tongue the rise. The length of the pitch lines in that case becomes the length of the rafter for a one-foot rise to the inches in run taken on the blade. The reader will notice that several of the reversed pitches are to be found in the first column, though representing some other pitch, that is, the full pitch becomes the ¼ pitch when reversed. The ¾, same as 1-3. The 2-3 as ⅜. The ½ being at the half-way point between horizontal and perpendicular remains unchanged.

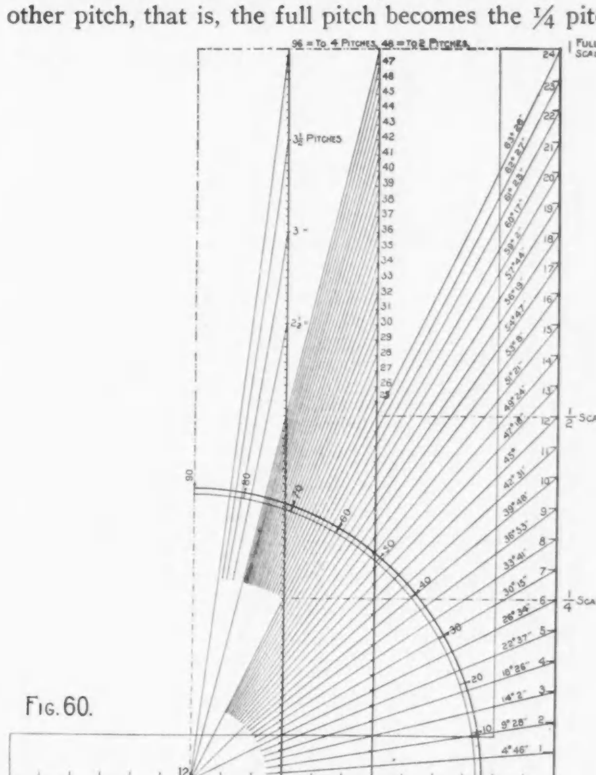


FIG. 60.

From this it will be seen that the low pitches become very steep when reversed. Thus, the 1-24 pitch becomes 6 pitches or has a rise of 12 feet to a one-foot run. The 1-12 pitch has a rise equal to 3 feet to a one-foot run, etc.

For the corresponding lengths of the hip or valley for these pitch lines, add 5-12 to the run of the common rafter which is the same as taking the diagonal of a square, whose sides equal the run as shown by the dotted lines for a 3-inch run, which in this case is equal to 4¼ inches and measure diagonally across to 12 on the tongue will give the length per scale for the hip for each foot in rise of the common rafter. This, of course, reverses the seat and plumb cuts, on the square, and also causes a calculation that can be simplified by always reckoning the run on the tongue of the square regardless of the pitch given the common rafter.

In Fig. 60 is shown how to apply the steel square for steep pitches. In this illustration we show all of the pitch lines up to 96-inch rise to one foot in run, or four full pitches. The pitch lines shown in connection with the steel square, represents the same up to the full pitch. Now leaving the pitch lines as they are and just imagine that we slide the square to the left until the 6-inch mark on the tongue rests at the starting point A and it will be seen that the scale has been reduced one-half; in other words, the pitch lines would intersect the blade at the ½-inch marks, thereby permitting of a 48-inch rise to a one-foot run. The 48 being double 24 (the span) is therefore equal to two full pitches. If it is necessary for a still further reduction, just slide the square again to the left until the 3-inch mark an the tongue rests at the starting point. The pitch lines will then intersect the ¼-inch marks on the blade and permitting of 96 inches rise to one foot in run, or four full pitches. These, of course, are unusual, but the rule that applies to the common pitches, that is, those most generally used necessarily applies to these.

For the corresponding hip or valley for the pitch lines above the full pitch, use 8½ on the tongue for the ½ scale and 4¼ for the ¼ scale. It will be seen that by the reduction in the scale, taken on the tongue of the square, permits of many pitch lines on the blade, thereby increasing the rise to any desired height.

In this illustration we give the degree and minutes of pitch for the common rafter up to the full pitch. To find the same for the reversed pitch lines, it is only necessary to subtract the degrees here given from 90 degrees. Thus—to find the degrees for the full pitch when reversed, subtract 63° 26″ from 90°. To do this it must be remembered that it is necessary to borrow one degree from ninety and that one degree is equal to 60″ and should be expressed thus, 89° 60″—63° 26″=26° 34″, which will be seen is the same as that for a 6-inch rise or the ¼ pitch. (Also see Fig. 59.) By referring to the degree scale in Fig. 60, the degree of the other pitch lines can be very nearly arrived at by scale as shown by the quadrant.

We trust we have made it clear that by using the tongue of the square to represent the run, instead of the blade as is the custom of most other writers, permits of the pitch lines up to the full pitch. Then again the blade being longer than the tongue gives a greater range of angles without reduction from the full scale to obtain the side cuts of the jacks and hips, which with this system are always on the blade, thereby helping to more readily fix on the mind the different cuts and where they belong on the steel square.

A Modern Church

PERSPECTIVE AND PLANS SHOWING THE INTERIOR ARRANGEMENT—MATERIALS USED IN CONSTRUCTING THE SAME—ADVANTAGES OF THE ARRANGEMENT

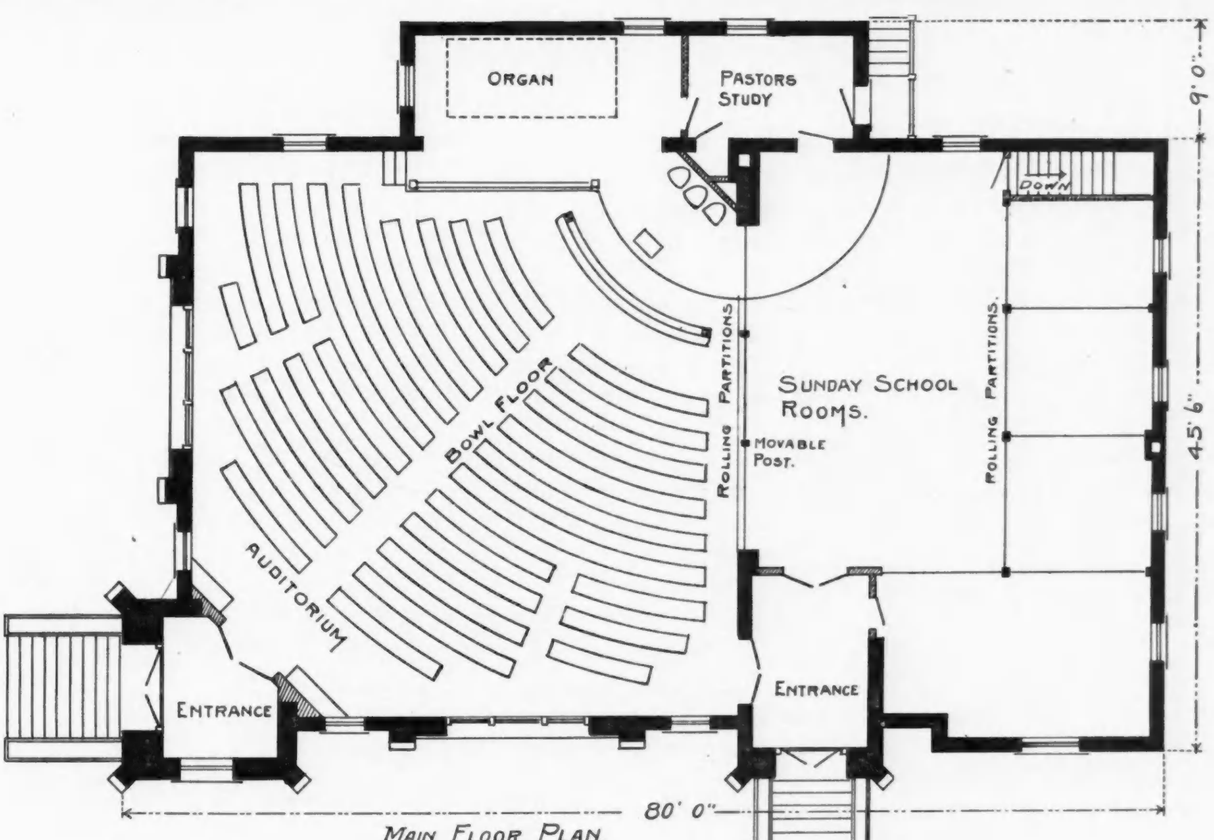
THE church shown on page 33 is a design of a Methodist Episcopal Church, at Auburn, Nebraska, erected after plans and specifications prepared by Mr. A. W. Woods. It is built of common brick, faced with chocolate colored pressed brick, and trimmed with native standstone with which that section of the country is greatly favored. The roof is of wood shingles and the cornice of galvanized iron. Large art glass windows open into the main auditorium, giving the same plenty of light and otherwise making a cheery room. The main entrance is through the tower, which is at the opposite corner from the pulpit. With this arrangement the speaker has his audience directly in front of him, which is a point that should not be overlooked. On special occasions the Sunday School room can be used in connection with the main room and the speaker taking his stand a few feet to the left, will be in full view of the whole audience. The auditorium floor is bowl shaped and will seat two hundred and seventy in the pews, and by using the Sunday School room, in connection with the same, will easily seat that many more. The Sunday School room is divided into class rooms by means of rolling partitions, while in the rear is located the choir and pastor's study.

The interior finish is of oak as well as the pews and other furniture. It is lighted with electricity and furnished with other modern conveniences.

The basement is finished off with an assembly room dining room and kitchen, besides the usual furnace and fuel rooms. The exterior presents a pleasant appearance and one that its erectors may be well proud of. The total cost of this building was less than twelve thousand dollars.

Highest Regard for Magazine

I have the highest regard for your paper and its management.—Ephraim Breitmeier, Bippus, Ind.



MAIN FLOOR PLAN.

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

WITH this number, we will start a consideration of double hung sash frames in brick walls.

Plate XXV. illustrates a well constructed frame in a thirteen-inch wall; the window finishing with an arch on the outside and a square head on the inside.

Fig. 111. is a section through the window head at the center line. The opening is spanned on the outside by a segmental arch "B," of face brick, rubbed to the required shape and laid on a temporary wood center. This center should not be "struck" until the mortar has thoroughly set.

The inner eight inches is spanned by a permanent wood center "C," usually constructed of two-inch spruce and made of sufficient length to give a bearing of four inches on the wall on each side of the window opening. On top of this center, a two-rowlock relieving arch "A," is turned.

The wall is furred on the inside as indicated at "E," and is then lathed and plastered; grounds being set as shown.

This furring of late is frequently omitted and the plaster applied on the brick wall itself, after it has been made impervious to water by a heavy coat of one of the many waterproof paints now on the market. This paint prevents the dampness, which penetrates the wall, from discoloring the plaster work.

Fig. 112 is a section through the jamb of the window. The space marked "G" in this and other sections should be well filled with scratch mortar or in better work, should be hand caulked with oakum, to keep out the air. The joint of the window frame with the brickwork is covered with a moulded staff bead as shown. This staff bead should be moulded so as to form a shadow line between the mould and the brickwork. This shadow line hides the uneveness of the brickwork.

Fig. 113 is a section through the sill of the window. The stone sill should be of a thickness that will properly lay up with the brickwork. It is usually as thick as two courses of brickwork and should be formed with a wash and with lugs to receive the brick jambs of the opening. When it projects beyond the face of the wall, it should have an undercut for water drip.

A two by four-inch joist, "K," is set on the inner face of the wall for a railing for the furring, "E." The trim, instead of running to the floor, is shown finishing on a moulded stool, "I," with an apron, "J," underneath. The wooden sill should lap well over the stone sill.

Fig. 114 is an exterior elevation of the window. The piece "D," is put in as a finish to cover the wood center "C." At "H," is shown a section through the sash bars.

Plate XXVI. illustrates a similar window in a brick opening spanned on the outside with a flat arch.

Fig. 115 is a section through the head and shows the inner section of the opening spanned with iron beams for the support of the floor joists which bear directly over the opening. These iron beams are necessary when there is not sufficient space between the window head and the under side of the floor joists, to turn a brick relieving arch on top of a timber lintel.

A piece of two by four stuff is bolted to the web of the inner iron beam as shown, to secure a nailing for the furring.

A two and one-half-inch by a three and one-half-inch angle iron is shown under the face arch, and is provided so as to prevent any settlement of the arch. Without some support of this kind, flat arches are very likely to sag in the center, causing a very unsightly appearance.

Fig. 116 is a section through the jamb.

Fig. 117 is a section through the sill. It shows the trim running to the floor and the space under window finished with a panel back.

Fig. 118 is an exterior elevation of the window.

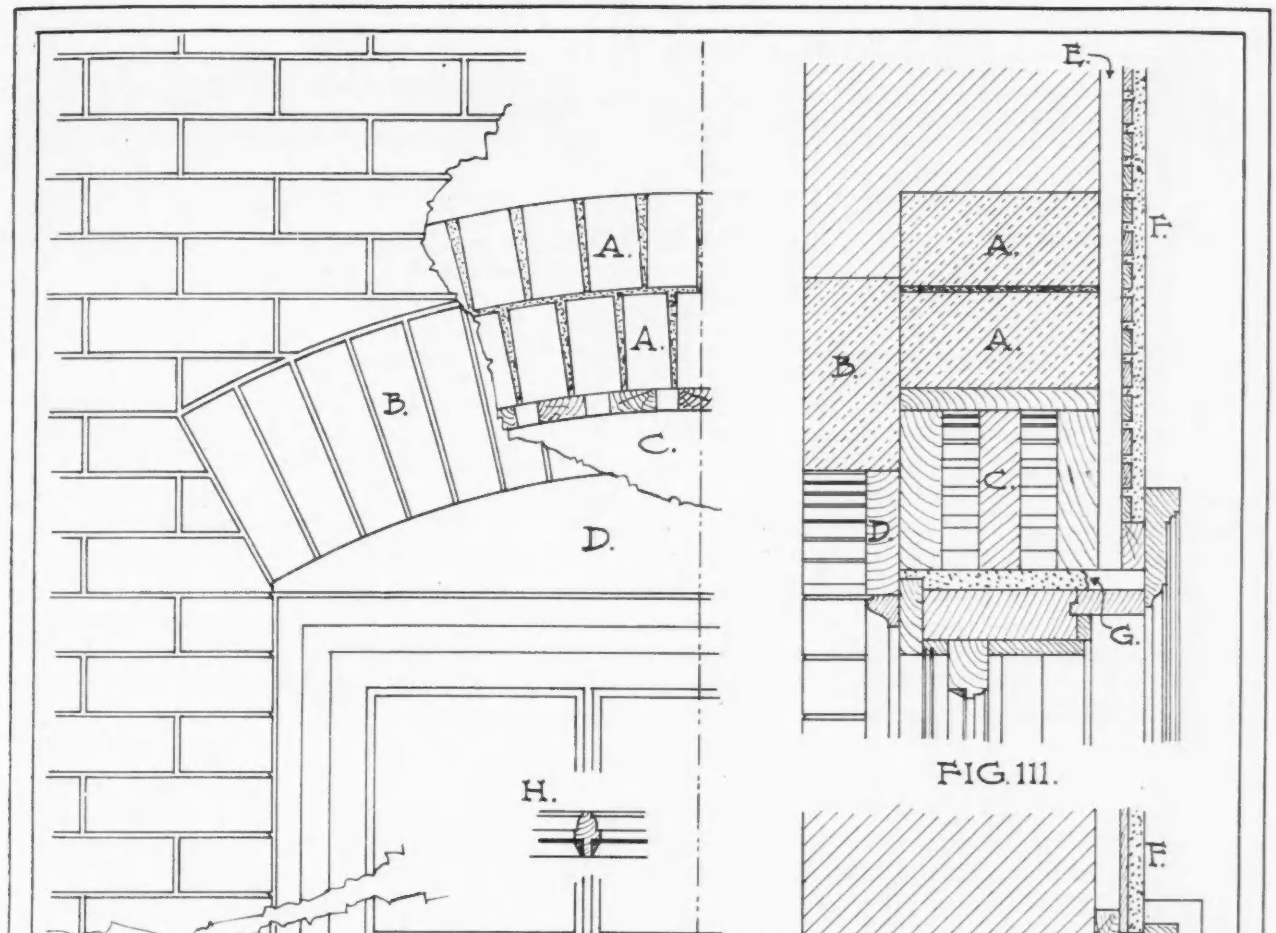
A Great Help to Him

I cannot get along without your magazine as it has been a great help to me.—David H. Still, Orion, Mich.

Needs It in His Business

I need your magazine in my business, it is by far the best in its class.—H. M. Needham, Sandwich, Ill.

A workman that can hold his temper can hold much else that is worth while.


E.
A.
A.
B.
C.
D.
F.
G.
FIG. 111.
F.
G.
FIG. 112.
I.
G.
K.
J.
F.
E.
FIG. 113.
A.
A.
B.
C.
D.
H.
SASH.
SILL.
FIG. 114.
PLATE XXV.
WINDOWS.

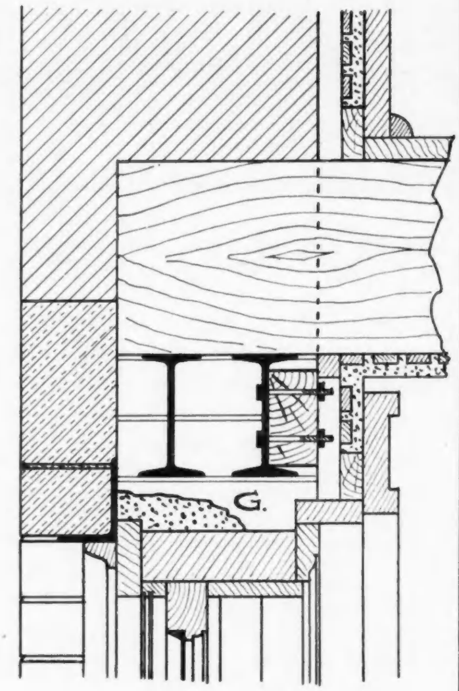


FIG. 115.

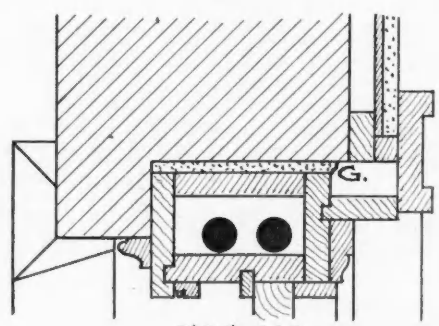


FIG. 116.

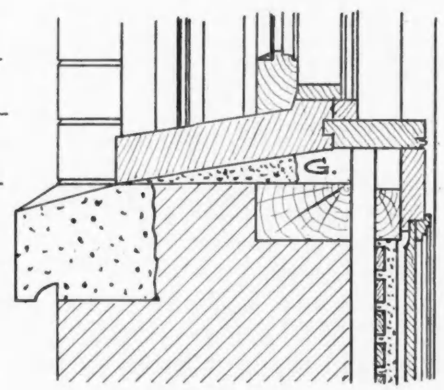


FIG. 117.

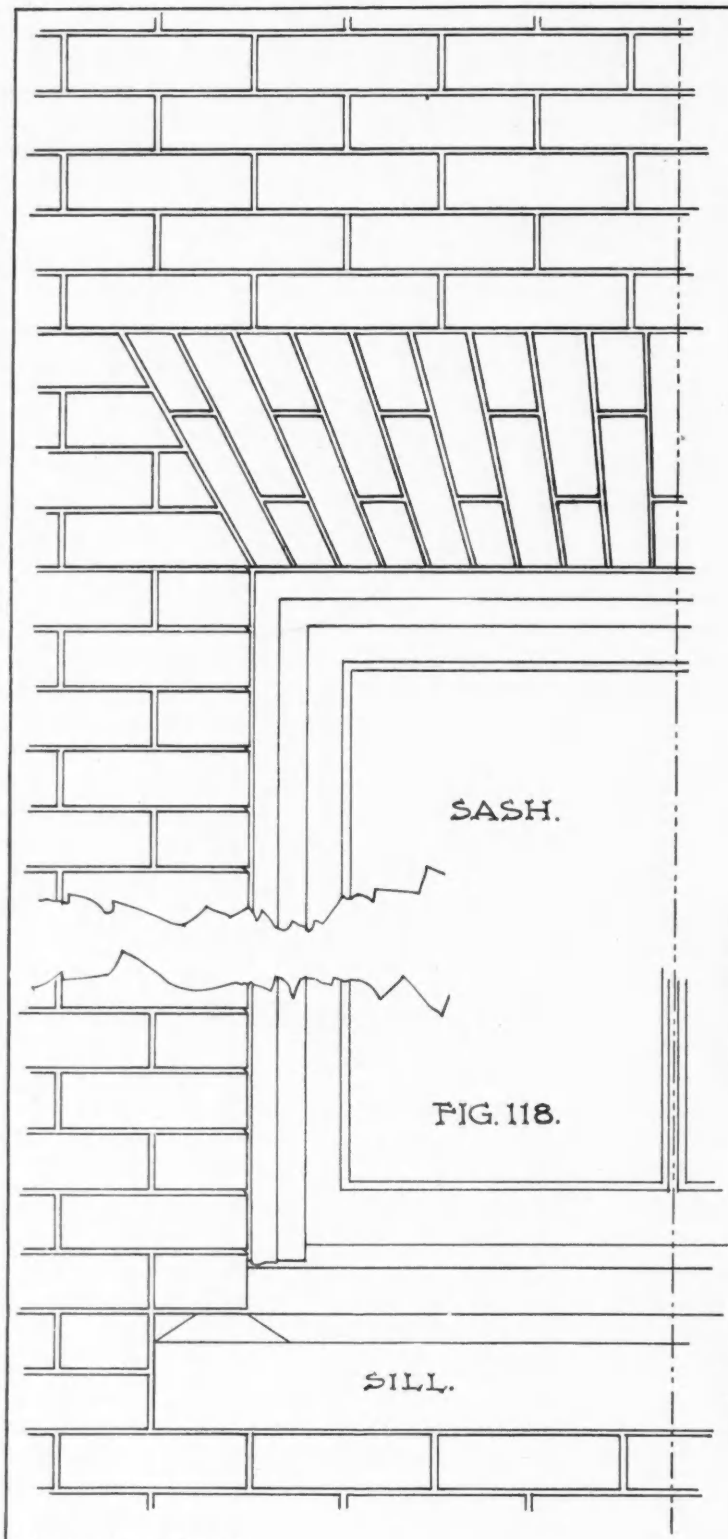
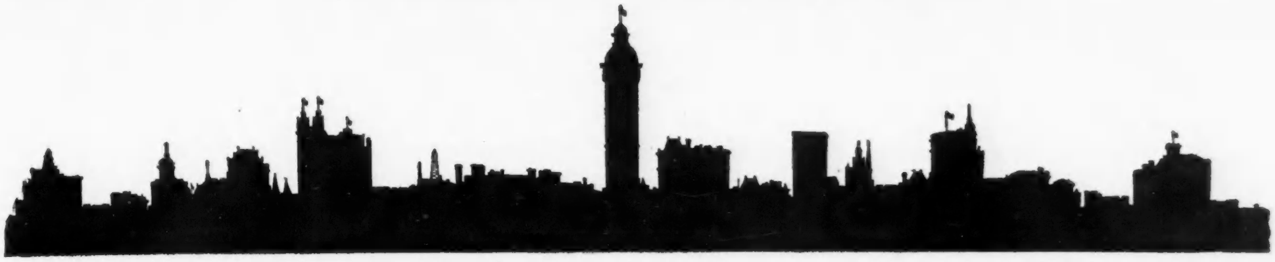


FIG. 118.

PLATE XXVI.

WINDOWS.



A Forty-Story Skyscraper

TALLEST BUILDING IN THE WORLD SOON TO BE BUILT IN NEW YORK—WILL TOWER ABOVE THE REST OF THE MAMMOTH STRUCTURES—GREAT FEAT OF MODERN BUILDING CONSTRUCTION

By J. A. F. Cardiff

TOWERING far above the highest of those magnificent skyscrapers that combine to make New York's skyline famous the world over, we will soon see the new Singer Building, the home of the Singer sewing machine and the latest wonder of architectural engineering.

The structure will be built at the northwest corner of Broadway and Liberty street, and will rise to a height of 593 feet above the street.

It has been the aim of the Singer Company to have the tallest building in the world, and it was with this object in view that the architect, Mr. Ernest Flagg, prepared the plans; naming forty stories as the greatest height to which he could carry the structure with safety.

Comparing it with other skyscrapers, it is nearly two-thirds as high again as the Park Row Building, which is the tallest building in New York today; containing twenty-nine stories and extending to a height of 382 feet above the street. This building is conspicuous in the cut above by the two domes which surmount it. The highest point of the Cathedral of Cologne is 515 feet.

Numerous other structures that will materially change the present skyline, are also under way, or contemplated, in the immediate vicinity, but although most of them are larger buildings, not one of them is as high as the Singer Building. The two tallest are respectively twenty-eight and twenty-nine stories.

The structure is an L-shaped annex to the present Singer Building and faces 74 feet on Broadway and 52 feet on Liberty street. The foundation will be of reinforced concrete construction, supported on reinforced concrete piles, and the superstructure will be made as light in weight as is possible, consistent with the required strength. The exterior will be of pressed brick, trimmed with limestone.

Perhaps the greatest of the many difficulties with which the architect had to contend, was the elements. A building of this height, standing alone, must be well braced to withstand the onslaught of the terrific gales that frequently pass over the city. The oscillation must be reduced to a minimum. This is accomplished by means of an elaborate system of wind braces or large triangular sheets of steel which are placed in the angle formed by the intersection of each girder with the steel columns and which are securely riveted to both girders and columns, forming a thoroughly rigid mass that will resist any wind pressure.

The plans are now completed and in the hands of the building department, and it is expected that within two years Old Glory will be majestically floating from the flagstaff surmounting the tower.

The Trinity Building as a Firestop

A rear view of the new Trinity Building in New York City shows an area of Mississipi wire glass windows seldom equaled. Such structures as these, says Perez M. Stewart, writing in the Insurance Press, when properly protected against exposure attack have a large public value. They stand as great barriers against the progress of sweeping conflagrations, protecting not only themselves but all structures to the windward. They are distinct additions to the welfare of the community. Had such forethought marked the design of great structures in Baltimore a very different story would be told. Not many years ago a fire occurred in New York which taught lessons. A clothing store next to the Home Life Building took fire and spread to the latter. The fire was checked by the blank fire proof wall on the south side of the high building. Two points were brought into view: the value of fire proof walls in checking conflagrations and the necessity for inclosing tall buildings on all sides by such walls, for had the Home Life been provided with suitable window protection on the north it would have performed a valuable service as a fire stop and would itself have escaped destruction. These lessons were well taken by the designer of the Trinity Building.

It Is It

I think that your magazine can spell its name with just two letters. It is IT.—Frank H. Petrie, Greenview, Ill.

If you don't make the experience you gain in this world worth more than the cost, you are not profiting by your lessons.

Hollow Concrete Block Construction

SHAPES AND SIZES WHICH ARE MOST ADAPTABLE FOR BUILDING PURPOSES—ROCK FACED BLOCK MOST POPULAR—CONSTRUCTING CHIMNEYS OF CONCRETE BLOCKS

By Harmon S. Palmer

THE best machines of the day for making hollow concrete blocks are geometrically correct when they leave the factory, and if the architect would study the combinations and designs which constitute the essential elements of a good machine he would be surprised at the great variety of buildings as well as the great variety of effects which he could construct from their product and the immense help which a good machine could do for him, as well as the great saving of money for his client.

The best machine is the one on which the greatest labor has been bestowed with reference to designs and combinations. Some investment companies have already discovered this fact and are reaping the benefits by purchasing their own machines and building from standard plans, which are now quite freely advertised by architects who make it a point to plan from the machine; by so doing, material men are safe in making up a large stock of blocks, which in turn have plenty of time to harden and get their permanent color, reducing breakage and clipping while carting, as well as being less absorbent when first put into a building. There is no doubt that the quality of a block and its value increases for at least one year, much more than the interest on the original investment.

It is at this point that the study of the machine begins, for upon this depends the sale of product and adaptability to general construction is of paramount importance. It is evident that very many dealers in lumber are now seeking information on this point for the purpose of adding this new material to that of their yards, and a few hints in this regard may not be out of place.

It is not the largest number of sizes and shapes that should be desired, but the least number that will enter into the largest number of combinations; in this respect differing but little from stock sizes in lumber. While this might run twelve, fourteen, sixteen and eighteen feet in length, six, eight, ten and twelve inches in width, the blocks should be of four, eight, sixteen, twenty-four and thirty-two inches in length, and in thickness eight, ten, twelve and perhaps sixteen inches, while in height most of them should be nine inches, a full block, and others half of this height. It will be noticed, as previously stated, that the number of lengths given is only five, to which should be added the return corner block and the joist block, and this number is only seven, yet any length of wall, any distance between windows and doors, can be made from these standard sizes within the limit of four inches without cutting a single block, but notice the shape of ends of hollow blocks. The most useful are those which have a vertical recess in which the casing of the wooden frame is held, setting back so as to exclude wind, cold and moisture; but, in addition to this, should a length of wall have to be adjusted, this recess, which is usually one inch deep, makes a line of cleavage, so that the mason with a pitching tool can cut off one inch by this means without danger of cracking the block, as would be the case should he try to cut it back of the partition; thus, when it becomes necessary to shorten the wall the flanges are easily knocked off from one end or both, as the case may be; thus it will be observed that the ends of blocks in regard to shape are of much importance when they are on the scaffold. The shorter lengths also require the same shape of ends for the same reason. Sometimes it is desirable, on account of color or other defect, to lay the blocks with the other side up, or end for end, in which case either end will fit the frames and produce that desirable overlap or broken joint, without resort to *rights* and *lefts,* as would be the case with any other shape, so that the advantage over straight ends or those without means to hold the frames are not to be overlooked in making merchantable blocks. The shape and locations of the cavities are also very important. The proportion of the different sizes which a dealer should carry cannot be definitely stated, but it is safe to figure that for every one hundred full blocks there should be twelve corners, twenty halves, ten quarters and ten three-quarters, while four of the eighths would in all probability be sufficient. In an ordinary two-story house one hundred blocks for the joists would be sufficient, so that a person can start a yard of these blocks with absolutely no risk, not even fire, the value of which will increase rapidly with age, which cannot be said of lumber; but the question of proper shape and standard length is of vital importance, and even more so than lumber, which can be cut to one length as well as another.

Making Chimney Blocks

In regard to the question of chimney blocks, the dealer or manufacturer need not at this time take into consideration. While this material and the hollow block is the equal of hard burnt brick for chimney purposes, the diversity of building plans makes it difficult to keep in stock the various shapes and sizes likely to be called for, and the method usually followed is to employ brick for the three inner sides of the chimney, using the outside wall of blocks for the other side; when it is realized that to build the chimney of hollow blocks of wider dimensions than the walls the matter of proper bonding becomes an important question, and to the beginner is quite serious in some cases, so that the above method is recommended. As all chimneys should be started from the foundation, the footing should be of proper dimensions, and the brick carried up with the wall by cutting out the block so as to insert a brick lengthwise and make a bond at least every two courses of blocks. By so doing, chimneys of any size are easily carried up with the walls, and as four courses of bricks will equal one course of standard blocks, the levels are the same and bond easily made by inserting a brick one-half in the space cut out of the block and the other half running out into the brick work. Of course, where stone is to be made according to plans without regard to standard of measurements, the machine must be adjusted for chimney blocks as to size and shape and proper cores for flues. It is not that the brick is better, but the simplicity of construction is the reason for this recommendation.

Blocks for the Market

To those desiring to manufacture blocks to keep in stock for sale with lumber and other building material, the foregoing instruction will be of great benefit if followed, and no remnants or loss from improper dimensions need be feared.

It might be asked at this point what style of face should be given to the block in order to be sure that they will always have a marketable value. The question is hard to answer definitely, because of the diversity of taste and opinion, and because of individual interest dictating to the public the style of face and method of making the same, which, in most cases, favors some particular machine or mold. Without casting any reflections upon the sincerity of various makers of machines, this question is of grave importance, and while it will expand and develop, at present we must accept the simpler design and those best adapted to the usual sizes of blocks. Much has been written and said about the prevailing rock face, and while many have condemned the imitation, none have offered a substitute which has found favor in the eyes of the public. The first six houses were smooth face, with different designs for joints; some beveled, some paneled, others drafted margin, while one was pitched face and one bush hammered; but not one of these could please the eye of an architect or enlist the admiration of the layman, and more than once the hollow block seemed doomed because of its unfavorable appearance. It was only after the first rock face house was completed that the industry was on its feet. Why this was so it is hard to tell, but the fact remains that for several years afterwards nothing else was used and all houses seemed to give satisfaction, and the rock face was closely imitated. The writer realizes what was the principal difficulty, but space in this article forbids a full discussion, and it will be taken up at some other time; but without going into details would say, for the present, and for standard blocks to keep in stock, stick to the old rock face design, except some specials which could be used as belting courses, gables, water-tables, etc.

In making rock face blocks it is not necessary to have much projection to the rock portion, but rather shallow and of small pitchings; these should be sharp and well defined, and if possible of a wavey nature. The machine should have at least five different designs of these plates and used consecutively from day to day, and the blocks intermingled, which, with the occasional changing of stone upside-down when the wall is laid, will destroy that monotony so frequently referred to. This, in connection with ornamental belting, smooth or corrugated courses above and below the windows, ornamental gables and panels between the upper and lower windows, sometimes continuing around the entire structure, will produce houses of most pleasing effect. Rock face plates for the machine should always be taken from the natural stone, and too much pains cannot be taken in the selection, and also in taking the cast, so that the fine grain of the stone and the sharp lines of cleaveage are retained in the iron casting.

While we may look with longing eyes for improvements in designs of face plates and building plans which will come in time, and is desirable, it is safe to lay in a stock of the common rock face blocks according to above dimensions, which will find their way, in connection with a small percentage of the ornamental, into enough city and country homes to exhaust the output of any conservative and properly located plant.

It will be understood that the foregoing remarks refer to those who are contemplating the manufacture for the open market and those who wish to be on the safe side without a lot of unsalable blocks which have been made for some special plan.

Before going into details of the much more intricate method of working from finished plans, necessitating illustrations as to adjustments and the proper co-operation of machines which must make the material called for, it is perhaps advisable to take up the manufacture of the stone itself. Let it not be supposed that because we are through with the first principles of hollow block construction that acceptable stone of perfect quality will always come to the building, although its lengths and shape may be correct, therefore some of the following articles will be on this subject.

Looks Forward to It

I think your magazine is the best out, and I look forward to its coming each month with much interest. —F. W. Radford, Bloomington, Ill.

A Pleased Subscriber

I am very much pleased with the magazine and every carpenter should be a subscriber.—H. Walcott, Muskegon, Mich.

CEMENT BUILDING CONSTRUCTION

FRED W. HAGLOCH

Artificial Stone and Concrete Finishing

VARIOUS METHODS OF FINISHING THE SURFACE OF CONCRETE BLOCKS—RELATIVE VALUE OF EACH AND HOW FAR SUCCESSFUL—COLORS THAT CAN SAFELY BE USED

IN finishing the surface of cement products we have three distinct classes or types, namely: molded or cast, broken, and mechanical. The molded surface is that produced by the use of molds, and may be plain, rock face or ornamental. Broken finish is that of breaking the stone to produce a natural rock face. Mechanical finish is the finishing of surface after the stone has been made and covers all types possible (except rock face) to produce with any material, such as, troweled, carved, polished and enameled. The mechanical finish is always the most expensive and the molded the cheapest, while the broken rock face finish is made by breaking the stone after the cement has set but not yet hardened. It is the only method by which natural rock face stone can be imitated, but concrete being a superior building material to natural stone I am not heartily in favor of this style, besides it makes more porous surface than any other method.

The mechanical finish, while requiring skill, is practically unlimited in its scope. By this method, natural granite and marble are surpassed in both finish and durability, but, as previously stated, it requires skill and the skilled workmen for this work are rare, and only years of patient experience will produce a sufficient number to place concrete-granite and concrete marble on a larger basis than our natural quarry products.

In mechanical finish our product must contain the proper material for its particular surface, for example: trowel finishes can only be successfully made on concrete surfaces containing sufficient cement, water and fine sand to form a smooth surface, while highly polished surfaces are governed by the nature of the sand and aggregates. In marble polishing we have two distinct methods: one by molding and mechanically finishing at various stages as the cement hardens, and polished finish by heavy pressure have made little progress in concrete owing to the immense amount of pressure required, although this method has been successful when salt is used to excess and the many medical tablets with polished surfaces are plain forerunners of the possibility of polishing concrete by pressure, and one example of artificial marble floor tile made in this manner has been fairly successful.

Trowel finishing is almost entirely confined to monolithic floors and walls, and while it is impossible to produce a high polish with the trowel alone it produces so dense a surface that a small amount of mechanical polishing producing a very high polished effect, which has proven very satisfactory in marbleizing interior walls, of which the Wabash station, Pittsburg, Pa., is among the best examples in America.

It is by the trowel and polishing method that any desired coloring matter may be mingled and the most pleasing clouded or veined surfaces imaginable obtained.

The varieties in this branch of concrete and artificial stone are far too vast for any one mind to grasp it all, besides the improvements and discoveries added almost daily, make it impossible for me to give all formulas and processes in detail; but subscribers desiring to learn how to produce any one particular finished stone, marble or granite, will be answered to the best of my ability, which would no doubt be subject to criticism by those making this particular branch a specialty, besides what may be considered best today will be entirely discarded a few months hence. We are, however, sufficiently advanced to assert that a better, finer artificial marble or granite can be produced at about half the cost of finishing natural quarry products. By carefully calculating, I am satisfied that a mausoleum built of Westerly granite and finished on the interior with polished Vermont marble at a total cost of $8,000, can be duplicated in artificial goods at $3,800, besides prove more durable.

For those readers who may desire to become more familiar with this industry, we give the following instructions:

Mix one part of red oxide of iron, one part ultra marine blue to thirty-five parts Portland cement and sixty-three parts fine crushed grey granite, add sufficient salt water to enable pouring and fill a glass cylinder (fruit jar), tamp carefully until the mass is free from air, keep damp for at least 48 hours, when the glass is removed by breaking, and the stone rolled on a plate glass surface upon which a thin liquid, made of one part potash, four parts ultra marine blue, thirty-five parts cement and sixty parts water. This will fill all crevices. The roll is then placed in a lathe and revolved at a speed of 400 revolutions per minute, and a felt or cloth saturated with a solution of oxalic acid and water is held against its surface for a period of twenty minutes. The heat caused by the speed and acid will produce a high reflecting polish. Some cements require more time than others, but by careful observation the operator will soon learn the needs of his material, as it is sometimes best to allow the composition to become a week old before polishing, besides some compositions require more polishing.

As previously stated, the variety of color and grain of materials is too large to be enumerated here, but the following color materials can be relied upon: excelsior carbon black, manganese black, ultra marine blue, oxide of iron red, Marseilles green. Ochres should not be used in the body of concrete, but may be added to the surface.

Concrete and artificial stone, when made of fine materials (cement, sand or fine crushed stone), can be carved readily when partially hardened; same being kept under damp burlap while not being carved. In this way fine relief carving can be produced at less than half the cost of natural stone and men skilled in cut stone can in a few days learn to do the work.

Enameling concrete surfaces is accomplished by chemical compositions poured or pressed on the surfaces of stone after same has become hard, but the most recent developments lead us to believe that where such composition is added before the concrete has hardened, a better union of the materials is possible.

However, we know of none that has proved a commercial success, although some splendid specimens have been produced.

Reinforced Concrete Bridges

To the Editor: Alma, Mo.

In making concrete bridges of eight-foot span, of what thickness would you advise to make the butments and of the arch? These bridges are to be on public highways. Would it be necessary to reinforce bridges of this size and nature? If so what would be the best to use for same? What will be the cost of concrete per cubic foot if cement costs \$1.70 per barrel, sand \$1.10 per yard and stone \$1.75 per yard? H. C. HARTMAN.

Answer: The accompanying illustration shows a simple method of building reinforced concrete bridges up to a span of thirty feet. The dimensions of butments being two feet wider than the driveway and the thickness about as follows:

Six to ten-foot span, two feet.

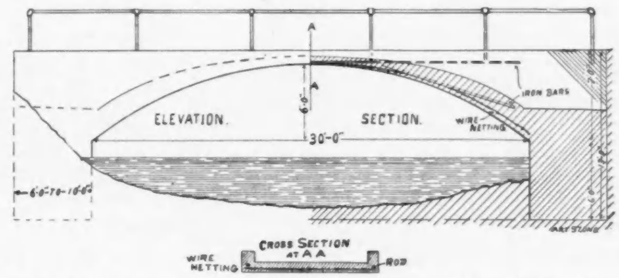
Twelve to thirteen-foot span, four feet.

Eighteen to twenty-four-foot span, six feet.

Twenty-six to thirty-seven-foot span, eight feet.

But the height of the butments has much influence on these dimensions, those quoted being twelve feet or less in height. The reinforcing being in the span only and consists of two mild steel rods from one to one and one-half inches in diameter placed near each side and wired to a heavy wire netting as shown in the cross section, to increase the strength and increase the number of rods.

The concrete is the lightest at the center A A, and should be at least double this thickness near



the abutments. By placing the steel and netting within two or three inches of the lower side of the arch the following thicknesses at A, A, will withstand heavy public traffic: Six-foot span, five inches; eight-foot span, six inches; ten-foot span, eight inches; twelve-foot span, nine inches; thirteen-foot span, ten inches; twenty-foot span, twelve inches.

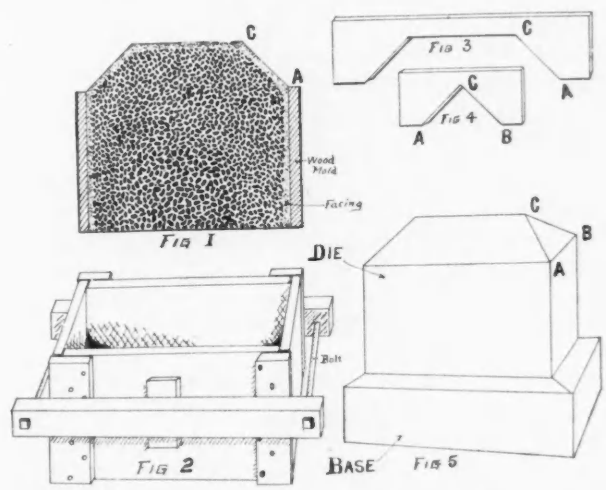
Making a Concrete Monument

To the Editor: Kithrell, N. C.

Will you please tell me how is the best way to make a concrete monument? V. V. HESTER.

Answer: In building a concrete monument it is best to make same solid, and by filling same with large boulders it is cheaper, as hollow spaces are difficult to form. Solid blocks, however, require more time to harden (cure).

Concrete monuments should be covered with



burlap and kept moist for eight to ten days. The following is a simple method and will be found practical. Artificial stone can be made to imitate granite, marble and sand stone so closely that it will require the skilled eye to ascertain that it is not a natural product. In the accompanying illustration we show a simple method for moulding a plain monument, the die being the main block upon which lettering is placed. Figs. 3 and 4 are formers made of wood with which the apex top is made and the various angles indicated by letters E, B, and C, on the formers correspond with the same angles as shown in the monument. These monuments are usually made of coarse concrete and faced with crushed granite and cement at a proportion of three to one. If a hammered or tool finish is desired, the same is done with a fiber brush shortly after removing the mould, some practice being necessary to be able to imitate the granite cutter's ax. A polish surface is best obtained by the use of chemicals. Artificial monuments differ from the natural product in that they absorb less water and therefore do not discolor. Such monuments have been erected in Germany since 1873, and in the United States since 1876, but no satisfactory results were reached in this country until 1892.

Laying Cement Floors

To the Editor: Wolford, N. D.

I wish you would answer in your magazine the following in estimating amount for cubic feet or cubic yards. How many pounds of cement are required to lay 100 cubic feet of work, like cellar or basement floors, walks, etc.? We lay here altogether by the cost. F. R. MARRS.

Answer: One cubic yard sharp sand, two cubic yards of gravel and two barrels portland cement will make two and one-half yards of loose mixed concrete or two yards of tamped concrete such as is used for the body of floors and walks. One cubic yard sand and four barrels of cement will make thirty cubic feet of top dressing, or wearing surface. The body concrete should not be less than three inches thick for walks and the top dressing at least one-half an inch thick. A cubic yard of sand weighs about 2,400 pounds; a cubic yard of gravel about 2,200 pounds and a barrel of portland cement contains about three and three-fourths cubic feet and weighs 380 pounds.

Kinds of Blocks to Use

To the Editor: Le Roy, Minn.

I wish you would advise as to what size of cement block to use for a house 30 by 30 and 18 feet high, basement of cement block seven feet high. Also will a cement block house be dry inside without lathing and plastering same or is there a cement block machine that will make damp proof blocks? M. B. BENSON.

Answer: Walls eight inches thick is sufficient but the foundation ought to be ten inches thick. The face dimensions of a block has little influence on the strength or durability of the wall; the sizes now in vogue are 12 by 24; 9 by 32; 8 by 24; 8 by 16; 6 by 16 and 4 by 16, all of which should allow for a fourth-inch mortar joint, thus a block termed 8 by 24-inch face is seven and three-fourths by twenty-three and three-fourths by actual measure. The damp resisting qualities depend upon many features, such as the materials, the seasoning and the construction of the block, therefore to be safe, waterproof the wall after being erected as some mortar joints might carry dampness. I have made damp-proof walls of hollow concrete blocks, and believe that I can do the same with any kind of block, as the composition, tamping and curing largely control this feature. Remember that the poorest as well as the best building material on the earth is concrete, and that to make sound blocks as a trade is not to be mastered in a few days. I always plaster direct on the blocks and waterproof as per formulas given in past issue of this journal.

Waterproofing a Cellar Wall

To the Editor: Paonia, Colo.

Is it possible to waterproof a cellar which is lined with a ten-inch wall of concrete (proportion one to seven) and plastered over with a coat of cement, through all of which the seep water comes during the summer time, raising about two feet in the cellar, but does not bother during the winter? The water seems to be quite strong with alkali. JAMES SPENCER.

Answer: This is an extreme example of water soakage and ought to be met by waterproofing the exterior of the wall, under the conditions, however, I would recommend the following: Clean the floor and walls on the interior, until free from dirt and loose particles, then let dry or heat until the heavy moisture is removed, as dampness prevents adhesion of the paint, which is made of five parts coal tar, one part liquid shellac and thinned with turpentine until the same is applicable with a flat brush, which must be applied so as to cover every particle of wall and floor, and coat same immediately with a portland cement plaster about one-eighth of an inch thick. The tar paint will discolor the plaster, but same can be coated again after drying. Following the above instructions have always proved successful.

Coloring Plaster

To the Editor: Amityville, N. Y.

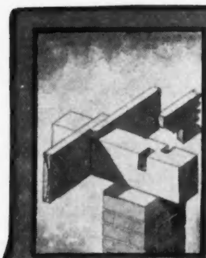
Will you kindly inform us what to use in the coloring of plaster? We have a house to finish in rough tinted sand finish and would like to know whether to use Venetian Red and other expensive colors or if Red Metallic and the like will do the work all right? HOFF BROS.

Answer: In coloring rough cast plaster, it is all done in the last (third) or finishing coat, Venetian red and earthy colors are liable to fade, but metallic oxide and copper as green and excelsior carbon can be relied upon. As colored plaster is darker when wet than after drying, it is best to mix samples and let dry to determine the amount of color required. Different colors of plaster require different amounts of color to produce a certain tint. Therefore exact formula is impossible.

Could Not Be Without It

I could not afford to be without the AMERICAN CARPENTER AND BUILDER if it should cost one dollar a copy.—Wm. J. S. Jones, Rock Island, Ill.

Don't forget that opportunity is a valuable part of your salary. You can get experience in no other way.



Practical Carpentry

Dwight L. Stoddard

Ellipses and How to Form Them

HOW TO FORM A PERFECT ELLIPSE IN THE SIMPLEST WAY—SEVERAL METHODS GIVEN FOR COMPARISON—PRACTICAL APPLICATION OF AN ELLIPSE

WHAT is an ellipse and how to form one is undoubtedly a much larger question than most builders would at first think. While it is a simple matter indeed to lay out an ellipse, many mechanics have different opinions as

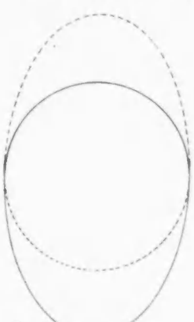


Fig.1

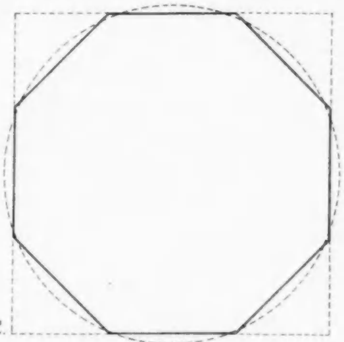


Fig.2.

to what the exact shape of a true ellipse really is, and it seems impossible to get any real authority on the subject. The dictionary says, "An ellipse is an oval," and an oval is the form of an egg or ellipse. It seems to me if that is what an ellipse is, a square might be a circle and a circle a square.

Fig. 1 illustrates what I call an oval (which is the shape of an egg), while the bottom of the oval and dotted line above, is what seems to me to be

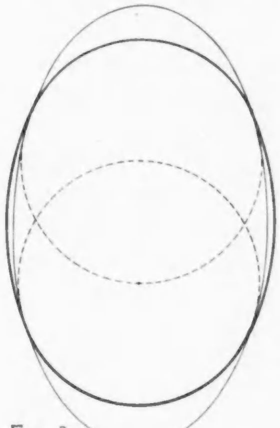


Fig.3.

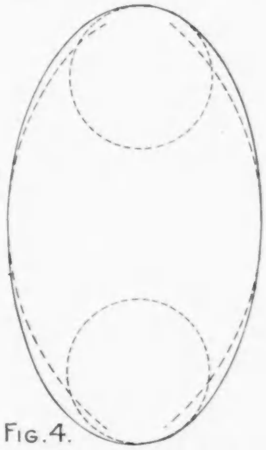


Fig.4.

an ellipse. The ends are apparently small circles blending into large circles at the sides, but as it is a continuous blend there is no part of a true circle in an ellipse.

The top of the oval and the dotted lines below form a true circle, and it seems to me that this illustration shows three complete and separate figures, an oval, ellipse and a circle.

Fig. 2 shows the dotted lines of a square and by simply cutting the corners off and making an octagon makes the figure as near a circle as a square.

Some claim that a true ellipse must be made of parts of circles and give very complicated methods of finding the centers, while others claim that a true ellipse is as illustrated in Fig. 3. This is made by

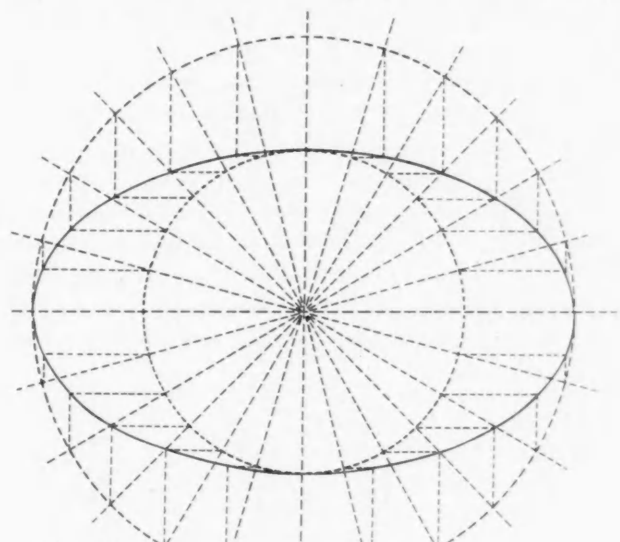


Fig.5.

simply dividing the length into three equal parts, strike the circles at the ends and where they intersect is the center point to strike the circle for the sides. The length being given this method finds its own width and therefore this strong line shows the ellipse thus constructed. Some would argue the light line ellipse was not a true one, while I hold it is, still I am willing to admit that the other is near enough for many practical purposes, and where an ellipse is that near a circle it answers very well for nearly all uses.

The dotted lines in Fig. 4 show where the true circles fall short of the true ellipse.

One claims the only way to form a true ellipse is as shown in Fig. 5. This is made by making a circle of the long axis and another of the short axis, then divide the circles into any number of parts (the more the better), where the lines intersect forms the true ellipse.

While I agree it forms a true ellipse if accurately

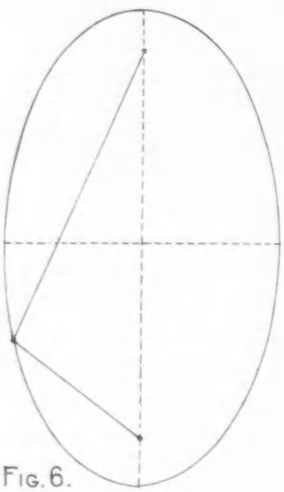


Fig. 6.

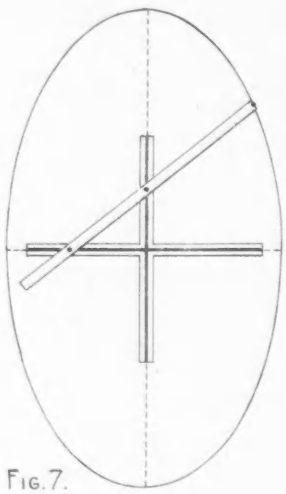


Fig. 7.

drawn, I cannot agree it is the only way, although it seems to me to be one of the most tedious ways. One who forms an ellipse that way and gets a true one must be a skilled mechanic and be very accurate in his measurements to be able to find the intersecting points and also a skilled artist to be able to sketch in the ellipse.

Fig. 6 illustrates another method which is claimed to be the only way by a great many. This is made by simply taking a string the length of the long axis and putting the center of the string at the center or top of the short axis, then bring the ends

Fig. 8.

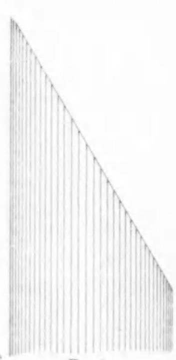


Fig. 9.

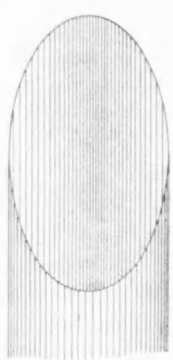


Fig. 10.

down to where they strike the line of the long axis and fasten the ends there and the string then guides a pencil to lay out an ellipse.

Fig. 7 illustrates another method that produces the same ellipse in a much more accurate and mechanical way. It is done by simply taking a stick and putting a pin in it one-half the length and another one-half the width and with the aid of a square or a trammel to guide the pins a true ellipse is drawn with a pencil at the end of the stick as illustrated.

There are many other ways but I consider those given most common.

Elliptical arches are generally just one-half of the top of an elliptical figure and the long way is on the level. Any of these methods would be accurate enough for ordinary work, although at times the figure stands the long way plumb instead of level. It is somewhat that way in putting a pipe through a roof, and in order to make a casing for a pipe it is well to use the most accurate method.

Fig. 8 shows the same ellipse placed perpendicular instead of horizontal.

A perfectly round cylinder or pipe cut square off is of course a perfect circle, but to cut a cylinder off at any degree whatever produces what I consider a true ellipse. It does not matter whether it is near a circle or a good ways from it.

Fig 9 shows a cylinder cut off at an angle of 60 degrees.

Fig. 10 shows the same cylinder and shows what I consider a true ellipse. I have given this subject some thought and have written to some length with the hope that others will express their opinion on the subject. I also hope someday to see our ordinary dictionary give a better definition of what an ellipse really is.

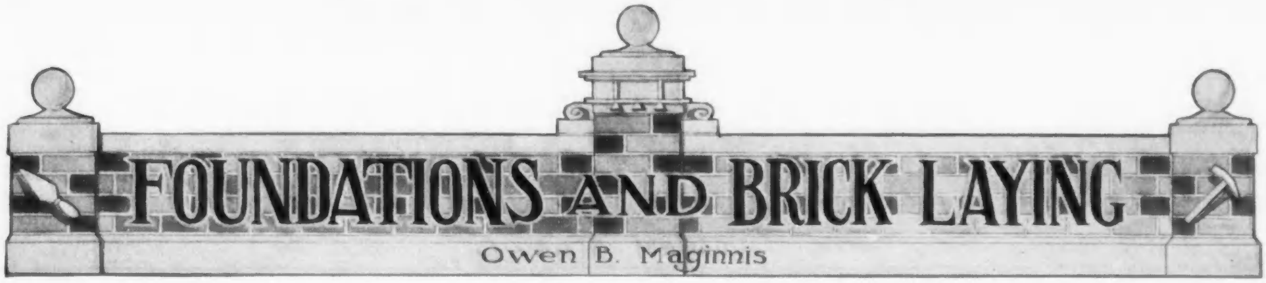
A Novel Amusement Tower

A company has recently been organized for the purpose of putting up at Coney Island, N. Y., an amusement tower 700 feet high to contain at various altitudes a roof garden, hippodrome, dance hall, revolving café, observatory, palm garden, etc. It is to have a diameter of 300 feet and contain 500,000 square feet of floor space. The hippodrome will be 250 feet above the ground, the café and dance hall 300 feet, the palm garden 400 feet, and so on, until the observatory and wireless telegraph station are reached, nearly one-eighth of a mile above the surface of the earth. Ten large electric elevators will lift and lower the crowds, and it is estimated that the tower will have a capacity for all the people who are likely to visit it. The cost is estimated at about $1,000,000. In the top of the structure are to be a Government Weather Bureau and a mammoth searchlight. The entire structure is to be festooned with electric lights.

More Pleased With Every Issue

I am more than pleased with every issue of the American Carpenter and Builder that has been published.—F. H. Hillerby, Williamsfield, Ill.

The man who does not find an element of pleasure in his work is missing something and is making a mistake somewhere.



Constructing Serial or Twin Arches

WHERE THE CENTRES ARE ABOVE OR BELOW THE SPRING LINE—THINGS TO BE GUARDED AGAINST IN CONSTRUCTING THEM—VALUABLE POINTERS GIVEN AS AN AID TO THE WORKMAN

A FEATURE of building construction which may not have come to the notice of our readers, is that of arches which are carried from horizontal lines above or below the centers or spring lines of the curves of the soffits. As this is something not hitherto treated on, and a feature of the very best brick

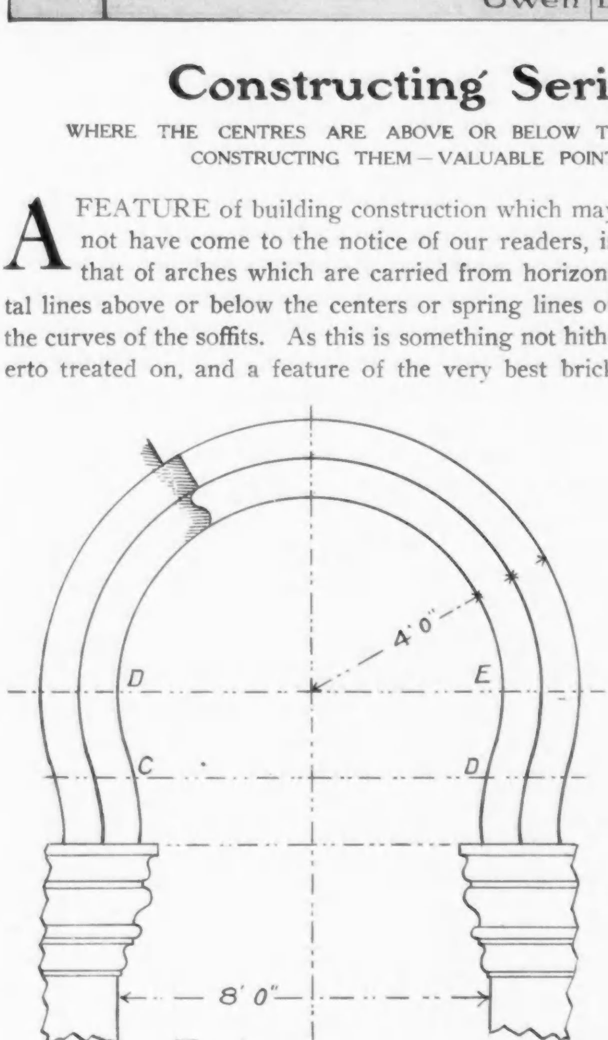


FIG. I.

and masonry work it is well worthy of consideration. Ordinarily the arches used in everyday domestic architecture have their imposts and spring lines on the same horizontal level, but in ecclesiastical or monumental architecture this is not always the case, as may be witnessed in many of our churches and public buildings. As it would be obviously impossible to quote any special examples, or details of same, we will still be able to take up technical and mechanical structure and note their salient points.

At the outset we might state that the best form of this rare feature is that illustrated in the Moorish or Horseshoe arch in Fig. 1 of the attached sketches, and is virtually a semi-circular arch with its soffit curve continued below the spring line to a more or less extent so as to be consistent with safety. Though these Saracenic arches are frequently to be seen in many of the Hebrew and Russian places of worship throughout the world the arches are not always happily designed and frequently the curves are carried either too far, or not far enough below the spring line giving an inharmonious effect, unlike the designs remaining in the Alhambra, Escurial and other exquisite examples of the Moorish builders whose proportions were so symetrical as to be safe and artistic. Statically these arches can be built in either brick, stone or concrete, even at corners, as the thrust on the bearings being directly vertical, all that may be required, will be a full and proper bonding of the constituent materials, but this must be of the best quality lest the arch fracture or become statically unsafe. From an analytical observation of the arch here depicted, readers will see that the centre, if it be not made to the full shape or elevation of the horseshoe, then the bottom reversed curves must either be laid to a templet or of molded bricks, and the centre having been set at the line C-D, turning the arch, or arches to the soffit periphery as represented. Oftentimes masons will prefer to have

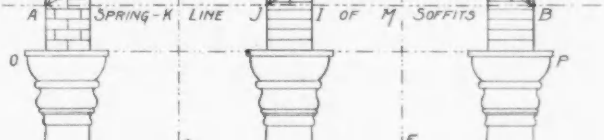


FIG. 2.

the centres set at the line D-E which is the real spring line of the semicircle, though it cannot be properly termed the actual spring line of the arch itself, and it is at this point we come to what might be termed the "Displacement" of centres. It is usual among mechanics to take it for granted that the centres of the arcs or curves is invariably on the spring line either inside the arch or at some point without it, as in the case of a pointed Gothic arch, drop Gothic arch, or any semicircular arch, but this is not always the case as is evidenced not only at Fig. 1 but also at Fig. 2, whereon is represented a pair of twin Gothic arches or, part of a series of Gothics usually found in churches; in which the centres are not on the spring lines but as the top

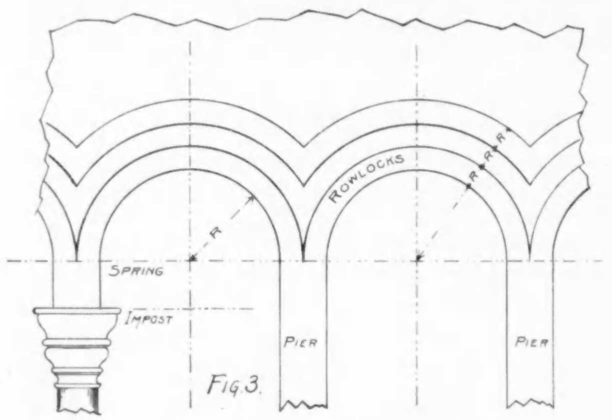


FIG. 3.

of the imposts of the capitals of the columns form the commencement of the arches, this line must be virtually termed the spring line although their is a short section of straight and plumb masonwork before the curves of the soffits on the right and left hands really commence, as they do on the line A-J-I-B, Fig. 2, being struck from the centres at the points A-J-I and B. The reason for this divergence from the ordinary method of laying out is, the desire of the architect to gain an apparent greater height to the eye and increase the gracefulness of the arches. As there is no limit to the artistic value which they are always endeavoring to instill into their designs it behooves the practical mechanics to follow their plans and details strictly to the letter, and figure without deviation, or changing of any measurements lest the work be carried out erroneously and the same be condemned by the architects in charge and the certificates for payments likely held up. Therefore it would be well for all interested in this, the most important part of building construction, to con over and peruse their plans and specifications, by comparing them most minutely, lest there be room for a possible error. I need scarcely remind readers that this is best done in the privacy of the home in a lonely, quiet and silent room, far away from any possibility of annoyance or disturbance, so that the facts recorded on the documents may become permanently ingrafted on the mind of him who is to assume the responsibility of the performance of the actual practical part of the construction and handle and place the materials of same, which will involve much cost, and save time, labor and perhaps money to the contractor.

A further development of this subject is seen at Fig. 3, where a continuous series of semicircular arches with one centre is shown; that to the left below the spring line shows how these arches differ. Three rolocks of stone or bricks are here represented, and the observer will notice how the several rings flatten into a segmental shape as they recede from the centres, also how their intersections will meet in a straight vertical line occurring directly over the central axis of the piers, which of course will be the best statical construction. This last mentioned feature is one which the tyro must ever keep before his mind viz.—the importance of always preserving the perfect statics of every part of his building, and to obtain this he must preserve his plumb and level lines throughout and to have all weights equally or centrally distributed as is seen on the column to the left of this sketch where the width of the base of the arch does not, and never should, exceed the diameter of the column which supports it, independent of the top and bottom areas of the capital, for should it exceed the area of the top of the shaft then the capital on account of any possible unequal pressure, is liable to crush or splinter and thus ruin its architectural appearance. Again corbelling out has the same defect, for the reason that the thrust pressure of the rings of the arches being greater than the pressure of the wedge-shaped prism, between the rings and below the spandrils, the projections of the corbells are liable to sink and distort the shapes of the arches. This is not so likely to happen when the piers are wide, wider in fact than shown here; still it is wisest to keep the soffit lines on the same face line as the reveals of the piers or jambs as hereon delineated.

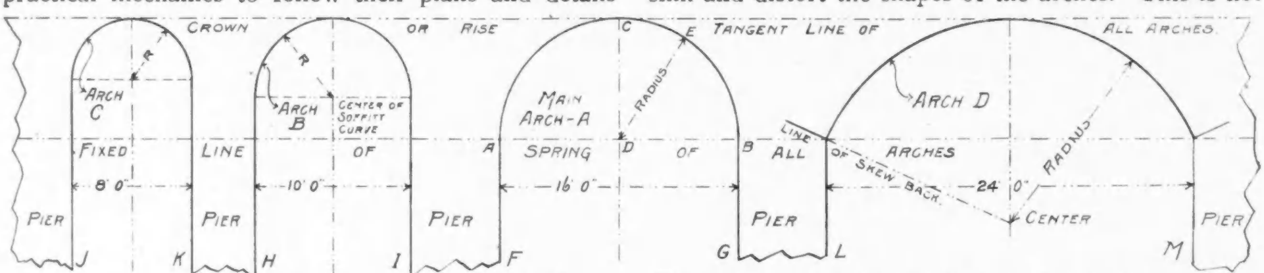


FIG. 4.

RISE OF ALL ARCHES FROM D TO C = 8 FEET.

In the next engraving, students will perceive a combination of arches which is by no means unusual in the better class of construction whether of wood or masonry, and for the sake of explanation and comparison I have drawn all on the same spring line, with an equal rise or height to the crown, so let us proceed to analyze the diagram as it will develop a most peculiar and unknown condition of affairs. Commencing at the main arch A, it will be found by reference to the dimension lines that it measures 16 feet in the clear of the reveals, or width of opening between the faces of the jambs, and that the arch spanning this opening is a regular semicircle A-C-B struck from the centre D with a radius of 8 feet as indicated. Taking this arch then as a standard of one, or a number of openings as the aisle of a church or any other collonade, let us see how any other arches of a similar height will be affected. Proceeding to the first arch to the left it will be seen that the span here is only 10 feet, but the rise is the same as in arch A, what will happen in arch B? For the reason that the rise cannot vary, then the radius of the arch must, because it would be obviously impossible to strike the same arc as in arch A, therefore the spring line must be raised up so that the tangent line at the crown of the soffit will be on the same level as that of arch A which is done as seen in the diagram by striking a semicircle to a radius of 5 feet. This will give an arch B, coinciding with arch A, and not by any means incongruous or out of proportion. In a similar way the 8-foot opening at the extreme left, and marked arch C can be laid out with the object of maintaining the soffits of the arches on one level tangent to the point C in A.

Again should the opening be wider than the 16 feet of Arch A, then the centre of the arch will be placed below the spring line A-B and the arch will assume a segmental form in the manner represented to the right in arch D, but the spring point of the skewbacks will be on the spring line of the main arch, no matter whether the width be greater than the 24 feet here given between the jambs, or even more, should the span of the arch be even wider than the measurement shown on this diagram. The points of the intersections of the radii from the centres passing through the spring line will always remain on the horizontal level of the said line, A-B of the main arch A-C-B of the main arch A, Fig. 1. Sized up in its entirety the result of the consideration of the diagram resolves itself into the fact that: No matter what the width of the span, or width of the arches between the reveals may be, or may vary, the tangent lines at the crown will always touch the highest point of each arch no matter what its radius; providing all the arches are of the same height and taken from one fixed spring line as shown at the spring line of the original or parent arch A-D-B.

Constructing an Ordinary Stair

HOW TO BUILD A STAIRWAY HAVING A STRETCH-OUT STRINGER AT THE START AND A QUADRANT BETWEEN TWO FLIGHTS—HOW TO CONSTRUCT A PITCHBOARD AND ITS IMPORTANCE

By Morris Williams

IN FIG. 1 is exhibited a plan of a stairway which represents a class that may be seen in any city and almost any village all over the country, yet few are the number of even those carpenters reputed to be first-class mechanics that are capable of executing a job like this to their own and their employers' satisfaction.

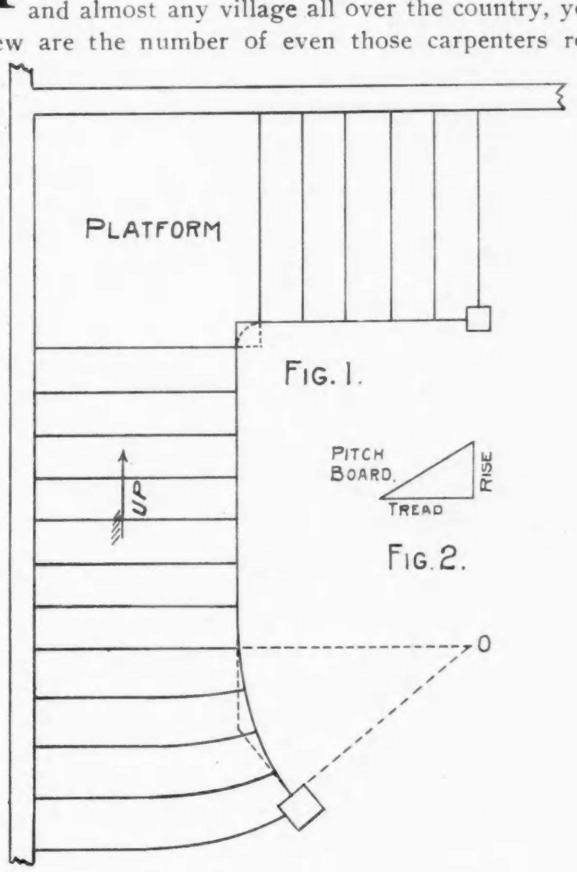


FIG. 1.
FIG. 2.

In this article I propose to explain as lucidly as the nature of such construction will admit, the laying out of all the details from the beginning to the end; so that any carpenter of ordinary intelligence may be able to go ahead with confidence of a successful issue.

The first requisite will be the pitch board which is shown in Fig. 2 to be a right angle triangle; the base representing the exact dimension of the tread, and the altitude or height the exact dimension of the riser. It is generally made out of a piece of one-inch pine board, and too much care cannot be taken to secure the exact dimensions for the treads and risers; which depends upon the run and rise of the stairway.

What is meant by the rise is the distance from floor to floor. In this instance it is 10 feet 6 inches, or 126 inches. By dividing 126 inches by 18, we will obtain a quotient of 7 inches, which is the exact dimension of each riser and in the complete structure we will have 18 of them. In ordinary stairways a 7-inch riser may be considered a very satisfactory limit to guarantee an easy stepping in ascending and descending.

A proportional tread for a riser 7 inches wide may be found by dividing the number 66 by 7, which equals 9 3-7 inches, which is the best proportional width of tread for a 7-inch riser.

With these dimensions for tread and riser, we will now cut out the pitch-board off a piece of an inch board; and mark 18 on the edge representing

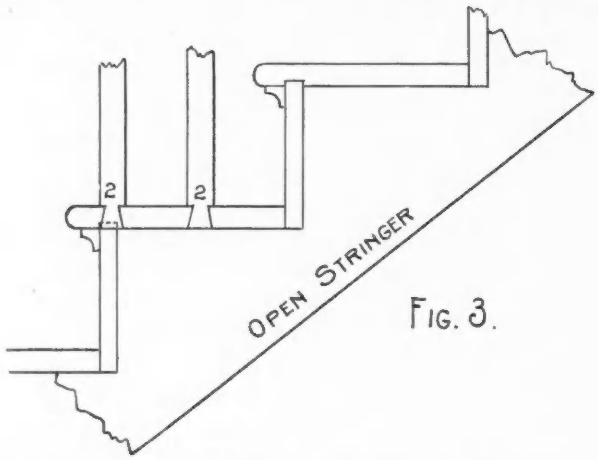


Fig. 3.

the risers, and 17 on the edge representing the tread. This will help memorizing the number of treads and risers required which in course of construction will be found of some advantage as it will minimize the danger of cutting the stringers too short.

With the pitch-board as a template the next process will be to mark the housings, or grooves, on

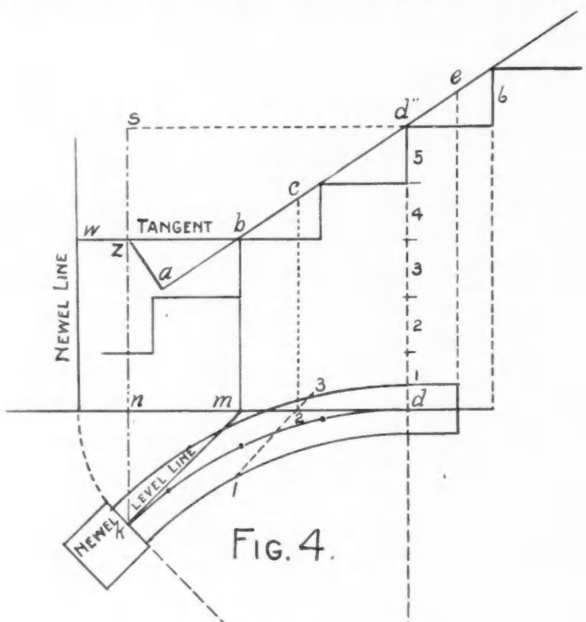


Fig. 4.

the wall stringer and also on the front stringer which generally in stairways of this class is cut out instead of being grooved.

In workshop parlance the grooved stringer is called the "closed stringer" and the cut stringer is known as the "open stringer." The constructive principle of the open stringer is considered superior to that of the closed stringer in stairways having continuous rails, where winding wreaths take the place of newels causing the rail to depend absolutely for its stability on the strength that may be secured by the best means available of fastening the balusters to the rail and stringers.

In open stringers the balusters are always dovetailed to the end of the treads as shown at 2 and 2 in Fig. 3, a method of construction if executed with care and when put together with good glue, and a nail or two, will hold the rail as fast as if held between newels; while with closed stringers there is no way of execution other than nailing the bot-

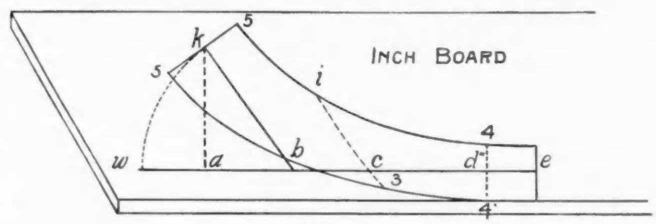


Fig. 5.

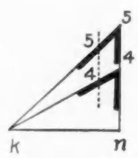


Fig. 6.

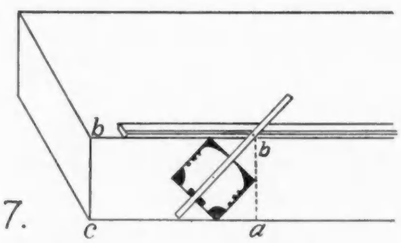


Fig. 7.

tom of the baluster to the top edge of stringer, a method, however well it may be done, will never accomplish the purpose of securing a stable and rigid rail.

The stretch-out portion of the stringer as shown in Fig. 1 is described from the center *o*; and the curve is made to continue four steps; equally divided; so as to obtain the same pitch for the wreath as that of the straight rail, which is an arrangement that should always be adhered to, as it gives the finished rail a more pleasing appearance, and saves a great deal of extra labor in the manipulation of the wreath.

An elevation of these steps above the plan of the curved rail is shown in Fig. 4 where the pitch line of the straight rail is shown continued to point *b* over two of them; and from *b* a level tangent line is shown extending to intersect a perpendicular line representing the side of the newel post at *w*.

From *k* in the plan another perpendicular line is drawn to *zs* intersecting the line *bw* in *z*; and from *z* a line is drawn to *a* square to the pitch line *a, b, c, d, e*.

In the plan is shown a line *1-2-3* drawn parallel to the plan level tangent *km*; and from *2* a perpendicular line is drawn to cut the pitch line in *c*.

Now we are ready to draw the face mold, which is shown in Fig. 5. A piece of an inch board is procured large enough to contain the mold; one edge of it is planed straight, and a line gauged from this edge at a distance a little more than one-half the width of the plan rail.

To this line is transferred the points on the pitch line in Fig. 4 as shown at *a, b, c, d, e.* The point

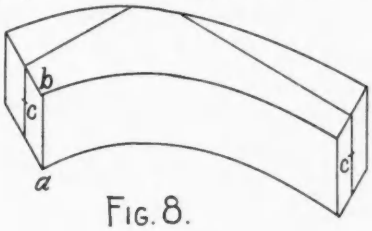


FIG. 8.

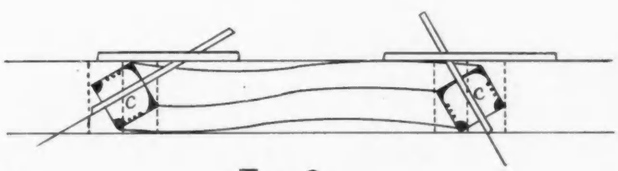


FIG. 9.

u indicates the length from *b* equal to the length *b w,* which is the level tangent shown in Fig. 4. Upon *b* erect the perpendicular line *b k;* place one leg of the compasses in *b*; extend the other to *w*; turn over to *k;* and connect *k b;* which will be the level tangent as it is required on the face mold.

Make the joint at *k* square to this tangent and the joint at *e* square to the line *b, c, d, e,* which is the other tangent required on the face mold. Now draw the line *1, c, 3* parallel to the tangent *b, k;* and make it equal to the line *1, 2, 3* shown in the plan Fig. 4.

In Fig. 6 is shown two levels that are required;

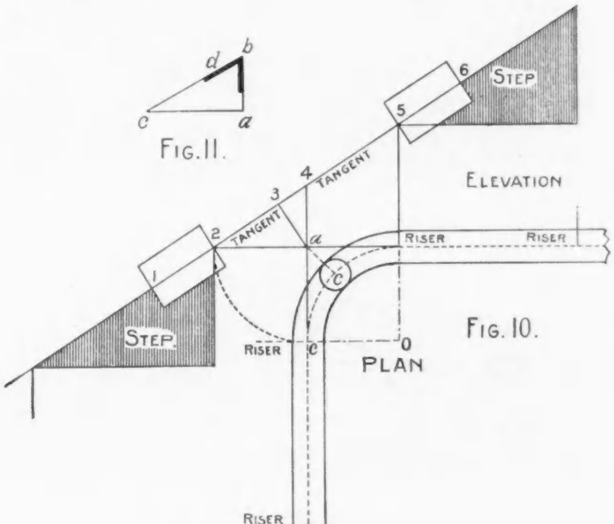


FIG. 11.

FIG. 10.

to twist the wreath, one for each end, and one forward as follows:

Make *k n* equal *k n* in Fig. 4; *n 4* equal to *z a* Fig. 4; connect *4 k;* the level is at *4,* and is to be applied to the end *e* of the wreath. The distance *4-4* is to be applied on each side of *d″* on the mold, as shown in Fig. 5, which determines its width at this end.

Again in Fig. 6 make *n 5* equal to *z s* in Fig. 4, and connect *5 k,* the bevel is shown at 5.

The distance *5, 5,* taken from this bevel and placed on each side of *k* on the mold in Fig. 5, will determine the width of the mold at this end; and by bending a lath to touch points *5, 1, 4,* the inside curve of the mold may be described; so also by bending a lath to touch points *5, 3, 4,* the outside curve is described; thus completing the form of the face mold.

We will now need to know what thickness of plank will be required for the wreath.

In Fig. 7 is shown how this may be found.

Where there are two bevels as in the case under consideration, select the largest of the two; and as shown in Fig. 7 draw a square section of the rail parallel to the blade; the distance *a b* as shown in this figure indicates the thickness of plank required. Now place the face mold on a piece of plank of such thickness, and cut out the form shown in Fig. 8,

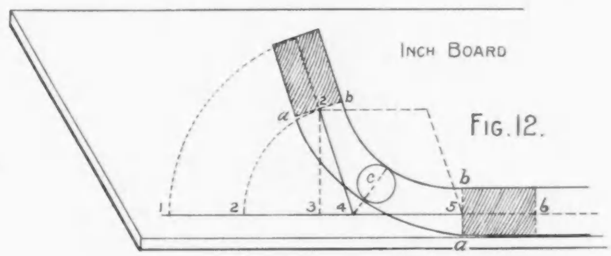


FIG. 12.

square to the face of plank, and cut the joints also square to the face and square to the tangents. Find the center of each joint as at *c* and *c* and place the bevels to cut the centers as shown at *c* and *c* in Fig. 9, which illustrates the wreath as it will appear after it is squared ready for the molding.

In Fig. 10 is exhibited the plan and elevation of the quadrant shown in Fig. 1 at the junction of the two flights adjacent to the platform. There is nothing in this figure that needs explanation, except the line *3 a,* which is drawn square to the pitch line of the rail from *a.* The pitch line of the two tangents is shown to aline with the pitch of rail; as from *2* to *5.*

One bevel only will be required for this wreath because the tangents are equally inclined and it is to be applied to each end owing to both being inclined. If one was level the bevel would be applied only to one end. This applies to cases where the plan tangents stand at right angles to one another as in this instance.

The bevel is found as shown in Fig. 11 where *c a* equals the length of the plan tangent *c a*; and *a b* equals the line *3 a,* which as already stated is made square to the pitch line of the tangents.

The face mold is exhibited in Fig. 12 and is drawn precisely as the face mold for the stretchout wreath shown in Fig. 5 was drawn.

In Fig. 12 the points *1, 2, 3, 4, 5, 6* are transferred from the pitch line in Fig. 10. On *3* a perpendicular line *3, 2″* is drawn; then one leg of the compasses is fixed in *4*, the other extended to *2*

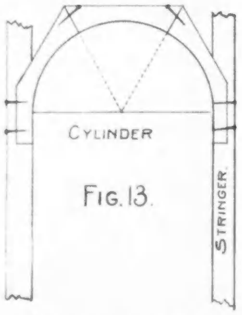


FIG. 13

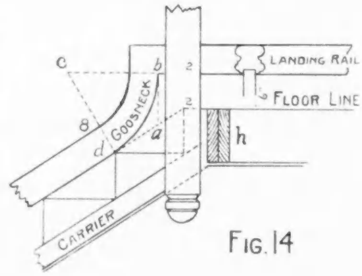


FIG. 14

and turned over to *2″*. By connecting *2″* to *4* we fix the position of the tangent *2″ 4* as it is required on the face mold; the other tangent being *4, 5*. The joints are made square to these tangents, respectively.

The shaded portions shown at each end are known as the "shanks," being, as they are, outside the curve of the mold, they do not properly belong to the wreath.

Fig. 13 exhibits a plan of the cylinder where it is shown to be constructed of three pieces jointed, screwed and glued together, the inside being worked to the curve of the well. It is connected to the stringers as shown by being notched and screwed.

In Fig. 14 a method is shown to draw the "gooseneck" adjacent to the landing newel so that the "knee" will aline with the landing rail.

The bottom of the rail is shown resting on the nosing of the steps, and continued to *2* the center of the newel.

It is desired to have the landing rail at a height of 2 feet 8 inches from the floor to the underside of the rail, we will therefore place the landing rail as shown 6 inches above the floor line. By this arrangement it is evident that when the flight rail is raised to its position 2 feet 2 inches above the nosing line the landing rail will then be 2 feet 8 inches above the floor line. Continue the bottom of the landing rail to *c*; from *b* drop a line to *a*; make *a d* equal *b a*; take *c* for a center; *c d* for radius and describe the bottom curve; again take *c* for center *c 8* for radius and describe the upper curve. In this figure is shown a carrier under the stairway extending to the trimmer *h*; care should be taken to always fix the trimmer so as to be of use to support the end of the carrier.

Mission Style of Architecture

A NUMBER OF TYPICAL EXAMPLES OF THIS STYLE OF ARCHITECTURE—DISTINGUISHING FEATURES OF THE SAME—LASTING EFFECT UPON THE ARCHITECTURE OF THE COUNTRY

By George Ethelbert Walsh

THE influences which are tending toward the formation of a distinctly American style of architecture are quite manifold, and one must not confine himself to any particular section of the country for data that will help in a broad, comprehensive study of the subject. The architecture of the South, East and West is rapidly undergoing changes and transformations, but the early influences which determined the distinctive nature of the architectural lines of development persist. A traveler may still be able to identify his location by the typical style of architecture which is presented to him in country and city. A more general interchange of ideas, and a broader catholicity of taste and selection on the part of our architects, are tending to eliminate boundary lines more effectually than the increasing cosmopolitan character of its people. The source of inspiration for the architect is as broad as the world, and the wellspring of his ambition should be wherever beauty, simplicity and proportion of lines are found, whether in the East, West or South.

The extent to which colonial architecture has impressed itself upon the growth and development of our country can scarcely be overestimated, or measured by ordinary standards of comparison. In modified forms it has influenced the architectural development of nearly every section of the country, and it will persist so long as good taste and judgment on the part of our architects prevail.

But in point of time the so-called mission style of design in buildings influenced the architecture of the New World. The early Spanish buildings in southern California were built as early as 1575, twenty-five years after the first exploring party of Spaniards penetrated the Gulf of California and made their way to

San Diego Mission

Upper California. The very earliest of these buildings have long since been destroyed, but those which came afterward are still in existence. The ruins of the early missions are rapidly disappearing, and within a short time their preservation will become impossible.

But the mission architecture has stamped its impress upon California, Arizona, and adjacent states fully as effectually as the colonial ever did on New England. And like the latter it is now spreading to all parts of the country. The great West meeting the two great tides of influence originating on the Atlantic and the Pacific coast, respectively, has made selections from both. It is not unusual in western towns and cities to see two types — colonial and mission — represented in adjacent buildings. The Eastener, wedded to early New England associations, has reproduced for himself in the far west a typical colonial home, and the man from the Pacific coast, longing for the gardens and low mission walls of his flowery state, builds on the lines which appealed to him as a boy.

Essentially different in their origin and characteristics, the colonial and mission architecture have this in common: their lines are simple and proportionate, and all attempts at ornate decoration are foreign to their conception and nature. Likewise their adaptation to certain needs differs materially, and yet they possess certain similarity of treatment. För country homes the mission style has steadily encroached upon the field held so exclusively by the colonial. The Far West has yielded so far to the subtle influence of the old mission ruins that miniature California towns and villas are often seen a thousand miles back from the Pacific. The Middle West, and even the Atlantic seaboard, are not free from the same influence, and it is not improbable that many of our seashore resorts will reflect this movement in time fully as much as the West.

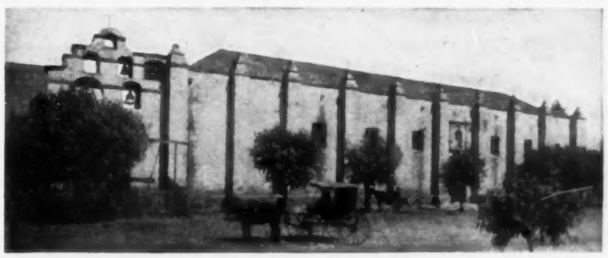
Carmel Mission

Santa Barbara Mission

In view of the rapidly disappearing missions, from which the modern houses are designed, exact studies of them are often helpful and inspiring. The chief features of these early missions were derived from the Moors and Italians, but Spanish influence modified and changed them to a considerable extent. The missions were low, broad masses of architecture, with simple outlines and roofs of low pitch. The character of the ornamentation was all Moorish. In some of the modern mission houses on the Pacific coast this has been carried to a degree of lavishness that takes away from the spirit of simplicity which the early types emphasized. The proper application of the Moorish designs and ornamentation presents a composite whole very pleasing to the eye.

The mission architecture, as embodied in the early California missions, is particularly adapted to warm countries and for summer country houses on our sandy seashore. With their appropriate landscape surroundings, low roofs, plain walls, deep porches and wide interior courts, the effect is striking and artistic. The most successful mission houses in the East or West are those which have followed their prototypes with considerable fidelity, both in respect to minor details of ornament and general character of outlines.

It is difficult to adapt this style to commercial structures, public buildings, or even town houses. Yet in California numerous instances of true mission style of public buildings, town houses, and commercial structures are on record where harmony of surroundings and buildings has been preserved. California hotels have in particular been designed according to this style, and considerable success has been attained there-



San Gabriel Mission

by. Spread over immense areas, they suggest coolness and rest in a land where the sun shines brilliantly for a good part of the year. The effect of the tropical sunlight on the modern mission houses gives to the picture a certain realism that cannot be obtained in a land where clouds and cold days predominate.

In the old town of San Diego one finds many typical houses of the mission style, and visitors go there to study the simple lines of an architecture that was transplanted to this country over two hundred years ago. The old San Diego mission is now mostly in ruins, and in spite of the attempts to preserve its outlines, it is rapidly crumbling to pieces. It was one of the earliest and most severe types of this architecture. It has scarcely any of the ornamentation that was added to some of the later buildings, and its flat, low pitched roof is in perfect harmony with its plain white walls.

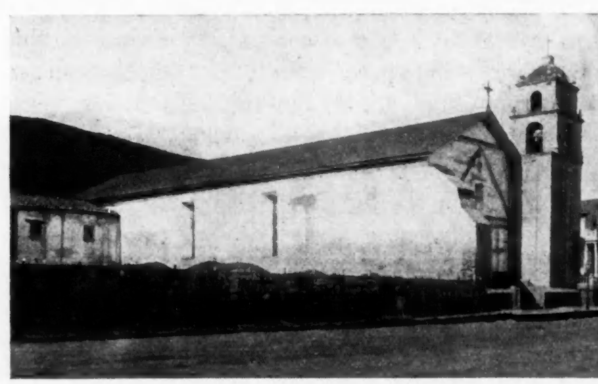
San Gabriel Mission

In other parts of the old town are ancient buildings which show the same simple characteristics. In the old tiled adobe house, built in 1772, and which was the scene of Ramona's marriage, we have another fairly characteristic picture of the earliest of the mission houses. The Estudillo house, 116 years old, and the scene of many historical events, stands as a monument to the early builders who were faithful in reproducing the architecture of their time. The ruins of the whole town of old San Diego are fruitful of suggestions to the architect or artist in search of local color and inspiration.

Mission Dolores

The new town of San Diego is quite a contrast. Here everything that modern art and science can do has contributed to its success. The modern homes, however, have not departed so very far from the source of their inspiration. They represent all that is best in modernizing the mission architect to the needs of the day. The view of the new town would prove more attractive to most visitors, and indeed it does possess a spirit of rest and beauty that cannot be denied. The orange groves, giant cacti plants, and waving pampas plumes add just enough color to the scene to give it a brilliant setting.

The Carmel Mission, founded in 1770, is also in a bad condition, although the tower portion has been better preserved than the other parts. This was built in 1770 at Monterey, and it represents the peculiar nobility of the Moorish designs and ornamentation. The tower is an excellent piece of work, simple, dignified and solid. The main entrance is an artistic production, flanked on either side by towers. Standing alone by itself, the ruined mission today is a Mecca for pilgrims in search of purity of architectural lines as embodied in the early Spanish missionary builders. Outside of the towers and imposing entrance the building is in such a sad state of decay that a study of its architectural lines is rendered somewhat difficult.



Mission San Buenaventura

The famous Santa Barbara Mission is, on the other hand, in pretty fair condition. Its walls, broken and chipped in many places, still serve to perpetuate the lessons which its builders unconsciously taught. This mission was founded in 1786, some sixteen years later than the other two, but its present state of preservation is due to more careful building than to the difference in time. The walls are heavier, and the quality of the workmanship apparently better. The roof has been kept in excellent condition, and the local authorities, while not patching it up, have made every effort to protect the building from decay. A little annual repairing will go a long way toward preserving these old types of missions for future study.

In the San Gabriel Mission, founded in 1771, a near-by view shows the belfry tower with the bells hanging in them. This mission is more severely plain than many of the others, and in the shadow of its walls there is a coldness of outline that is not attractive. Viewed at a distance, however, it lends itself to the landscape so that its beauty of simplicity stands out more effectively. The surrounding trees, instead of hiding the structure, tend to soften the rather harsh outlines and give to it a virtue peculiarly its own.

The Mission Dolores, in San Francisco, founded in 1776, has lost much of its early effect by the surround-

Mission San Luis Rey

ing march of civilization, which has steadily robbed it of its landscape setting. The purity of its architecture is apparent. It has long been a picturesque place for visitors, and a study of its lines and simple decorations cannot fail to increase one's knowledge and admiration for this style of architecture.

A general view of the Mission San Buenaventura, founded in 1782, is another picture that holds the attention by virtue of its great simplicity, and yet harmony of outline. The rising swell of the mountain back of it forms a setting that cannot fail to elicit admiration. The belfry tower is of distinct merit and somewhat different from the others. Its severely plain sides, up to the story where the belfry is located,

Santa Ynez Mission

is relieved somewhat by the dome and ornamental designs above.

The spirit of all these mission buildings is easily interpreted. Simple lines and excellent proportions, with no attempt at elaborate and ornate decorations, are embodied in every one. There is almost a spirit of solemnity in the plain walls, but this is somewhat relieved by the towers and belfries, as if to enforce the lesson that all true aspirations must reach heavenward, away from the sordid earth.

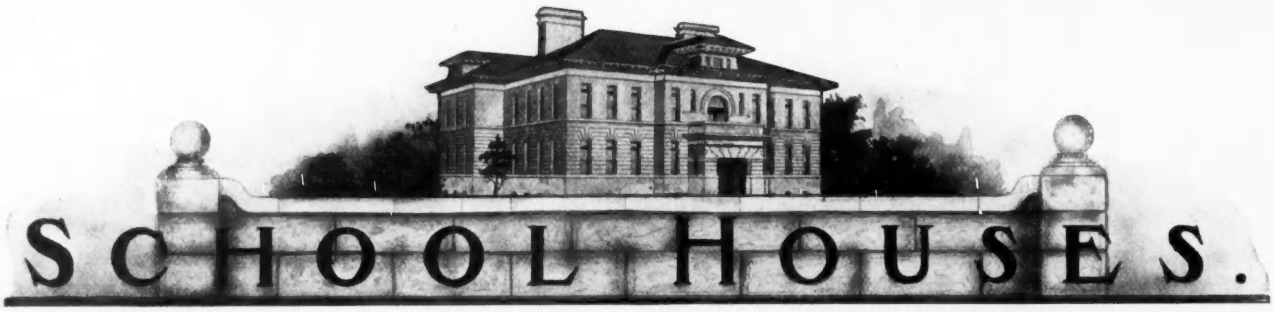
In the Mission San Luis Rey, founded in 1798, we find more elaborate attempt to build for ornament. Yet the whole structure is in perfect proportions, and every ornament has its distinct value. The building stands as a landscape mark that blends beautifully with the sun-lit clouds or clear blue of the sky. For miles its white towers and delicately-tinted walls serve as a beacon of rest for the tired eyes. In even a more marked degree is the old mission of Santa Ynez, near Los Olives, a landscape mark. The mountains towering behind it seem to inclose it with tender embrace. For miles away it appears a white dot on the landscape, and, as one approaches, its beauty increases. Like the other missions, it stands as a beautiful monument to the skill and artistic worth of the early Spanish missionaries who labored so faithfully on the Pacific coast long before gold transformed the country into a great commercial center. Romona, with her sheep-shearing friends, are more in harmony with the scene than the modern gold-dredges and spirit of commercial rivalry which are modernizing the sweet pastoral land of sunny California.

The spread of the craze for mission furniture has spent itself in many directions, and its popularity has witnessed a natural reaction; but the introduction of mission architecture in the construction of our homes is devloping more slowly and steadily. In the end it will impress itself more permanently upon our life than the mission furniture. Houses are not changed within a day or year. Furniture may be replaced with each passing fad, but our homes are built as permanent expressions of our tastes and aspirations. Architects are drawing inspiration from the art which the early missionaries established in their adopted country, and the return to these simple sources of architecture indicates a healthy phase of our national life. Eventually, when the typical American architecture has been established, the mission style will be well represented in many of the lines of construction and artistic ornamentation. It is a new art that is still as old as the country.

Increased Use of Gas Engines

The remarkable strides recently made in the design and construction of large gas engine units, both in this country and abroad, have clearly indicated that the possibilities for the application of that form of prime mover are practically limitless.

German builders were among the first to appreciate this fact, and, as a result, have perfected the best types so far produced. American builders, however, have not been slow to see the advantages offered by large units, and the Allis-Chalmers Company, of Milwaukee, for one, has been placing before the purchasing public, for some months past, its gas engines of the Nürnberg type, in capacities ranging from 300 to 5,000 horse power and for all power purposes.



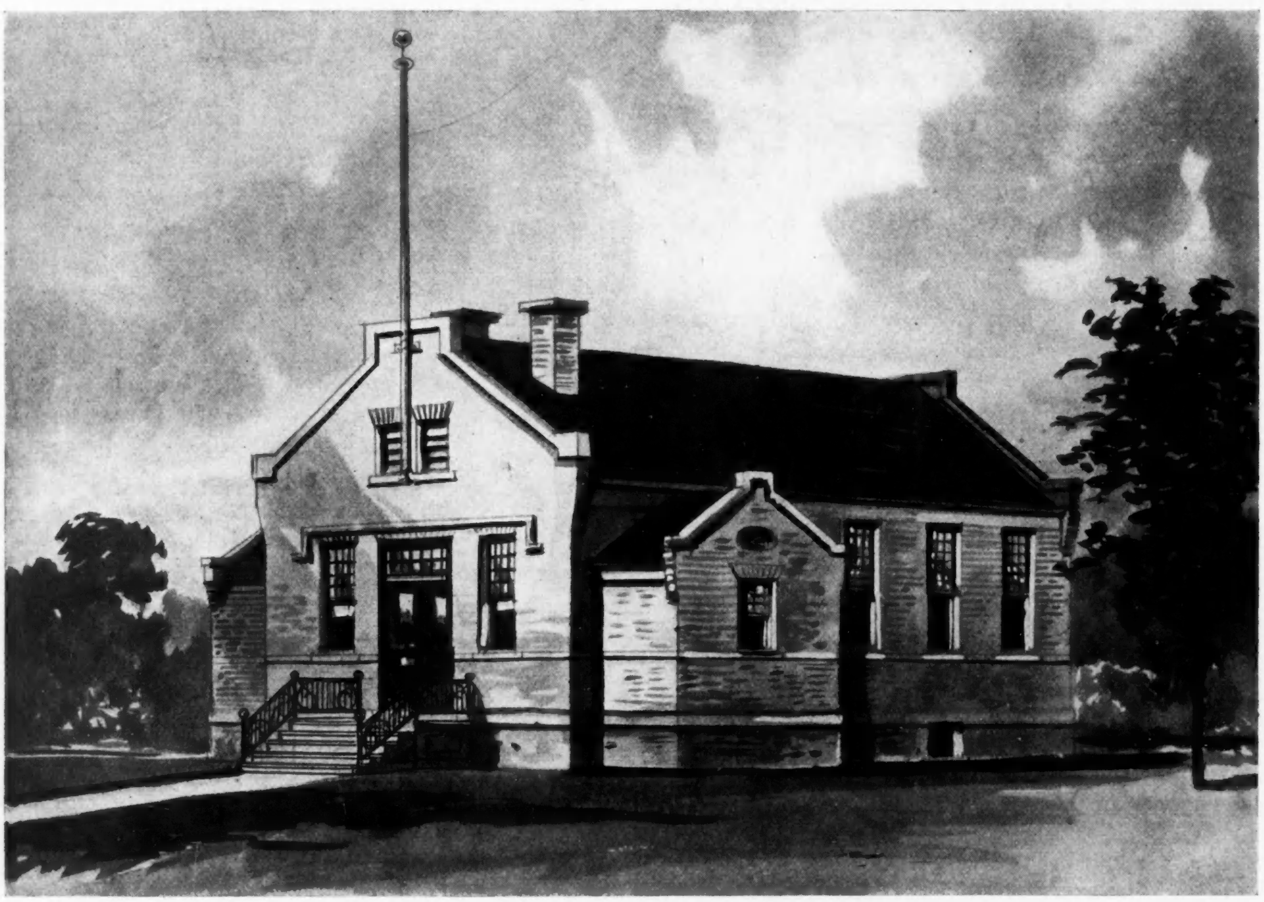
Two Modern School Houses

SHOWING THE PERSPECTIVES AND FLOOR PLANS OF TWO EXTREME MODERN TYPES—FILL THE REQUIREMENTS IN THEIR RESPECTIVE LOCALITIES

THIS month we are illustrating two extreme types of modern school house construction designed by G. W. Ashby, architect. They both fill the needs in the respective localities where they were built.

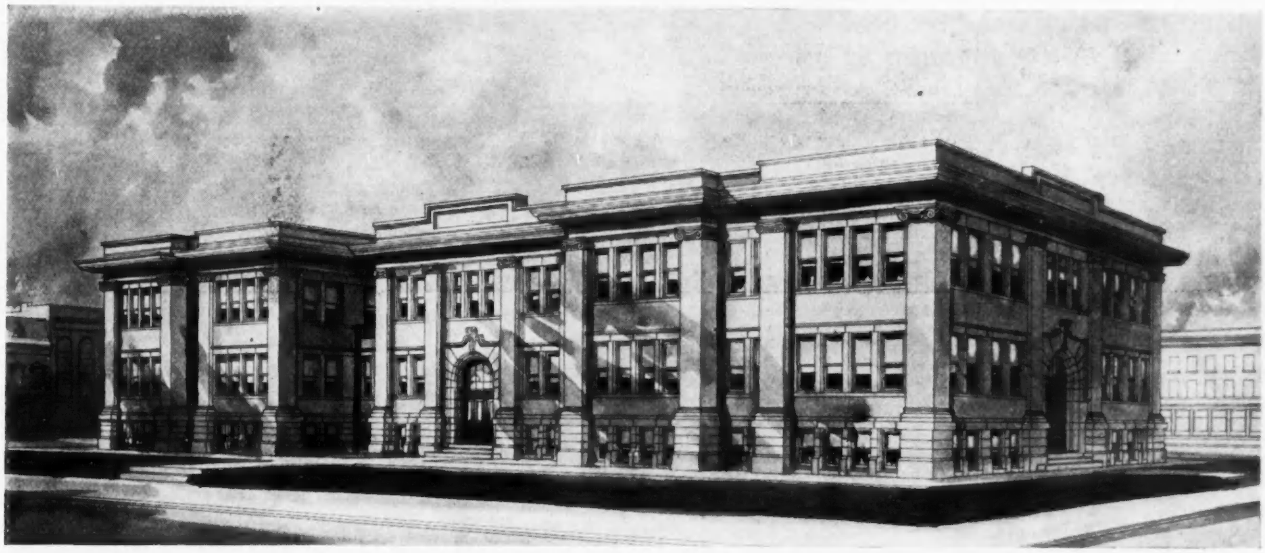
The large school is one of the most modern types of graded schools common in our large cities. It contains twenty class rooms, ranging from Nos. 1 to 20. These are 25 by 32 feet and can easily seat 45 students. Rooms 21 to 36 and 44 to 47 are cloak rooms and there is one for each class room.

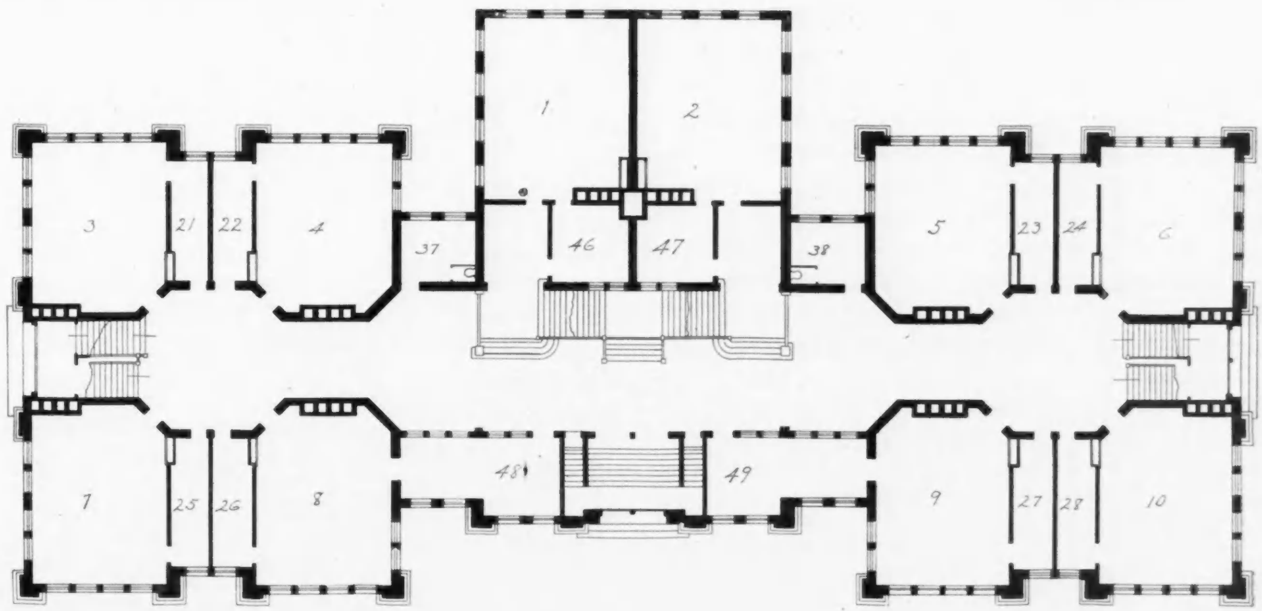
The rooms from 37 to 40 are the teachers' toilet rooms and there are two on each floor. The principal's private office rooms are from 41 to 43 and are located at the head of the main stairway, thus giving him a view of all that is going on in the upper hall and the main stairway. Room 48 is the museum where various curios can be exhibited and can also be used for exhibiting the work of the scholars. This is a good feature in school work, for it creates a healthy interest among the scholars to do good work so it will be placed on exhibition. Room 49 is the library, which is conveniently located near the main entrance. Here the children can draw books for home study on their way out after school and thus avoid a great deal of confusion.



The basement is equipped with all the modern conveniences, such as lunch rooms, play rooms, manual training rooms, toilet rooms, and boiler, engine and fuel rooms. The reason for having the manual training room in the basement is that it does not litter up the rest of the school, lumber and things to work with can

(*Continued on page 62.*)

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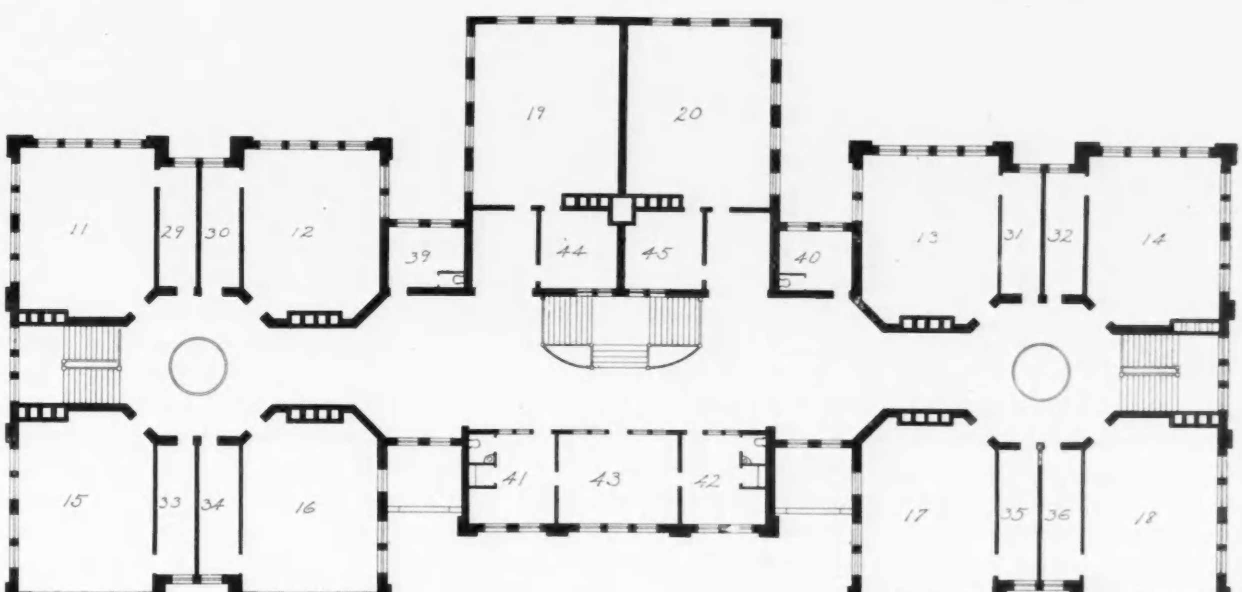
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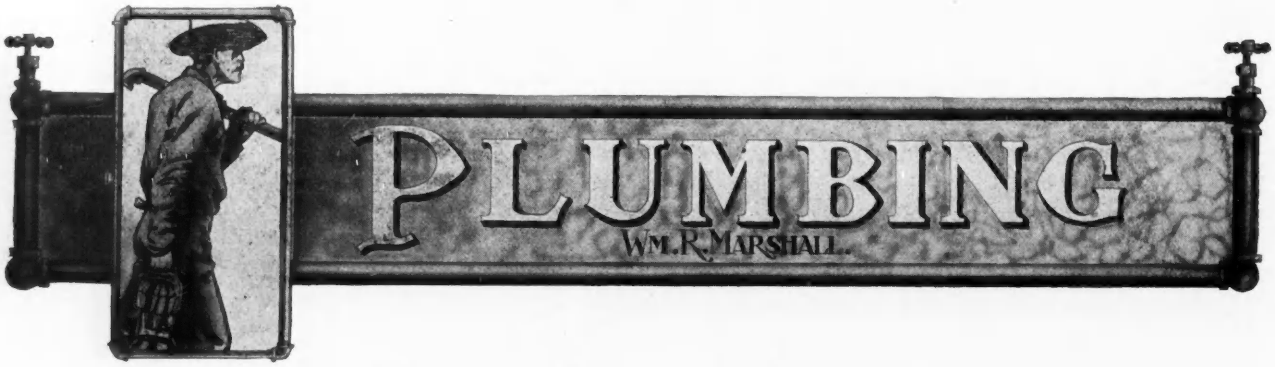


Properties of Water

ASCERTAINING THE HEIGHT TO WHICH WATER WILL RISE AT A GIVEN PRESSURE—NUMBER OF PIPES OF A GIVEN SIZE WHICH WILL CARRY AS MUCH AS ONE PIPE OF A LARGER SIZE

A TASTELESS, transparent, inodorous, liquid, almost incompressible, its absolute diminution being about $\frac{1}{20000}$ (one twenty-thousandth) of its bulk; possesses the liquid form only, at temperatures between thirty-two degrees and two hundred and twelve Fahrenheit. *Chemically considered,* it is a compound substance of hydrogen and oxygen—two volumes of hydrogen to one volume of oxygen. Water is the most powerful and universal solvent known.

The gallon is the unit of measure for water. The unit of water pressure is the pound per square inch; one gallon of water measures .134 cubic feet and contains 231 cubic inches and weighs about eight and one-third pounds, or sixty-two and one-third pounds per cubic foot.

	Cubic Inches in a Gallon.	Weight of a Gallon in Pounds.	Gallons in a Cubic Foot.	Weight of a Cubic foot water English, Standard Pound Avoirdupois.
Imperial or English.	277.274	10.00	6.232	62.32
United States.	231.	8·33	7.470	62.35

The above is figured at sixty-two degrees Fahrenheit, which is taken as a standard temperature.

The weight of a column of water, one inch square and twelve inches high, at sixty-two degrees Fahrenheit, equals .433 pounds per square inch.

$$.433 \times 144 = 62.35 \text{ pounds per cubic foot.}$$

The pressure of still water, in pounds, per square inch, against the side of any pipe or vessel, of any shape whatever, is equal in all directions—downwards, upwards or sideways. To find the pressure in pounds, per square inch, of a column of water, multiply the height of column, in feet, by .433; approximately, we say, one foot of elevation, is equal to a half-pound pressure per square inch.

The head is the vertical distance between the level surface of still water and the height in the pipe, unless caused by pressure such as by a pump, etc. Water pressure is measured in pounds, per square inch, above atmospheric pressure, by means of pressure gauge. To ascertain the height water will rise, at any given pressure, divide the gauge pressure by .433; the answer is the height in feet.

Example: The pressure gauge on city supply pipe in basement shows 25 pounds pressure. To what height will water rise in piping system throughout the building?

Solution: $25 \div .433 = 57\frac{1}{2}$ feet.

While water will rise to this height, sufficient head should be provided to furnish a surplus head of about ten feet above the highest point of delivery, to insure a respectable velocity of discharge.

Equation of Pipes

It is frequently desired to know what number of pipes of a given size is equal in carrying capacity to one pipe of a larger size. At the same velocity of flow, the volume delivered by two pipes of a different size is proportionate to the square of their diameters, thus: A four-inch pipe will deliver the same volume as four two-inch pipes.

Example: 2 inches $\times$ 2 inches $=$ 4 square inches.
4 inches $\times$ 4 inches $=$ 16 square inches.
16 inches $\div$ 4 inches $=$ 4 2-inch pipes.

With the same head, however, the velocity being less in a two-inch pipe, the volume delivered varies about as the square root of the fifth power (i. e., as 2.5 power) (Kent). Thus one four-inch pipe is equal to 5.7 two-inch pipes.

Example: With the same head, how many two-inch pipes will it take to equal one four-inch pipe?

Solution: $2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32 \sqrt{32} = 5.7$ nearly.

In other words, the decrease in loss by friction in the four-inch pipe, in comparison with the two-inch pipes, is equal to 1.7 two-inch pipes over the actual square of their respective areas.

Water boils or takes the form of vapor or steam at 212 degrees Fahrenheit, at a mean pressure of the sea level, or 14.696 pounds per square inch. Water freezes, or assumes a solid form (that of ice), at 32 degrees Fahrenheit, at the ordinary atmospheric pressure, and ice melts at the same temperature. The point of maximum density is reached at 39.2 Fahrenheit; that is, water at that temperature occupies its smallest possible volume. If cooled further, it expands until it solidifies, and if heated, it expands.

Hardness of water is indicated by the easy way in which it will form a lather with soap, the degree of hardness being based on the presence and amount of lime and magnesia. The more lime and magnesia in a sample of water, the more soap a given volume of water will decompose. The standard soap measurement is the quantity required to precipitate or neutralize one grain of carbonate of lime. It is commonly recommended that one gallon of pure, distilled water takes one soap measure to produce a lather, and, therefore, one is deducted from the total amount of soap measurements found to be necessary to produce a lather in a gallon of water, and in reporting the number of soap measurements or degrees of hardness of the water sample.

The impurities which occur in waters are of two kinds, mechanical and physical; dirt, leaves, insects, etc., are mechanical and can be removed by filtration. It is said that these impurities are held in suspension.

Solutions of minerals, poisons and the like are physical and are designated as those held in solution.

Freshening water to render it palatable is accomplished by aeration; that is, by exposing water to the action of the air, by passing air through it or raising it to an elevation built for that purpose, protected from dust and other impurities of the air (if the water is to be used for drinking purposes), and allowing it to run down an incline, which is slatted or barred, so as to break it up into small particles, and allow it to become saturated with air.

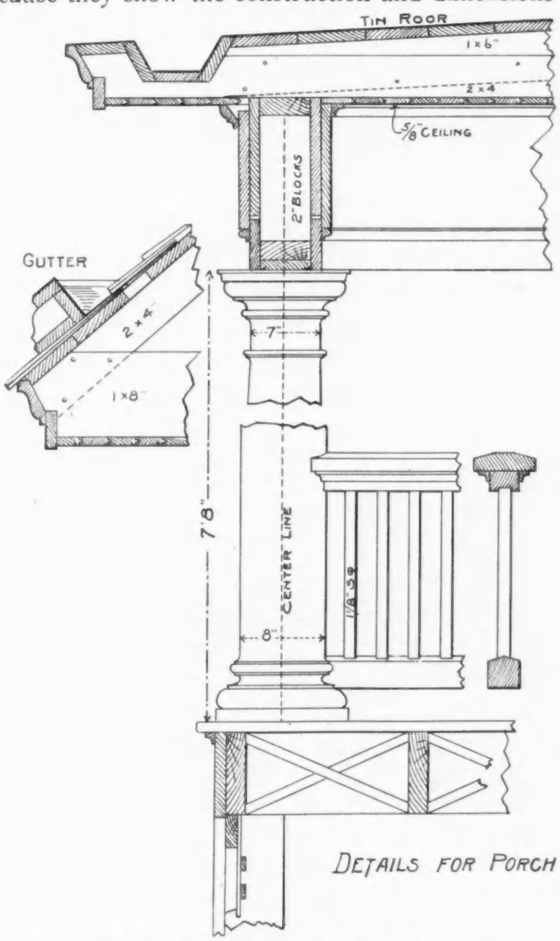
This process, however, is of no practical use for actual purification.

Drawing Lesson for the Carpenter

SHOWING THE IMPORTANCE OF THE DETAIL CONSTRUCTIONS THAT ENTER INTO THE VARIOUS PARTS OF THE BUILDING AND HOW TO PROCEED TO DRAW THEM

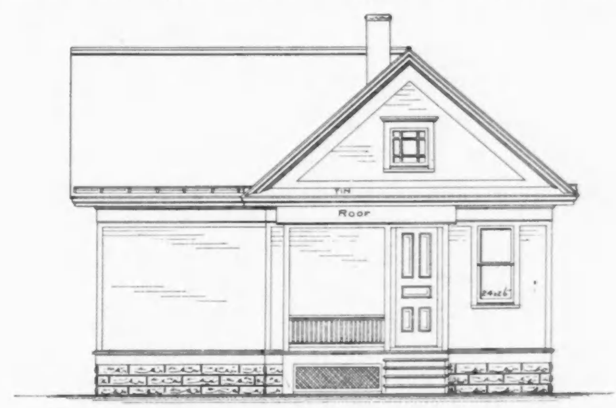
By A. W. Woods

WITH this lesson we give the rear elevation of our subject, together with detail drawings of the porch, cornice, window frame and trim. Details are a very essential part of the plan, because they show the construction and dimensions of



Details for Porch

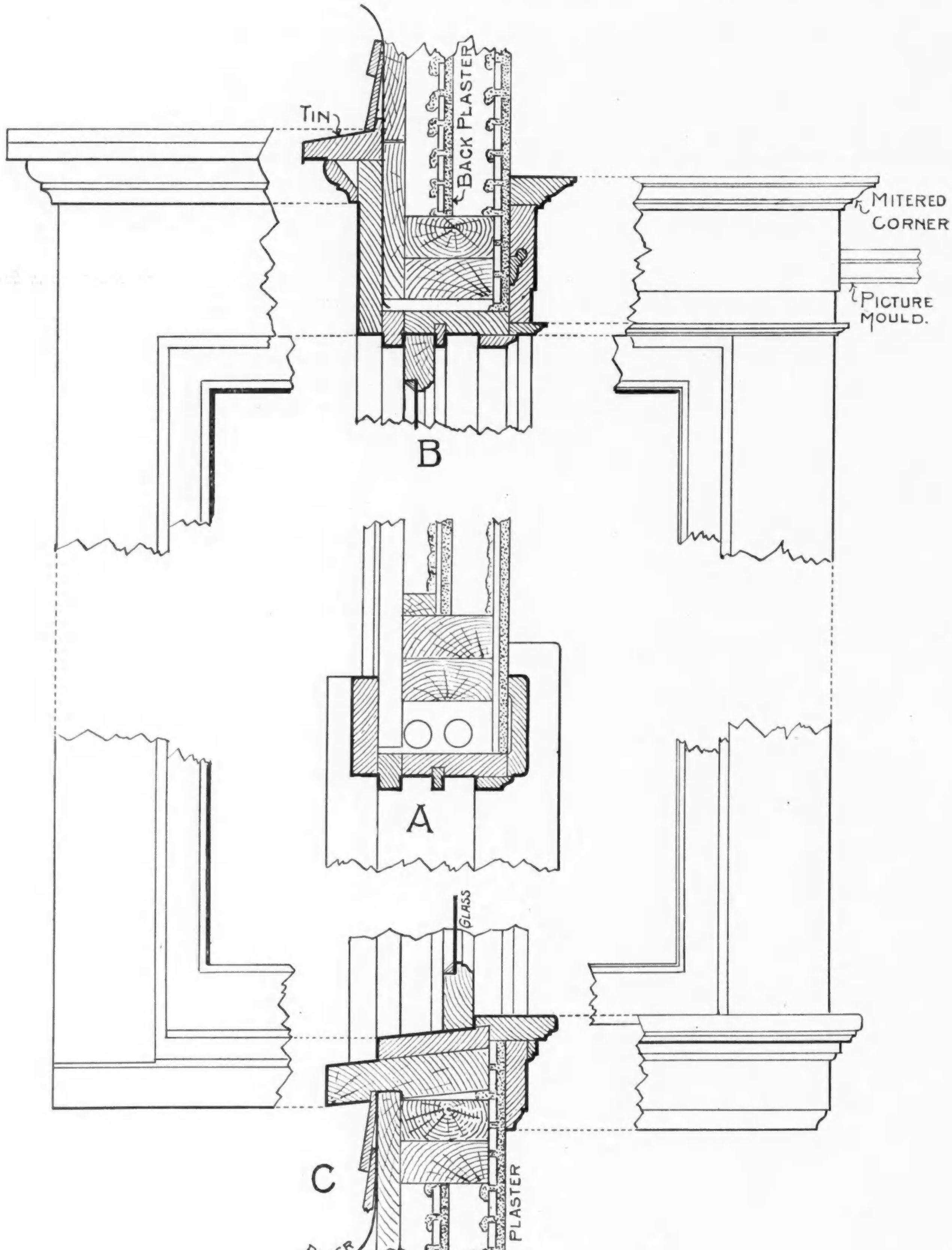
the material required and should in all cases be complete and furnished along with the other drawings pertaining to the job while the mind is fresh on the subject. It saves time in the end on the part of all concerned. In the rush of work, architects are too much inclined to pass the details by and devote their time in getting out the scale drawings for the several clients that they may have, with the idea of saving time and furnish the detail drawings later on. Some even go so far as to specify that the detail drawings will be furnished from time to time as the work progresses. In such cases, nine times out of ten, the much needed drawings are not forthcoming, thereby causing a delay and necessarily a loss on the part of the contractor,



Rear Elevation.

and when he does finally get them, it is after he has made several trips to the architect's office, and then it is usually a case of "furnish the details while you wait." The work is then hurried through without reference to ideas that may have been the intention to incorporate and the chances are that the scale drawings from which the contractor based his estimates has been disregarded and work of a different sort is substituted. This practice is too common and we mention it to show the importance of completing the whole drawings before turning the work over to other hands to work from.

members employed in the construction so that he may make out his lumber bill and estimate accordingly.



When a contractor is asked to figure on a job it should be complete in detail, showing the different

It is better to make all sectional details full size, when this can be done, but sometimes for want of space it is necessary to reduce the scale and when this is done, the scale should always be given and where there are important measurements, they should always be given in figures.

Where different views of an object is required, it is best to run them off on the same paper in connection with each other, as shown in the illustration of the window frame. Draw one section complete, from which draw the other parts, always beginning at the construction part first.

Taking the window frame for an illustration, begin at A by laying off the studding, sheathing, lath, plaster, jambs, castings, etc. Then show the top and bottom sections as at B and C, and from these to the right and left show the elevation of the interior and exterior casings.

With this we close our lessons on the cottage. Much more could be said in connection with the subject, yet we hope in our efforts we have said something that will be of lasting benefit to the large army of readers.

Suitable Lime for Thick Walls

REASONS WHY THE SAME LIME CANNOT BE USED IN MORTAR FOR THICK WALLS AND THIN WALLS — KINDS OF LIME AND PROPERTIES OF EACH

By T. B. Kidner

SOME recent experiences of mine have emboldened me to call attention of my fellow readers of your helpful journal to an important detail sometimes overlooked by practical bricklayers and masons, viz.: the choice of suitable limes for use in mortar for thick walls.

Last autumn, while directing the installation of a modern system of ventilation in a large public building here, I found it necessary to have a number of openings cut through brick walls of from 16 to 24 inches thick. The building was erected some thirty years ago and is a first-class structure in its details, but in every case where an opening had to be made I found that the mortar in the interior of the wall had never set, but was in such a condition that it could be crumbled between the finger and thumb with very little effort.

I called the attention of the masons who were cutting the holes to the state of the mortar and found that they were not aware that certain limes should never be used in thick walls or other situations where the air cannot reach the mortar.

Limes are generally classified under the following heads:

First. Pure or "fat" limes.

Second. Poor or weak limes.

Third. Hydraulic limes; the last varying greatly in their hydraulicity.

The first of these, the "pure" limes, are so-called because they contain but a very small percentage of impurities, (say 5 per cent), the bulk of their mass being pure calcium oxide or white lime. When such a lime is mixed with water ("slaked") it is quickly brought into a fit condition to absorb the gas known to chemists as carbon-di-oxide, or carbonic acid gas, which is always present in large quantities in the air. The effect of this absorption is that the lime forms into crystals or "sets," the crystals being a necessary condition for the strength of the mortar. But if a pure lime be used in thick walls where the air cannot reach it, this interesting chemical process cannot take place, and the mortar simply dries up into a crumbly condition without setting, which was precisely what had happened in the walls referred to above.

Pure limes should therefore be used for plastering, lime-washing, etc., as they depend entirely upon the air for their setting properties and will not crystallize (or set) away from the air.

For brick work or masonry, where cement mortar is not used, "hydraulic" limes should be chosen. Hydraulic limes contain certain substances which in themselves cause the mortar made from them to set, quite apart from the air which is so necessary for the setting of pure lime. Mitchell's "Building Construction" says on this matter: "Hydraulic limes contain a number of useful impurities such as silica and alumina, which on being burnt form a calcic silicate and aluminate, together with a portion of pure lime, the measure of the impurities up to a certain point being the measure of the hydraulicity. *These impurities render the lime independent of external agents for its setting properties.*

Limes containing 6 to 16 per cent of these useful impurities are termed feebly hydraulic, those containing 16 to 26 per cent hydraulic, and those with from 26 to 36 per cent eminently hydraulic."

Before the present almost universal adoption of Portland cement for such purposes, hydraulic lime mortar was used extensively for works under water, where it would set thoroughly and properly because of its special properties. In many parts of the world it is also specified for thick walls for the same reasons, which, of course, render it valuable for all constructional work.

Most Practical Magazine

A more practical, safe and up-to-date periodical than yours, has not been published.—H. T. Keener, Searsboro, Iowa.

When a man loses his temper he should stop and hunt it up before going any further with any undertaking.

Short Talks With Our Subscribers.

YOU are probably most interested this month in the result of our Great Prize Contest. We were greatly pleased with the large number of our readers who took an active interest in the contest, over 500 sending in new subscribers. Through this means over 3,000 new members were added to our great family of readers, bringing the total up to over 28,000. Can you imagine what an army this means?

The contest closed March 1 and the result was very close. There were several ties and in these cases the contestants scoring the points first were given the preference, as announced in the February issue.

Winners of Grand Rewards

1. M. E. Davis, McKeesport, Pa. 59
   Remington Standard Typewriter, No. 7, value $100.
2. Charles Blue, Mendon, Mich. 58
   Complete Chest of Carpenter's Tools, value $65.
3. H. G. Aurand, Barrington, Ill. 53
   Dearborn 54-inch Roll-top Office Desk, value $50.
4. Francis L. Bain, Cambridge, Mass. 45
   Complete Set of Drawing Instruments, value $13.50.
5. Joseph C. Turner, Sydney, Cape Breton, Canada... 45
   Cash Prize, $10.
6. W. W. Ramey, Waterloo, Neb. 44
   Cash Prize, $10.
7. J. J. Helling, Toronto, Ontario, Canada 44
   Cash Prize, $5.
8. C. A. Hillebrand, Leakesville, Miss. 38
   Cash Prize, $5.
9. T. E. Amason, Thomasville, Ga. 38
   Cash Prize, $5.
10. F. F. Worcester, Whitehall, Ill. 35
    Cash Prize, $5.
11. R. N. Adams, Corvallis, Ore. 34
    Cash Prize, $5.
12. Fred. Lichtenberg, Yonkers, N. Y. 31
13. T. F. Clegg, Lazearville, W. Va 31
14. W. H. Cokayne, Sedalia, Ind. 31
15. E. Van Nortwick, Republic, Kan. 30
16. Larin Turner, Paintsville, Ky. 30
17. E. A. Traut, Lead, S. D. 30
18. Newton McKay, Pimento, Ind. 30
19. Will Geyser, Carnegie, Pa. 29
20. W. C. Bussa, Portsmouth, O. 29
21. J. D. Houston, Detroit, Mich. 28
22. H. A. Moreland, Tupelo, Miss. 27
23. J. T. Williams, White Castle, La. 27
24. Walter S. Dryden, Redman Mills, Pa. 26
25. J. N. Kikendall, Springfield, Ill. 26
26. A. F. Stahl, Seneca Falls, N. Y. 25

Each of the above, from twelfth to twenty-sixth, cash prizes of $1.

Winners of Territorial Prizes

North Atlantic States.		
M. E. Davis, McKeesport, Pa.	59	$25.00
Francis L. Bain, Cambridge, Mass.	45	10.00
South Atlantic States.		
T. E. Amason, Thomasville, Ga.	38	25.00
T. F. Clegg, Lazearville, W. Va.	31	10.00
Northern Central States.		
Charles Blue, Mendon, Mich.	58	25.00
H. G. Aurand, Barrington, Ill.	53	10.00
Southern Central States.		
C. A. Hillebrand, Leakesville, Miss.	38	25.00
Larin Turner, Paintsville, Ky.	30	10.00
Western States.		
R. N. Adams, Corvallis, Ore.	34	25.00
Sydney H. Smith, San Diego, Cal.	21	10.00
Miscellaneous.		
Joseph C. Turner, Sydney, C. B., Canada	45	25.00
J. J. Helling, Toronto, Ont., Canada	44	10.00

Checks for the cash prizes were forwarded to the successful contestants only a very few days after the close, and the other prizes were promptly shipped.

This contest has been the means of creating a mutual interest among the members of the family, and has been of great benefit. We hope before long to be able to announce another similar contest. Watch for it.

Large Family Still United

"Once a member, always a member." This appears to be the watchword of our great family of readers. It required but a simple notification to our Charter Members that their first year was up, and that to continue their memberships it was necessary to renew their subscriptions for another year.

We hope this number pleases you. We have tried to make it attractive and practical in every way. Have we succeeded?

One of our members said he did not see how it was possible to improve on the March issue. But we have, don't you think so? We hope to make every number this year better than the succeeding one. You are to be the judges. Let us know if you think we are failing to live up to our promises at any time.

We start the new year with much brighter prospects than last year, and we intend to surpass our own record. Last year we determined to surpass all competitors. We have succeeded. We are so far in the lead that we can now only make comparisons with our own record. Now we are determined to beat that.

Work for the Machine Carpenter Shop

THINGS THAT MAY BE PROFITABLY MADE IN YOUR OWN SHOP—USELESS TO COMPETE WITH MANUFACTURERS IN MANY THINGS—WHAT TO BE GUIDED BY

AMONG the early sayings about planing mill work in the AMERICAN CARPENTER AND BUILDER it was pointed out that there are certain limitations to the classes of work that can be done to advantage in a machine carpenter shop. This advice still holds good, but it is probably worth while to make a little further study of just what this limitation is, so that we may not only be informed as to what we ought not to do, but may also get some suggestions about what we can do to advantage. As a general rule, it is a waste of energy to undertake the manufacture of any regular standards in planing mill stock that is made and carried in stock by large manufacturers who make a specialty of this class of work, because unless there are some peculiar local circumstances to turn the balance, you can purchase this stock from the large manufacturers for practically what the rough material would cost you. This includes casing, base, standard moulding, sash and doors, columns, and quite a list of other items, most of which are familiar to the average carpenter. However, in looking over the list of things that might be regarded as standard, occasionally we come across something that can really be made better in the machine carpenter shop than anywhere else. Take window and door frames for standard sash and doors as an example, and while we find that the sash and doors are made in quantities at prices that cannot be duplicated in the home shop, the frames they go in are nearly always made to order. Apparently the large planing mills and building contractors and carpenters have never made any great effort to get together on matters of this kind. Anyway, no matter what the cost, the facts are, the average planing mill does not consider it a satisfactory undertaking to make up a lot of stock sizes of window or door frames during the dull months of the winter against the possible rush call of the spring. They say every man has his ideas about what frames ought to be, and they differ so much, not only in style, but in the dimensions of sash and glass called for that to make up a stock from which to be able to satisfy the average customer one would have to carry such enormous quantities and wide varieties that it would eat up all the profits that would accrue from reducing the cost of manufacture by making large quantities.

Carpenter Has Advantage

This is one point where the carpenter or building contractor has the advantage of the big planing mill and has a chance to make up windows and door frames during the dull season and during bad weather, so that he will not only have something to do then, but will help materially when he gets busy during the summer. As a rule, the builder is a deciding factor in the specifications for articles of this kind, and while the man for whom he is building, of course, has a word to say, and can have the final word, the man who employs a builder depends more on the builder's word and advice than the builder depends on the advice of the planing mill man. In other words, it is the builder and architect who are mainly responsible for the element of individuality in building operations. It is this individuality that interferes with the operator of the big planing mill and prevents his making up window frames in advance, carrying them in stock, but where a builder has his own little machine carpenter shop, there is nothing to prevent him making up in advance a stock of frames that will be satisfactory in his own work. That is where he has the inside track on one class of work that looks like stock material, and this element of individuality which has been showing up quite prominently the past two years in the building trade is serving to enlarge considerably the scope of possibilities in the machine carpenter shop. Therefore, while we should keep in mind that there are certain limitations to the work that can be profitably done in the carpenter's own machine shop, we should not lose sight of the fact that frequently there are also undeveloped possibilities that need attention. These possibilities come from two sides, one is the encroachment on the field of standard mill work by this growing element of individuality calling for more special work than ever before, and the other is bringing machine work into play where nothing but hand work has obtained heretofore.

At first it is difficult to persuade the average carpenter to lay aside his hand saw for the machine saw except for ripping boards and things of that kind, just as it is difficult to lay aside any thoughts, habits or manners that have been instilled into us through generations of time and practice for something radically different. Continued association with machinery will eventually develop new ideas and different grooves of thought, but they come gradually, and sometimes so slowly that it makes one feel like a little shaking up to the old order of things would be good for some of us. If the carpenter who is raised by and wedded to the use of hand tools for everything, could look at himself and his work through the eyes of a man raised entirely in a machine wood working factory, it would seriously disturb a lot of what he considers well defined logical ideas, for he would get the other extreme. He would be looking at it from the viewpoint of a man who does as little hand work as possible and turns to the machine to relieve all manner of physical effort. The man raised in a machine wood working factory exclusively, should he contemplate such a job of carpenter work as building a house, would probably insist on cutting all his framing to length in the machine shop. He would not only trim his joist and his studding, but would want to cut his rafters and probably square his sheathing boards and even flooring and weatherboarding to exact lengths in multiples of two feet, or whatever space the studding and joist should call for. In short, he would figure on doing practically all the work to be done on the material right in the machine shop, so that all he would have to to when he put it together would be to set each part in its place and do the nailing. Then he would likely try to figure out some scheme to have a special nailing machine with which he could do this work. Or, after getting started off on this idea of a portable nailing machine, his mind might turn to thoughts of a portable wood working shop, of a few machines, including rip saw, cross cut and jig saw, put into some kind of box-like frame and mounted on wheels so it could be moved from place to place and made do such work as trimming joist, studding and rafters, and, in short, practically all of the wood working that is generally done by hand in the practice prevailing among carpenters and builders.

Of course, this would be an extreme view, and would be impractical to quite an extent, but no more illogical than for the carpenter to insist on doing things by hand that he might do by machinery and save energy and make money. In other words, the machine wood worker would occupy one extreme as compared to the carpenter on the other, and between the two there is plenty of ground to cultivate what can be made to bear a good harvest. Every man will have to figure out for himself just what it is he can possibly do best by machinery and what limitations he should put on efforts of this kind to best meet the requirements of his own peculiar situation, but nearly every man can find a chance to make use of machinery more than he is if he will but give the subject proper study. And that is the purpose of this little discussion, to inspire thought, thought with a view to extending the use of power wood-working appliances for the benefit of the carpenter and builder.

Two Modern School Houses

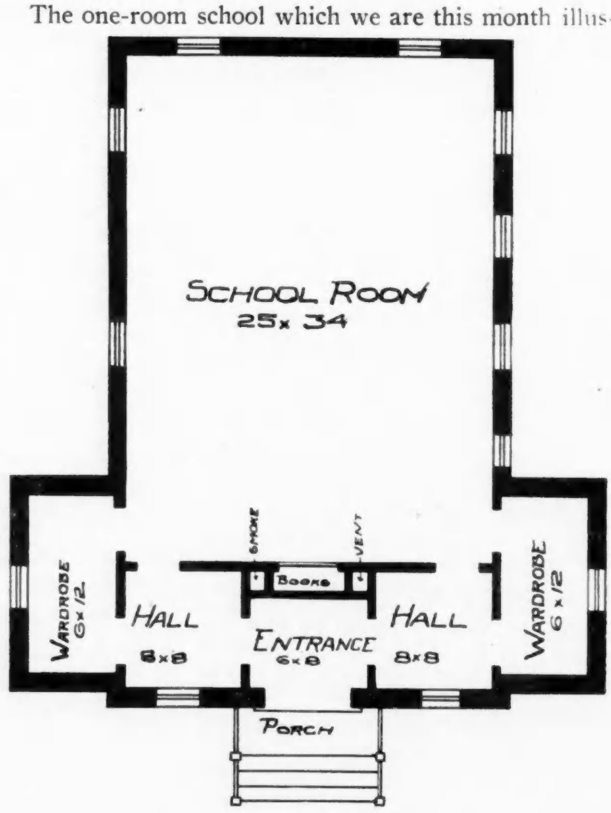
(Continued from page 54.)

be more readily brought there and the noise which must naturally go with sawing and hammering will not disturb any other room in the building.

The building can be constructed of brick or lime stone, depending upon the locality, and the roof is covered with composition roofing.

There are three large exits from the school, which in a building of this size is very essential.

The one-room school which we are this month illustrating is just as modern as the twenty-room building and answers the purpose for its locality just as well.



FLOOR PLAN OF A ONE ROOM SCHOOL HOUSE

The main room is 25 by 34 feet and can accommodate from 45 to 50 students. There are two wardrobes, one for the girls and one for the boys, or if desired, one for the small children and one for the large ones. The outer door does not open into the school room proper but into the entrance hall and this will prevent any injurious drafts striking the children.

Great Benefit to Carpenters

Your magazine is fine and of great benefit to us carpenters.—F. H. Pyle, Farmington, Iowa.

Desirable Modern Houses

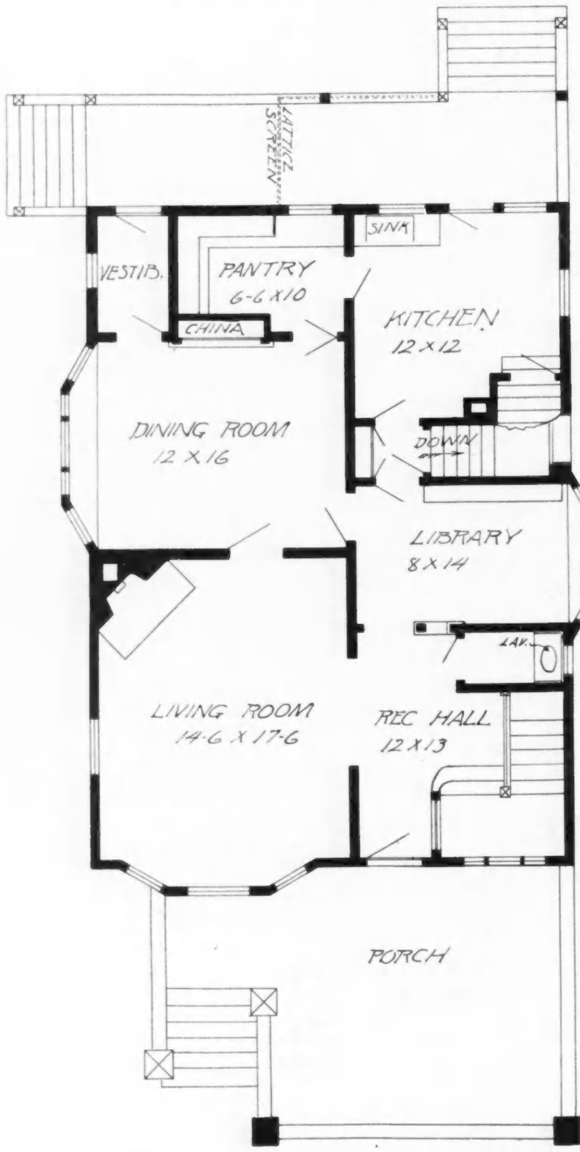
PERSPECTIVES AND FLOOR PLANS SHOWING THE INTERIOR ARRANGEMENT—DESIRABLE FEATURES OF EACH—SUGGESTIVE TO THE CARPENTER AND BUILDER

THE residence shown on this page was constructed for W. S. Woodworth at Hinsdale, Ill. The first story is constructed of siding and the second story is cement. The roof is covered with moss green shingles and the siding on the first library and kitchen. There is a large reception hall at the front of the house and the pantry is conveniently located between dining room and kitchen. There is a tile mantel in the living room which not only adds to the appearance but is also a great convenience. The

story is also moss green. The entire trimming is white giving an exceptionally fine, artistic effect. A noticeable feature is the large porches at both ends of the house and the balcony on the rear of the second floor. The entire interior finish is in dark stained oak. The first floor is divided into the living room, dining room, dining room is so located as to make it private, which is a good feature in any house. The second floor is divided into four bedrooms and the bath room. Each bedroom has a clothes closet and opens directly into the large hall. There are two stairways leading to the second floor.

A Gambrel Roofed Cottage

The illustration and floor plans of the gambrel roofed cottage shown on page 65 is that of a house at Lincoln, Nebraska, erected from plans prepared by Archi-



tect J. H. Craddock, of that place and is but one of the many that bear silent witness of this kind that he has planned in past years. The floor plans show it to be a well arranged and comfortable home of seven large rooms, aside from the large reception hall, bath, pantry and plenty of closet rooms. It has a basement under the whole of the house which is 28 feet by 43 feet 6 inches.

The interior finish is of select Georgia pine, finished in the natural state. It is fitted with all of the modern conveniences that go to make a model up-to-date home. The lines of the gambrel harmonize with the other parts of the house and all blend in making it what it shows to be, a beautiful suburban home.

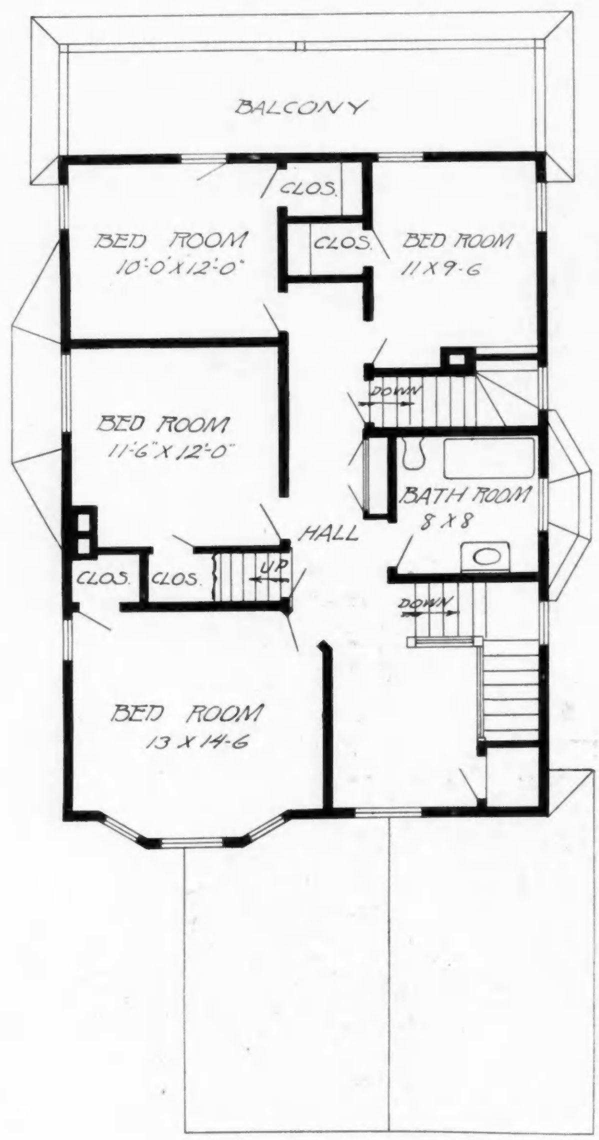
A Stucco Cottage

The house shown on page 66 was designed by A. Raymond Ellis, of Hartford, Conn., and he describes it as follows:

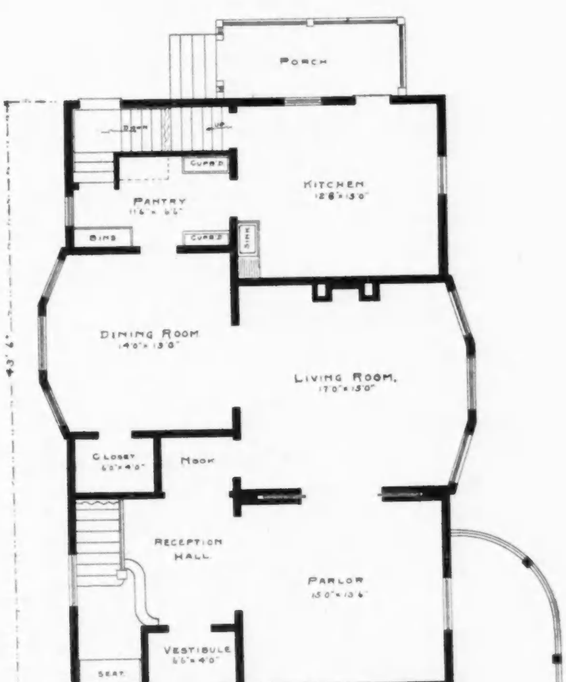
"Building at the present time is more expensive than it has ever been before, but even with these conditions, it is possible, with some common sense, good taste and a practical architect to build an attractive and comfortable house for a small sum.

The problem of building inexpensive and artistic houses, something out of the ordinary, has been well studied, as shown by the accompanying plans. To do this it has been necessary to use some economical means to produce all that is necessary to a home.

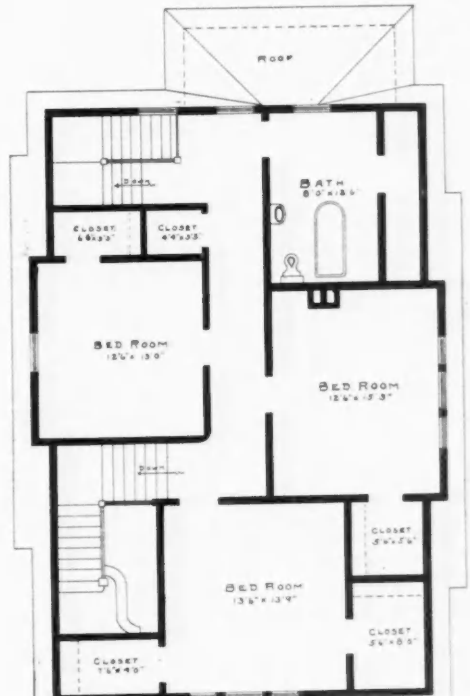
In order to reduce the expense it is necessary to do away with all unnecessary ornamentation, depending upon simplicity to give it a distinctive charm and grace. Therefore cement plaster on metal lath was used for the exterior walls, covering the roofs with shingles.



The terraced porch which shields the entrance to the house, is covered by the main roof sweeping down over it, this supported by the heavy cement columns gives it a simple dignity, which by so doing we gain space in the second floor. All the shingles are stained a Venetian red, which gives a tone to the plaster and



FIRST FLOOR PLAN

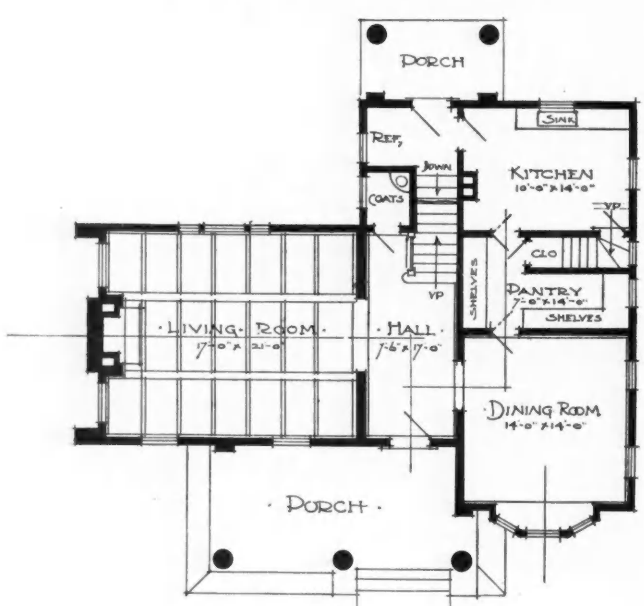


SECOND FLOOR PLAN

the dark brown outside trim harmonize with the surrounding landscape.

The windows divided into small panes and neatly draped give a cozy appearance.

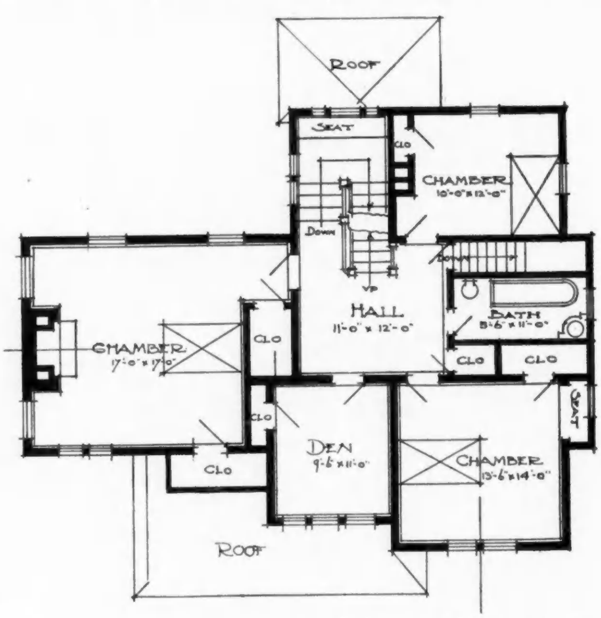
The first floor, as shown by the plan, consists of a large, well lighted living room, while the dining room,



· FIRST · FLOOR · PLAN ·

pantry and kitchen are located so as to be convenient, and no space is wasted. The hall is worthy of careful consideration, for this is the keynote of the general effect and impression of the whole house, therefore the rooms were so placed that the hall will look spacious. From the stair landing a flood of light pours down the stairs and also lights the second floor.

In the attic the available space is used for trunks



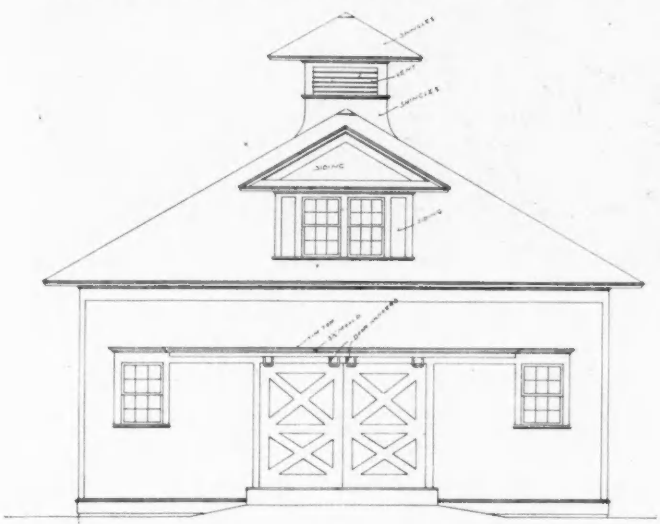
· SECOND · FLOOR · PLAN ·

and storage, and there is sufficient space in the cellar for coal and store closets. This house can be built for $4,000.

Well Planned Horse Barn

PERSPECTIVE AND DETAILED DRAWINGS GIVEN — FULL DESCRIPTION TELLING KINDS AND SIZE OF TIMBERS USED — ALL MODERN CONVENIENCES INSTALLED

WE are this month illustrating the horse barn of the Geo. B. Robbins Farm, and in addition to a few words about its utility we will explain its construction, which, we trust, will be of interest to our readers. To make this article more comprehensive to those interested in barn construction we show an exact reproduction of the architectural plans after which the building was erected, in addition to a photograph of its exterior as it now appears.

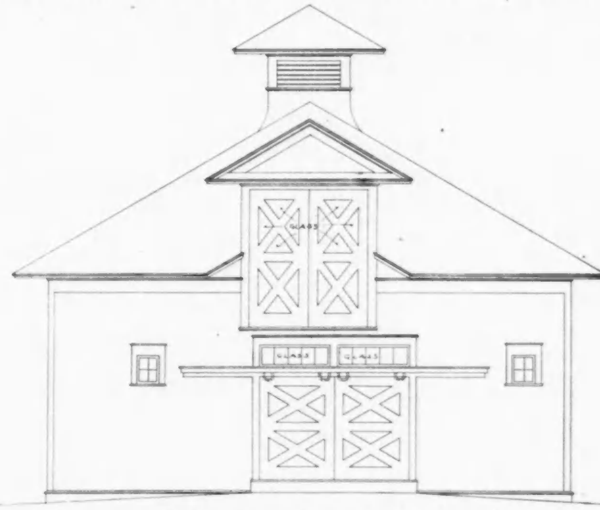


This building is designed to accommodate fourteen horses, having ten single stalls and four box stalls, and all the necessary feed bins, harness room, wash room, grain room, carriage room, storage rooms, etc.

The carriage room, which is 30 by 36 feet clear span without posts, is on the east end and has an entrance of large double sliding doors, and also a large sliding door to the horse stable. The carriage room floor contains a carriage wash near its center and overhead is a large trap door, so any vehicles which are out of use can be hoisted up to the floor above for storage. The carriage room also has direct doors to the harness room and harness washing room. The harness room is equipped with dust-proof cases for the harness, blankets, etc., and the washing room contains a sink with soft water supply and all the necessary fixtures required for the washing and repairing of the harness.

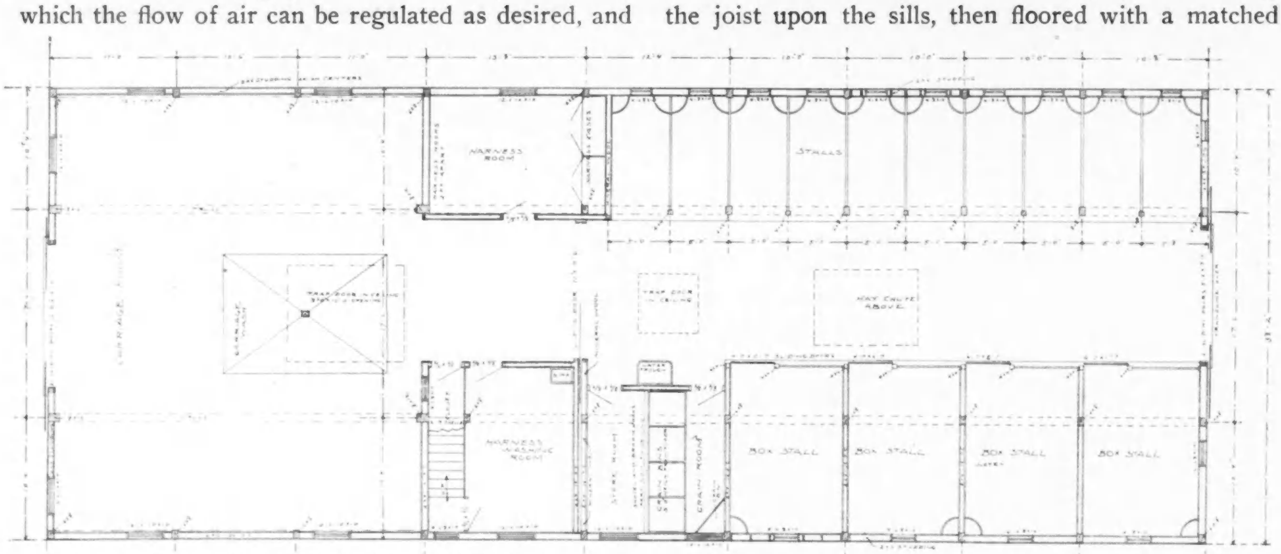
The stable room contains a watering trough, a store room for tools, brooms, shovels, etc., and a grain room for the mixing of feed, and which has small grain bins which are connected with spouts from the larger bins on the upper floor.

The box stalls have sliding doors with a wire grill in the top half, and the partitions between all stalls have wire grills running up to a height of about 7 feet above the floor, thus obtaining a free circulation of light and air. Each stall is equipped with a window that is hinged on top and swinging out. This provides each animal with fresh air and a direct draft upon the animal is avoided by these windows being placed up near the ceiling, also being covered with a wire screen for protection. All stalls have cast iron feed boxes, salt boxes and wrought iron hay racks connected directly with hay chutes from the hay room above. All stall floors are slightly sloped to the back and there connected with a cast iron drain trough running the full length of and on each side of the driveway.



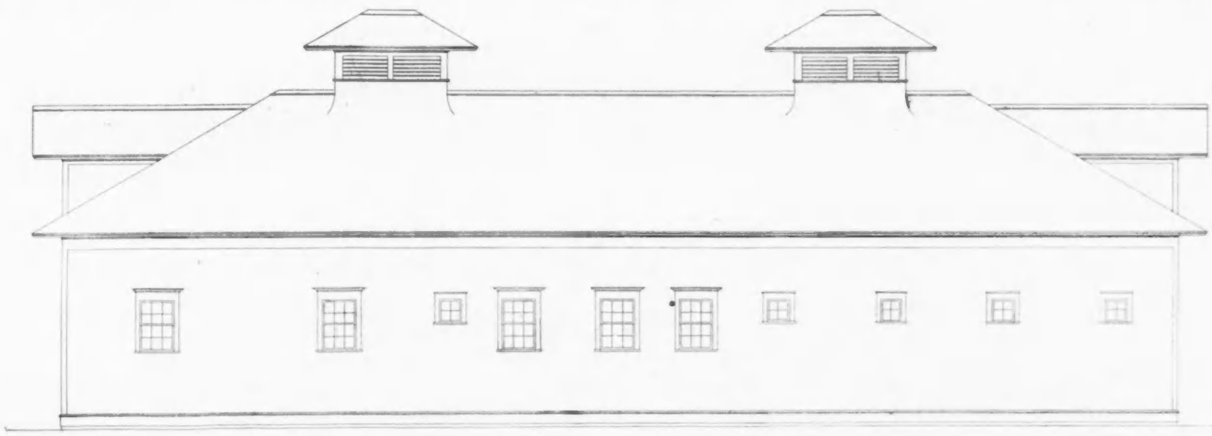
In the ceiling of this driveway is a large trap door for throwing down hay and bedding, and also for the hoisting of hay from the hay wagon in stormy weather.

One of the roof ventilators has a shaft running down to the ceiling of the horse stable for ventilation, and is at this ceiling provided with trap doors by which the flow of air can be regulated as desired, and this shaft at the same time serving for a hay and bedding chute.

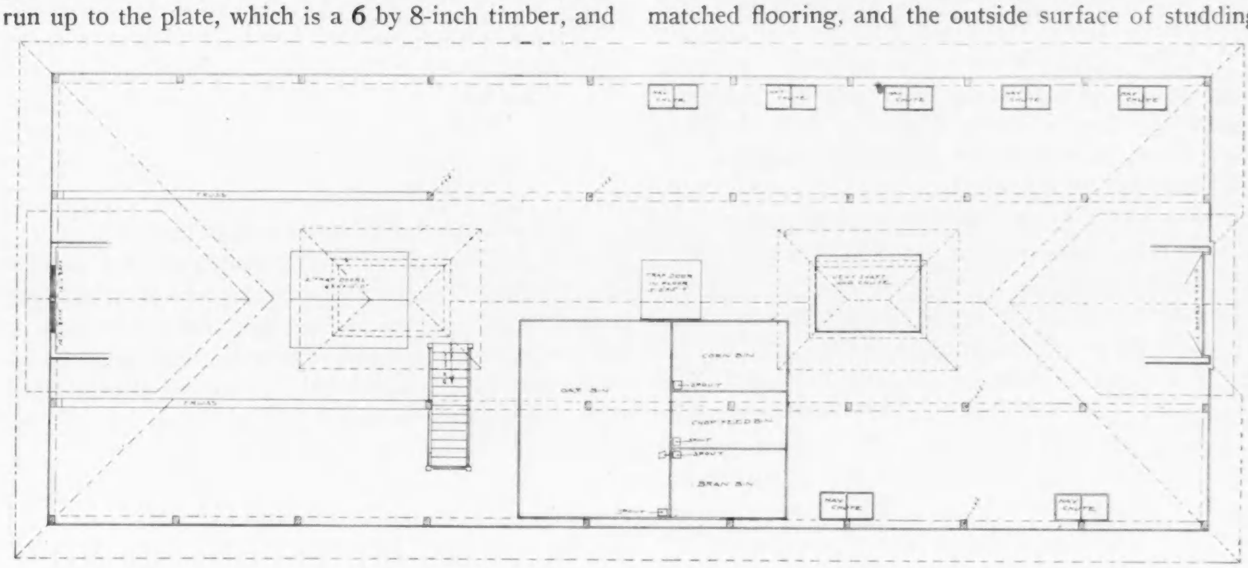


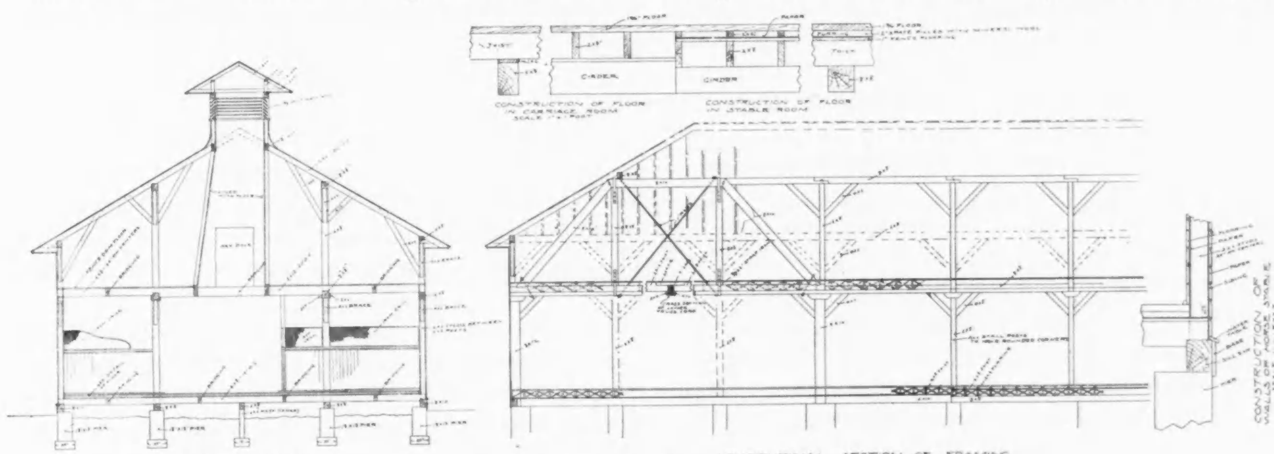
The second story is used for the storage of hay, bedding, grain and feed, and the room above the carriage room is partitioned off into a dust-proof room for the storage of vehicles, etc.

This building is built on a foundation of stone piers, so as to admit a free circulation of air in under the floor and to prevent the floor from becoming cold in the horse stable. It is built, as well be seen in the detail above the longitudinal section, by first resting the joist upon the sills, then floored with a matched floor 1 inch thick, which is covered with a heavy building paper, then 2 by 2-inch strips are nailed one over each joist. The space between these strips is filled with mineral wool, then this entire surface is floored with a strong floor 1¾ inches thick, and on this are laid strips of various thickness to receive and form a pitch to the stall floors. On the sills over each stone pier is set a 6 by 8-inch post for the support of the second-story floor and roof. These posts run up to the plate, which is a 6 by 8-inch timber, and at the second-story joist level there is a 6 by 8-inch timber notched in between these posts for the bearing plate of the second floor joist. All these timbers are braced at all intersections with 4 by 6-inch braces. The outside walls are formed by filling in between these bents with 2 by 6-inch studding spaced 2 feet on centers and well spiked to the floor joist, sills and plates. The inside surface of these studding are covered with heavy building paper, then ceiled with matched flooring, and the outside surface of studding is also covered with paper and then sided with drop siding. The roof is of cedar shingles dipped in moss-green creosote stain, which in contrast with the white-painted walls makes a very artistic effect. The interior of the carriage room is finished with yellow pine beaded ceiling, varnished, natural finish.



NORTH ELEVATION OF HORSE BARN FOR MR GEORGE B ROBBINS HINSDALE ILL.





DRAWINGS OF HORSE BARN FOR MR GEORGE B ROBBINS HINSDALE ILL.

Edward Hurst Brown.

Painting the New House

VARIOUS KINDS OF STAINS SUCH AS VARNISH STAINS, OIL STAINS, WATER OR SPIRIT STAINS, ACID AND ALKALI STAINS, AND WIPED STAINS—EFFECT OF EACH ON VARIOUS KINDS OF WOOD

WHILE some woods are of such natural color that they present a pleasing appearance when the beauty of their grain is brought out by varnish, wax or other finish applied upon the bare or filled wood, as a rule most woods need some treatment to alter their color, either by deepening it, or by changing it altogether, in order to bring the woodwork into harmony with the general decorative scheme of the apartment. This process of changing the color without hiding the natural grain of the wood is accomplished by staining or dyeing. The methods used in staining wood vary considerably owing to the nature of the wood to be stained or to the special effect desired. The principal varieties of stains are oil stains, water stains, alcohol or spirit stains, acid and alkali stains, pigment or wiped stains, wood dyes, and the fuming process. Moreover the color of open grained woods, like oak, ash, chestnut, etc., may be modified by coloring the paste filler by adding some pigment to it. In addition to the above method of staining, all of which are used by the painter and hardwood finisher, there are large quantities of stains sold that are intended principally for the use of the amateur who wants to stain and finish in one operation, and who does not possess the mechanical skill or technical knowledge needed to use a true stain. There are two classes of stains of this kind. The first, known as "varnish stains," consist of varnish mixed with some dry pigment that is ground with it. These varnish stains require constant stirring, while using, to prevent the pigment from settling out or the color from running streaky. Such stains are suitable only for household work, touching up chairs and the like, that have become rubbed and disfigured, or finishing some small article that the amateur tinker has made, and are entirely unsuitable for finishing the woodwork of a new house. Another class of single operation stains and varnishes consists of varnish that has been colored with aniline dyes. These have been extensively marketed in the past three or four years under various fancy names. They have the advantage of being uniform in color, since there is no pigment to settle out, but as all analine colors are more or less fugitive, it is likely that these new varnish stains would fade out more or less on exposure to strong light. Their greatest disadvantage for the practical mechanic is that, being made for amateur use, they dry so quickly that it is difficult to avoid showing laps when used on broad surfaces, like door panels. Moreover in the case of any stain and varnish combination, the flaking or cracking of the varnish, from any cause, leaves the bare wood exposed, while in the case of a proper stain, the surface of the wood remains colored even though the varnish should peel from it.

Purpose of Stains

Until the past few years, stains were employed chiefly for the purpose of imitating a more expensive wood when a cheap wood had been used for finishing a house. For example, white pine and whitewood or poplar were stained to imitate walnut, oak, cherry, rosewood or mahogany, the stains employed being made of pigments of suitable color mixed with linseed oil and turpentine with the necessary amount of japan driers. Coach colors, or pigments ground in japan, thinned with linseed oil and turpentine are used by the painter when he wishes to make stains of this character himself. Oil stains are really nothing more than thin paints mixed from colors that are of a transparent nature, such as sienna, umber, ochre, Vandyke brown or the lake colors (which are of vegetable or analine origin, precipitated on a base of whiting). Lampblack and asphaltum are also used in the preparation of these imitative stains.

Architects, as a rule, were not much in favor of stains of the class just mentioned, as their use was the cloak for a sham—the masquerading of a cheap material under the guise of a more expensive. Moreover the widely different character of the grain of the hardwoods imitated from that of the soft woods that were stained, immediately proclaimed the deception to everyone with any knowledge of the different finishing woods. For a time natural finish was largely used, but the natural color of white pine or whitewood did not harmonize with the prevailing decorative colorings and the colors of oak, ash and the other hardwoods seemed to need more or less modification to fit in with modern decorative fabrics and wall papers. The colorings of the Morris school and the Liberty velvets, the burlaps, denims and other fabric hangings in rich hues, demanded stronger and richer colors than the hardwoods afforded, and yet the beautiful markings of the grain made some form of varnish finish preferable to painted or enameled woodwork. The furniture manufacturers naturally led the way and some, more daring than the rest, conceived the idea of staining oak or ash in shades of green or brown, in dull blues or even in bright red tones. This was the origin of such stains as Forest green, sealing wax red, tobacco brown, Mission oak, Flemish oak, golden oak, Sixteenth Century oak and other colorings whose names meant nothing originally except that they were invented as catch phrases for advertising purposes. Now, however, they have come to be recognized as definite colors or effects. They are not all produced by oil and pigment stains, but these particular tones are obtained by various methods of staining, some of which will be indicated, although it is unnecessary to give the particular formula for each case, since the expert wood finisher can frequently obtain the required effect by more than one method. It will be sufficient for our purpose to indicate the general methods used in different classes of stains.

Objections to Oil and Pigment Stain

The greatest objection to oil and pigment stains is that the color is not carried deeply into the grain of the wood but lies upon the surface. If the wood is dented or marred, its original color shows in marked contrast to the finished portions. Another decided objection is that as the wood begins to darken naturally by age, the pigment in the stain causes the wood to have a cloudy or muddy appearance. In other words, the clear, rich tone of the finish is lost. The advantage of an oil stain is its ease of application and the fact that it does not raise the grain or fiber of the wood and hence no subsequent sandpapering is required.

The next class of stains to be considered are the water and the spirit or alcohol stains. Both of these are made by mixing or dissolving lakes or vegetable coloring matters or analine colors or dyes in water. Many of these stains are decoctions from natural woods, roots, etc., such as logwood, Brazil wood, sandal wood, campeachy wood, dragon's blood, tobacco and numerous other substances of vegetable origin. The aniline colors give greater variety of coloring but are not so permanent as the vegetable colors. These water and spirit stains possess the great advantage of penetrating deeply into the fiber of the wood and of practically dyeing it, so that surface bruises will not show marks. They also produce clearer tones than the oil stains and do not become cloudy or muddy. They cannot be used to any advantage on white pine, whitewood (poplar), cypress or other woods of a soft or spongy nature, since on these woods they cannot be applied to produce an even color tone, but on hardwoods, such as oak, cherry, mahogany and the like, they produce far more beautiful effects than can be obtained by the use of oil stains. The greatest objection to the use of water or spirit stains is that they raise the grain of the wood, requiring subsequent sandpapering before the first varnish coat is applied. Spirit stains are more penetrative than water stains and dry quicker, hence they are better adapted for hurried jobs, but otherwise they have no special advantage. In order to prevent raising the grain of the wood, when using water or spirit stains, some wood finishers add a certain proportion of glycerine or castor oil, but these must be used with the greatest care, since they leave a greasy surface to which subsequent varnish coats do not adhere well. In the use of either oil or water stains, two coats should invariably be applied in order to prevent tiny air bubbles or raised bits of wood fiber causing spots of unstained wood to mar the surface. The second coat should be applied after the first coat has thoroughly dried out and been lightly sandpapered. For some of the stains that have the nature of a dye, a mordant or chemical to fix or set the color is needed. A solution of alum or of green copperas is generally used for this purpose.

In this connection it is well to mention the fact that this question of novel effects in stains has attracted a great deal of attention from wide-awake varnish manufacturers, and it is now possible to obtain many beautiful stains and dyes that give the modern colorings so much desired, especially where furnishings of the Mission or "Craftsman" or other quaint types are to be used.

Many of the woods, especially oak and mahogany, become very beautiful by simply deepening their natural tone. Age will give them this deeper tone, but it is not possible for us to wait fifty or a hundred years for mahogany to assume the deep rich red tones so much admired in old furniture, and we must therefore resort to artificial methods of ageing these woods. For this purpose the acid and alkali stains are particularly well adapted. The oldest stain of this kind used, and one of the best, is lime water, or the milk of lime made by slaking ordinary lime in a sufficient quantity of water. This is brushed over the surface of the wood and allowed to dry, and then the lime is brushed off. If the stain is not deep enough the process is repeated one or more times. The wood is then thoroughly washed and then sponged over with vinegar to neutralize any traces of alkali that might remain, and which would injure the subsequent varnish coats. The greatest objection to the use of lime is that it is slow. Ammonia, reduced with water to the proper strength, is much quicker than lime.

A number of other acids, alkalies or other chemicals are used on woods containing tannic acid—such as oak, ash, mahogany, etc. They have no effect, however, on dry, pitchy or sappy wood, such as white or yellow pine or whitewood. Among these chemical stains may be mentioned chromate and bichromate of potash, which give the golden oak effect on oak or dark mahogany; picric acid which gives a yellow effect and is specially adapted for toning up walnut; iodine, which produces a beautiful brown stain, but is rarely used on account of its expense; caustic soda, which has a darkening effect, and copperas which is used to set and deepen the colors that have been obtained. Sycamore and cherry give excellent effects when deepened in tone with acid, lime or potash and then stained with Bismarck brown, a very beautiful aniline stain.

Fuming wood gives very beautiful effects—where the wood contains tannic acid—especially on oak, which is particularly susceptible to this process—but it is unfortunately not well adapted to standing trim in houses, since it requires an absolutely tight room or box, in which the wood is subjected to the fumes of 26 deg. ammonia for twelve hours or more, until the desired effect is obtained. A good airing is needed to permit the ammonia gases to escape before any varnishing is done. Fuming gives results that cannot be obtained by other means, without any raising of the grain or need for sandpapering.

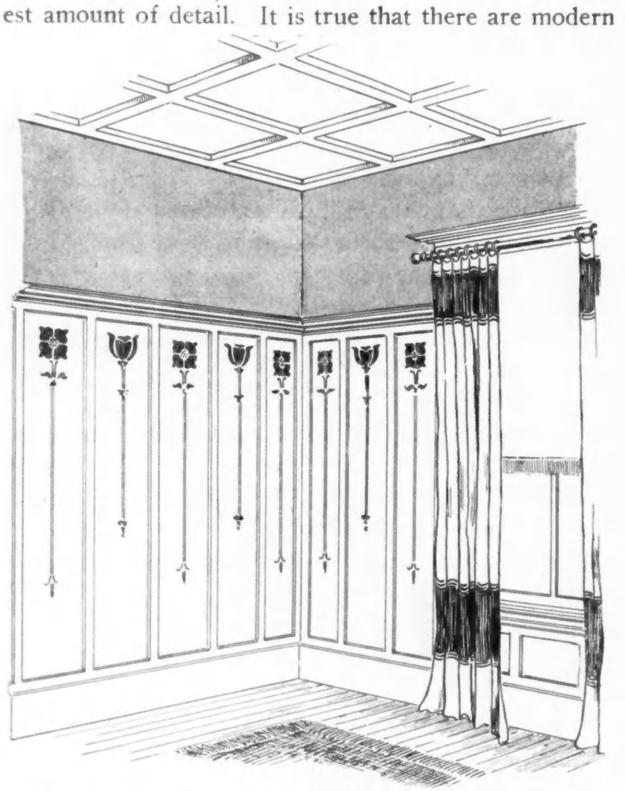
A class of pigment stains, that really are not stains, is used to produce remarkable effects on white pine and develop unexpected beauties in that wood. They can be used on quartered oak with good effect but are not well adapted to any wood of even grain. These stains are made by mixing any transparent pigment color, such as would be adapted for oil stains, including chemically pure green and Prussian blue, or some of the strong red lake colors, with linseed oil and turpentine to the consistency of a thin paint. This is then applied with a brush, the same as an ordinary paint, and allowed to partially dry, when it is wiped off with a cloth. This wiping off leaves the harder portions of the wood practically bare of color, while the stain has sunk into the softer, more open portions of the grain.

Suggestions for Modern Decorations

SIMPLICITY AND BREADTH OF TREATMENT CHARACTERIZE MODERN DECORATION—DESIGNS FOR VARIOUS ROOMS AND SUGGESTIONS FOR HARMONIOUS COLORS GIVEN—STENCILING BECOMING AN ART

By Sidney Phillips

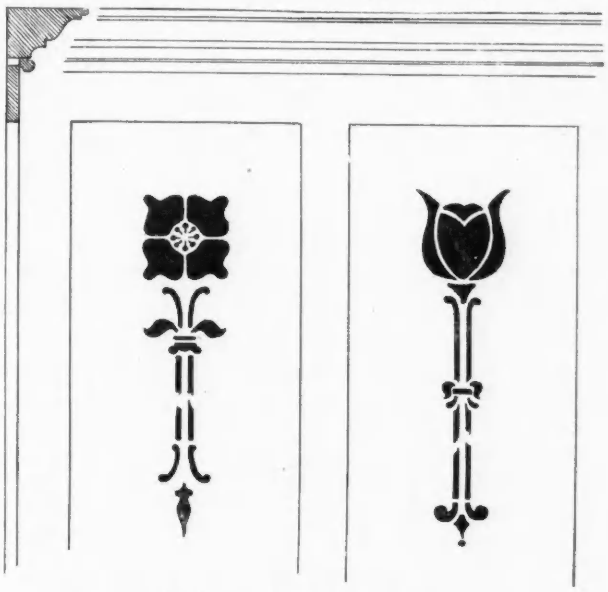
THE key to the character of modern decoration is simplicity and breadth of treatment, rather than multiplicity of detail and mere prettiness. The color treatment is simple, and the ornament is placed so as to obtain the greatest effect with the smallest amount of detail. It is true that there are modern



wallpapers and tapestries in which there is no lack of detail, but it is subdued to a general decorative scheme, so that the minor portions of the design form, as it were, a background upon which the principal motif stands out and thereby making it more prominent.

One of the greatest characteristics of modern decoration is the revival of the stencil. This is by no means new, stencils having been used by the Greeks and having been employed by Chinese and Japanese decorators from almost the beginning of art in those countries. The stencil forms a convenient and inexpensive means of repeating any ornament which recurs constantly in the decorative scheme, but, because it is largely mechanical, it need be none the less artistic. So is the compas a mechanical method for producing a circle, but the decorative purists would not, therefore, object to its use in drawing. Why, then, should they find fault with the stencil, which is a mere tool for producing a given result? The decorator is able to design and cut his own stencils, and he exercises his individuality and judgment in the way he combines them; in the colors he selects and in the actual application of the color. For by skillful brushwork the stenciled ornament is given much the character of freehand work. The colors may be blended and shadows may be introduced. Novel effects of all kinds are possible.

Our decorators have learned much from the Japanese in their handling of stencils for these skilled handicraftsmen are able to produce the most complicated and intricate ornament by this means, cutting the stencils from tough paper which is reinforced with silk threads. Two or more stencils are used, the second completing the design which is only partially contained on the first one. The modern German and French decorators have elaborated on this idea, until they produce pictorial friezes, landscapes, foliage, figure designs and intricate interlacing scrollage by means of these double stencils. Indeed, there is no limitation to the possibilities of stencil designing, and their full usefulness is only beginning to be understood by the average decorator. So far, very few of these double stencils have originated with American designers, but the leading stencil cutters to the trade offer their clients many beautiful patterns that owe their origin to German and French artists. The English decorators are more given to the use of the single or simple stencils,



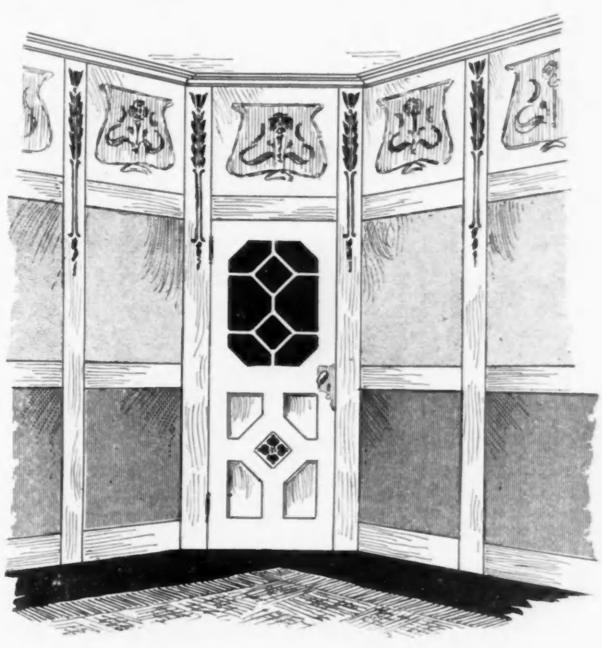
Detail of Stenciled Ornaments

using double stencils only when more than one color is to be employed, but even in these they are far in advance of the crude stencils that were the only kind known a score of years ago, and which brought this art into disrepute. In the old stencils the ties were regarded as inconvenient necessities and were allowed to break the design at their own sweet will. The modern decorator, however, so designs his stencils that the ties form an integral part of the pattern, and the broken and crude appearance of the earlier stencils is in this way avoided. So much for the general subject. Now let us consider the application of some of these modern stencils in decoration.

The first illustration is a sketch of a decorative scheme that would be well suited for a dining room, or a reception room, with a different color scheme, or it might be used in a restaurant or a hotel. The high dado is divided into long narrow panels, twelve inches wide, separated by flat moldings two and a half inches wide by five-eighths of an inch thick. The dado is capped by a heavy molding that serves as a shelf, having a projection of four and a half inches. This would make an excellent place to display steins and other curios, which would stand out well against the background or plain burlaps used for the upper wall. If it is desired to display plates, as well, a narrow groove should be run in the upper surface of the molding, about two and a half inches from the wall, so as to hold the edge of the plate, as it stands upright and prevent it from slipping. The ceiling is divided into squares by means of inch and a half by three-inch moldings. Two stenciled ornaments alternate in the panels, the balance of the room being kept entirely free from decorations. There ornaments may be introduced in the door panels, if desired, with excellent effect. These designs are shown in larger scale in the detailed sketch. It will be noted that the ornaments consist of a quaint flower at the top of a tall, double stem, which can be varied in length to suit the height of the room. It will be noted that in both flowers, the ties of the stencil form the dividing lines between the petals, and are an integral part of the design.

Now let us consider some possible color schemes and modes of treatment. The entire dado may be paneled up of wood — let us say white wood — and finished in white or ivory enamel, the stenciling being done in gold. Either gold bronze may be used or gold size japan may be employed for stenciling, and when it has dried to the right tackiness, the ornament is gilded with gold leaf. The upper wall is hung with a bright scarlet or vermillion burlaps, or a yellow might be chosen instead. The ceiling panels are hung with an ivory or cream colored buckram.

Another suggestion would be to finish the woodwork in forest green oak, with the ornaments gilded. A dull red or a gray green burlap is used in the upper third of the wall. In either case where the ornament is gilded, a very rich effect is obtained by outlining the



stencil design with a very fine black line. This involves handwork and adds considerably to the expense.

Where a particularly rich apartment is wanted and expense is no object, the woodwork may be made of oak, which is not to be filled, but is given a coat of gold size japan, and the whole surface is then gilded with leaf gold, that is beaten with a soft brush into the grain of the wood. If the pure metal is found to be too bright, it may be toned down by a thin glaze coat of asphaltum. The ornament is stenciled on in vermilion outlined with a fine line of black, and the upper wall is hung with blue damask. The ceiling panels may likewise be gilded. A novel and striking effect could be obtained by gilding the panels only, the stiling and moldings, and in fact all the woodwork except the panels being stained black and finished with a dull or egg shell gloss.

The panels may be filled with a bright red burlap, the ornaments being in dark green, with gray green used for the upper wall, the woodwork being in mission oak. Indeed, many color combinations will suggest themselves, that would be both novel and effective.

The second design is suited for the dining room or hall of a country house or seaside cottage, and is well adapted for a room that is furnished in the Mission or Craftsman style. The quaint corner cupboard or china closet is in keeping with the style. The woodwork is of oak, finished in forest green or tobacco brown or some of the other novel stain effects now on the market for use with wax finishes. The broad flat mouldings should not project above a quarter of an inch, and the horizontal mouldings should be kept from a sixteenth to an eighth of an inch back of the vertical finish. The lower panels may be filled with dark red burlap or imitation leather. The middle panels can have a brown burlap, while the upper panels should be hung with a deep ivory or cream colored buckram, upon which the shield-shaped ornaments are tinted in a light gray green or a golden yellow, the ornament being stenciled in bright red. The stencil ornaments on the upright mouldings are to be in bronze or bottle green or in Indian red. The floor is very dark green or black.

Another color scheme would be to use varying tones of dull green or olive for the panels, with salmon colored shields and Tuscan red stenciling.

These two designs, which are capable of many modifications, illustrate the tendency of modern decoration toward simplicity, and also show the effectiveness of a small amount of ornament properly placed, especially when used in connection with plain fabric surfaces.

Constructing Concrete Chimneys

VARIOUS SUBSTANCES WHICH TEND TO DISINTEGRATE CONCRETE BLOCKS—BEST MATERIALS TO USE IN MAKING BLOCKS FOR CHIMNEYS OR FIREPLACES

By Fred W. Hagloch

CHIMNEY and fireplace construction has baffled the concrete builder the past few years more than any other subject, as some would give entire satisfaction and others prove failures.

By a series of practical tests the causes of this difference has been in a measure understood, although much is yet to be learned, and a report of these tests will, we hope, assist in further research.

Sulphuric acid, potash and magnesia are more or less injurious to cement products and the first two are produced by the burning of coal and wood, while magnesia is found in some cement, but as long as the cement product is kept in a moist place, the magnesia is harmless; and as a chimney becomes very dry, the magnesia has the most favorable opportunity of creating disintegration of the concrete; and sulphuric acid or potash having the same effect on concrete, these three elements soon turn concrete into dust by crumbling away. To successfully overcome this our tests have solved much, which is verified by chimneys erected years ago and are now in fine condition, which is due to the absence of magnesia. A few examples exist where in a slag cement having an abundance of magnesia have withstood the endurance test, but only when crushed furnace slag was used instead of sand.

This is understood only when we realize that all slag products are acid and potash-proof, their raw materials being entirely different from that used in making Portland cement, but that the constant dampness alone prevents disintegration, yet Portland cement, made largely of furnace slag, is proof against these enemies, besides having all the qualities of a high-grade Portland cement. Of this class we have but two brands on our market, and a large number of our readers could not obtain them; besides we have only limited time tests.

Natural gas flumes destroy concrete chimneys in less time than any of the above, and it is known that under strong usage sound concrete has disintegrated in a few weeks.

Hence, to make a concrete chimney proof against these elements we must prevent their coming in contact, which is best accomplished by applying two coats of salt and lime to the interior surfaces of the chimney, the solution consisting of equal parts of salt and lime with sufficient water to make same readily appliable with a brush.

Another feature is not to use stone for at least three months after same has been molded, and keeping same very wet both several hours previous and several days after placing.

Our tests bear us out on above and we might add that cements burned at a high heat are preferable.

Sand cement brick made of lake sand and high-burned Portland cement became brittle while those coated are perfectly sound.

One sand cement brick made of lake sand and Universal (slag) Portland cement, remained sound without the coating, which forces us to place Portland cement made of slag among the high grades.

Brick made of low-burned cement showed some sign of crumbling, even though they had been protected by the coating mentioned above.

Something the Boys Can Make

COMPLETE INSTRUCTIONS OF HOW TO MAKE A WASTE BASKET—KINDS OF WOOD TO USE AND PROPER FINISH FOR SAME—ILLUSTRATIONS SHOWING THE VARIOUS PARTS

FIG. 1 is a design for a light waste-basket of good size. Usually, waste-baskets made of wood are heavy cumbrous affairs, too heavy to be easily handled or so light in construction they fall to pieces on the slightest provocation.

This particular basket is light yet substantial,

and was designed by a college professor who delights to spend his odd hours making things.

It is made of oak, and was finished in the natural color of the wood by applying one coat of transparent filler and one coat of varnish. It can be made of soft wood, if desired, and painted or stained.

Square up a piece of whitewood for the bottom twelve and one-fourth inches by twelve and one-fourth inches, by three-eighths of an inch.

For the corner pieces, plane up eight pieces two and one-half inches by 17⅝ inches by three-eighths of an inch.

The slats for the sides are to be three-quarters of an inch, by 17⅝ inches, by one-eighth of an inch. There are nine of these on each of the four sides.

As these slats are quite thin, there may be some trouble holding them while planing. It may be necessary to plane them to the required width and thickness before cutting to a length, clamping one end of the piece to the bench, using a hand-clamp, and plane the free end, then reverse and plane the other. The planing must be done away from, not towards the clamp in order to prevent buckling of the piece.

Square up four pieces for the bottom to a width of two and one-half inches, a thickness of three-eighths of an inch, and a length of a little over thirteen inches. As these ends are to be mitered, they may be cut but roughly at this time.

The top will require four pieces a little over fourteen and one-fourth inches long, by one inch wide, by three-eighths of an inch in thickness. The ends of these pieces are also to be mitered later.

Four pieces of molding each about fifteen inches

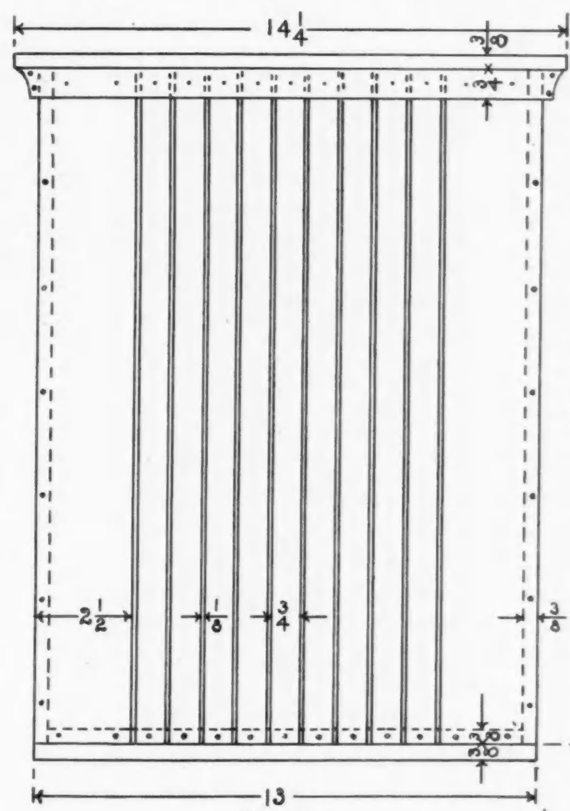


FIG. 1

long, will be needed for breaking around the sides, under the top. Any small molding, such as can be found around any new building, will do. It will be necessary, however, to select one, the lower part of which is like C or D, Fig. 4, rather than one like A or B, for reasons which will appear later.

Having got out the stock, begin the construction by nailing the corner pieces together. These cor-

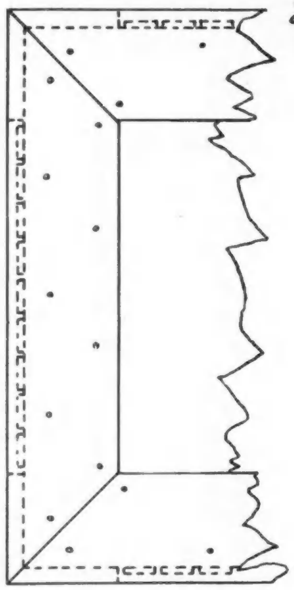


FIG. 2

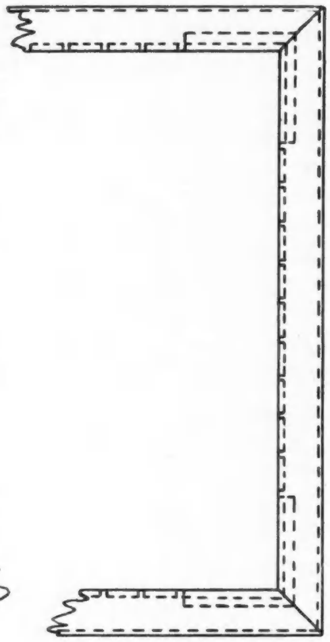


FIG. 3

ner pieces are shown in the drawing, Figs. 2 and 3, as mitered; that is, one edge of each is planed to an angle of forty-five degrees to one of its faces. Miter joints are more difficult to make than butt joints. Either kind will answer here though the miter is the one a master workman would use.

The manner of setting the bevel to this angle is shown in Fig. 6. Hold the beam of the bevel-square against the blade of the steel square. Slide it along, at the same time moving its blade so that it shall pass through the corresponding numbers on tongue and blade of the steel square.

Setting the bevel in this way will necessitate placing the beam against the inner surface of the

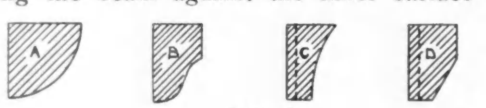


FIG. 4.

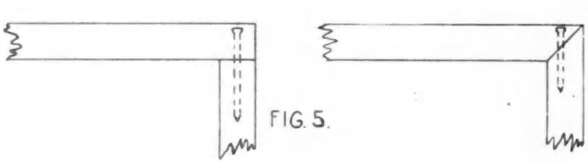


FIG. 5.

board in testing the edge while planing. This is more desirable than to set the blade so as to test when the beam is against the other side. A trial will show why.

If the butt joint is used, one piece on each corner should be made three-eighths of an inch less than the other to allow for lap.

In nailing, place one piece in the vise and begin at one end. This will permit the free ends to be moved so that the side and edge where the nail is being driven may be kept flush or even. Keep the nail at least one inch from the end of the piece so as to avoid splitting, further, if oak is used, use a small finishing nail. In hard wood, dip the point of the nail in oil or soap before starting it. Care must be taken to keep the oil from getting on the head of the hammer, however. Stand so as to look along the piece into which you are nailing so as to sight the nail plumb with reference to the sides of the inner piece. Should a nail bend and refuse to be driven farther, pull it out by placing a small block of wood under the hammer head as shown in Fig. 7. Substitute a larger block as the nail comes out if necessary to keep the nail from being further bent or from enlarging the nail hole.

When the nail has been driven into the wood almost its full length, care must be taken not to mar the surface of the wood by continuing to drive it. The nail head should be sunk slightly below the surface by means of the nail punch, or set. The poll of the hammer is rounded slightly that nails may be set without the use of the punch, but this is for rough work only, or for work where the slight de-

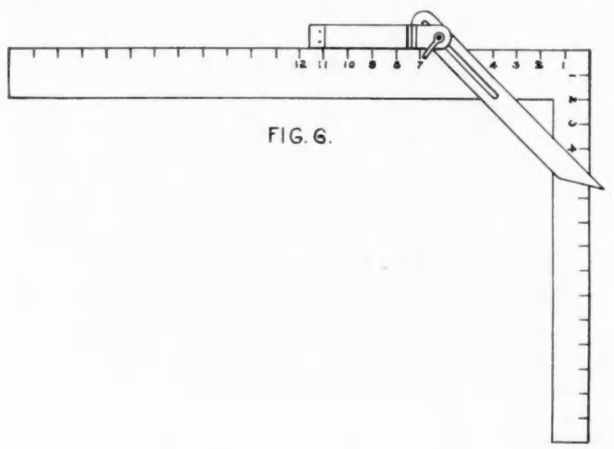


FIG. 6.

pression which is made will not make any particular difference.

Beginners can usually be told by the way they hold the hammer. They invariably grasp the handle about midway between the head of the hammer and the end of the handle. Years of usage have fixed the length of the handle. It did not simply happen to be of the length that it is, but was made as it is purposely. Beginners should grasp the handle pretty close to the end and get into the habit of holding it that way even though it may seem awkward at first.

Having nailed the corner pieces together, fasten them to the bottom piece, keeping their ends flush with the under side of the bottom.

The molding should next be prepared by cutting it to the required length with a forty-five degree miter at each end. The length can be got by holding the molding across the corner pieces at the bottom and marking. It should be thirteen inches from short point to short point, the short cut being on the inside of the piece.

A miter box is very convenient though not absolutely necessary in making these cuts. If none is

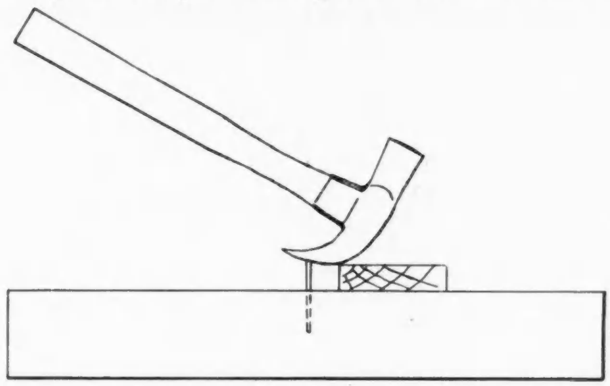


FIG. 7.

at hand the bevel and try-square must be used to give the proper marks. It will be well, in order to secure a good fit, to allow a very little margin in sawing to be taken off later with the block plane. It takes a pretty good workman to make such a joint with the saw alone, unless he "saws a fit" which is too difficult for beginners and will, therefore, not be described at present.

As the slats are not of the same thickness as that of the corner pieces, it will be necessary to rip off the backs of the molding at the ends. Gauge top and bottom of the molding to a depth of one-quarter of an inch, gauging with the gauge block against the back, from each end to a mark squared across the back two and one-half inches from the short cut of the miters. The dotted lines in C and D, Fig. 4, show the cut.

Now nail the molding around the top, nailing from the inside of the corner pieces into the molding, also, nailing from one molding into the other. Nail in but one direction at each corner if several nails are used, otherwise, one nail might strike the other and split the wood.

Place the four pieces, Fig. 2, which go below the bottom, in place. They are mitered at the ends and are thirteen inches long, measured from long point to long point. Their outer edges are to be flush with the sides of the corner pieces.

Nail the four top pieces in place after mitering them to a length of twelve and one-fourth inches, from short point to short point. Their inside edges should be flush with the inside surfaces of the corner pieces. Now fit and nail the slats in place, spacing them so as to have equal distances between. They are to be nailed from the outside at the bottom and from the inside at the top.

In all nailing see that the piece into which you nail has a solid support back of it.

Fill all nail holes with putty colored to match the finish to be used. This coloring can be done by mixing a little of the filler with the putty.

The natural color of oak is suggested. It is obtained by using paste filler which contains no coloring matter, followed by one or two coats of shellac or varnish, allowing each coat to dry thoroughly before applying the next.

Properly Hanging Doors

COMPLETE DESCRIPTION OF SETTING JAMBS, HANGING DOORS AND FITTING LOCKS—DETAILED DISCUSSION OF EACH STEP—THINGS TO GUARD AGAINST IN ORDER TO OBTAIN BEST RESULTS

By A. O. Stien

I DO NOT like to see the head-jamb half an inch higher at one side than the other. But, you may say: "It's because the floor is not level, and the jambs are of the same length." For such a case I would suggest the following remedy: Test floor with level before cutting jambs, then make one longer accordingly. Leaving it out of square at top doesn't do any good, and looks bad. In setting jambs, use a straightedge, plumb inside as well as edge; fasten one jamb at top and bottom, getting head-jamb as near square as you can. If there are several doors of same width, I use a crating, 5 or 6 inches wide, straight on one edge and squared at both ends, cut to exact length to fit between jambs at top. This I place on floor against the jamb fastened, then push the other jamb up to board. This gives the same width at bottom, also tells if jamb sets square through opening. If doors of several widths make crating long enough for widest opening, then after setting jamb, square and cut off for next size. Don't get jambs twisted. Squint through opening from one jamb to the other. If in line, then jambs are straight. They might, even then, be out of plumb. After fastening jambs at both sides, use the straightedge, holding it against inside of jamb; if it bulges out, draw in with nail; where it does not touch straightedge, it needs to be wedged out. When jambs are straight, it becomes easier to fit the door. It is easier to mark the door while casings are off.

Hanging the Door

I never rabbet a jamb for door; not for outside nor inside. Why? Because, if a door is twisted it will never fit against the rabbet, while a stop may be moved to suit. It is claimed that stops jar loose, causing door to rattle. A couple screws through stop near lock would help to keep it in place. Joint door on one edge —getting the crown side in toward room. Have door held up to jamb, mark opposite side and upper corners with a sharp pencil. If door comes above inside of header, set a divider a little less than that difference, and mark along bottom of door with divider. After taking door down, move the two inside corner marks up as much as divider is set. This will give length of door, but not the usual 3/8 short for inside doors. I prefer to square, from corner marks, across edge of door, then draw a line, to get at the sawing from face side. Next plane door square — the edge — to marks — not bevel. Why? Because you want it just the same size on front or face side, and we marked it on back side. By squaring, through edge, we get same size as near as any other way. After the size is gotten, bevel to suit. I use very little bevel on butt side, just enough to clear from binding. I have seen doors beveled about 3/8 of an inch on top. Looks bad, and does no good; 1-16 bevel would be nearer right, if any is needed. After door goes in: place something under it to keep it up to jamb — not very tight; use a thin, sharp knife, mark for butts. I use 7 inches from head-jamb to top of upper butt, 12 inches from floor to bottom of lower butt, marking jamb and door at same time. I use 4-inch butts for 1 3/8 doors, cutting clear across edge, and gauge 1 3/8 for 1 3/4 doors. This leaves butts project alike and also gives enough clearing for base-blocks. Now square from butt mark about equal to thickness of door; if 1 3/8 or less, place point of knife in cut, then move butt against it, and mark for other side of butt. Know which side of mark you are working at. If easy to forget, better make an X below the upper, and one above the lower mark. Set gauge to thickness of door, mark only for length of butt, not way beyond.

In chipping out for butts in jamb — same may apply to other flush work — do not place chisel in knife-mark at first, but a little inside of mark, to chip out a backing for chisel. This prevents chisel from slipping outside of mark. Use chisel for most of cutting, then a router for leveling bottom. I use the router set about 1-32 deeper than thickness of butt; also using it for gauge on edge of jamb and side of door. For fitting butts to doors, I saw across edge, to knife-mark, a little quicker than using chisel only.

Fitting Locks

I use a 9-16 bit, yet fit locks so they don't rattle. A lock ought to fit, yet be so that it can be removed should the door need planing. One trouble is the hole is too small for spindle, so that it rubs against wood, making it work hard or not at all. Use 9-16 bit for spindle; 5-16 for keyhole, and bore straight. After lock is cut in deep enough, mark around front with knife. Use chisel and router. Fitting on strike plate or keep: I measure from edge of door to front of tumblers, usually 7-16 for a 1 3/8 door.

Knowing height, I fasten keep to jamb with the two screws intended. This holds it solid, while I dig out for tumbler and bolt. Inside of keep makes a good backing for chisel, too. After cutting around outside, take off keep, and cut down recess to suit. I bend front of strike-plate away from tumbler, which makes lock work easier. May seem slower to fasten keep first; but with the automatic drill and lightning brace, it don't take long to move a couple of screws, and prevents slipping.

A person told me that he had hung sixteen doors in one day. He did not say whether strap hinges were nailed and about hooks for locks or how. He was an excellent workman, did good work, but ——

It is well that a person can do fast work; but how often door-hanging shows what the carpenter is.

It took me about five hours to hang my first front door, putting on three butts, front door lock and bell.

Hints About Hardwood Floors

"When you buy a house," said Alpheus Tucker, who represents a Chicago manufactory that makes hardwood floors, "examine the floors carefully; it may save you many days of trouble. If carpenters would be careful to see that hardwood floors were perfectly driven together there'd be fewer worried housewives in this land of ours. Hardwood flooring should be kiln dried and the building in which it is laid should be thoroughly dry, too. Too many persons insist on moving into houses too soon; they don't give the building time to dry out and the result is that all the rest of life is filled with sorrow and complaining.

"We positively discourage the use of oils on maple floors, as it has a tendency to discolor the wood and make it look dirty and greasy. If a finished floor is desired we suggest applying two light coats of varnish. Should the gloss of a varnish floor not be desirable, rub the floor lightly with a good rubbing oil and pumice stone with a piece of burlap. Then wipe dry and the gloss will have disappeared, leaving a dull finish, which is desired by many.

"All floors should be 'gone over' from time to time and touched up. In the regular housecleaning the housekeeper should pin a soft cloth over her broom, wetting the cloth and wringing it out so the dust will adhere to it, but be sure to go over the floor with a dry cloth afterward. In case some dirt adheres to the floor use lukewarm water and soap, being particular to cleanse it off as quickly as possible and wipe dry. For removing stains use a cloth saturated with turpentine or benzine. If the floor looks dull get, at small cost, some floor reviver, saturate a cloth with it, wring out half dry and rub the floor with it and you'll get the desired result."

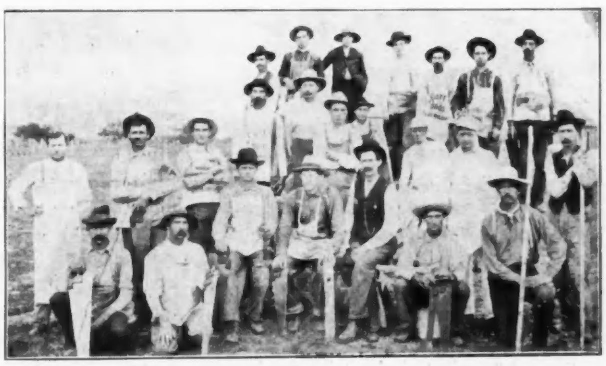
Mr. Tucker says the idea, once popular, of having different kinds of wood in a floor has been superseded. The finest floor, he says, is that laid with one kind of wood, highly polished. It is considered "better taste."
—Architects and Builders' Journal.

Proud of Being a Member

I feel proud of being a member of your great family.
—Olaus Hanson, Ellsworth, Iowa.

Some Members of Our Family

This illustration is of a group of twenty-four carpenters whose subscriptions were secured at one time for the American Carpenter and Builder in the Great Prize Contest. Newton McKay, of Pimento, Ind., was the contestant

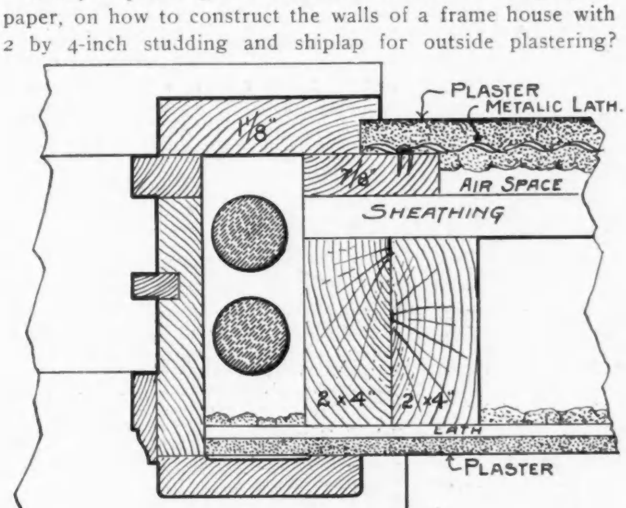


who induced his fellow-workmen to become members of the great family. Pimento is a town of 150 population, so it is seen that the magazine is well represented by Mr. McKay, when he can induce one-sixth of the inhabitants to subscribe for it at once.

Use of Metal Lath

To the Editor: Walcott, Iowa.

Will you please give me some information through your paper, on how to construct the walls of a frame house with 2 by 4-inch studding and shiplap for outside plastering?



Should common or metal lath be used and should window and door frames be made different from those for a frame house with shiplap and siding? Herman Schreiber.

Answer: We would prefer using expanded metal lath secured to strips as shown in the accompanying illustration. This gives a better clinch for the mortar than if the lath was stapled direct to the sheathing, besides it creates an air space and also a wider jamb at the windows, which is essential where large plate glass is used necessitating heavier sash than for the common double strength glass. It is a good idea to plow or groove out the corner of the frame so that the mortar will extend under the edge of the frame. The flashing of the caps can be put on in the usual way and plastered over. Of course, it would be much easier as far as the plastering is concerned to set the frames after the plastering is done, but it would not make as tight a job, especially to prevent leakage at the top. The frame work should be very substantial, otherwise a settlement or vibration will crack the plastering. A. W. Woods.

Proper Stair Finish

To the Editor: Avon, N. Y.

I am putting in a flight of stairs from a room that is painted white. Would like your advice as to finish of stairs. Would oak throughout look well with the white? Please give your opinion on the subject.

Answer: We should not advise the use of natural oak, but if oak finish is to be used for the stairs, a pleasing and effective combination would be to darken the oak with ammonia, as described in the article on "Stairs" published elsewhere in this issue, or to use a sixteenth century effect, obtained by means of sulphuric acid diluted with an equal quantity of water. Forest green oak is also very pleasing in combination with white woodwork. Several manufacturers make green stains suitable for this purpose, or the oak may be stained by dissolving verdigris in soft water or vinegar. Before using the stain on the actual work, try it on a small piece of the wood first. Mahogany land rails and newels, with white spindles, of a colonial design, always make an effective finish for a staircase that lead from a room or hall finished in white. Edward Hurst Brown.

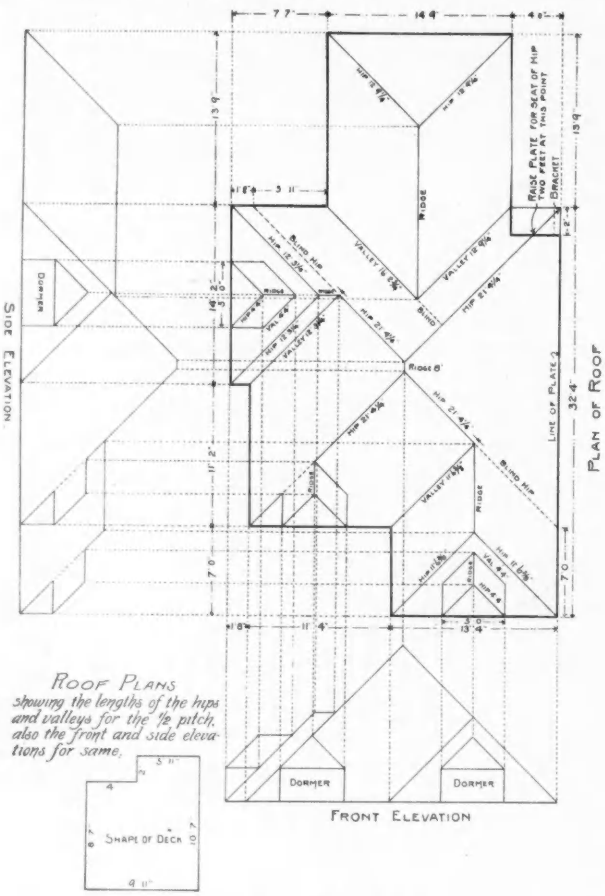
Drawing a Roof Plan

To the Editor: Hammond, Ind.

Although a very recent subscriber to the American Carpenter and Builder, I beg the privilege of submitting the enclosed drawing of the outline of a building, for which I would like to have the roof plan, or elevation for same. The roof to have one-half pitch, and hips with dormer windows in preference to gables, if possible. The building is two-story of brick, and to have shingle roof.

John C. Lavene.

Answer: While this roof is considerably cut up, there is nothing complicated about it, except at the four-foot angle on the right-hand side, which should have been opposite the angle on the left-hand side, but in this there is two feet difference. Now since the question asked for a given pitch, there are two ways to get around this irregularity. First—To make a deck, which should be placed on a level with the ridge of the highest gable and would be to the contour of the plates for the main roof and to the dimensions as



ROOF PLANS showing the lengths of the hips and valleys for the ½ pitch, also the front and side elevations for same.

shown in the small diagram. Second—To extend the toe of the right hip over the plate till it rests in line with that on the left side. Consequently the real seat of the hip will have to be raised above the plate as much as the common rafter rises, in a two-foot run, which in this case, the roof being the one-half pitch the common rafter will rise two feet at the point where marked by the arrow. The planceer at this angle will be two feet wider than that for the regular cornice, but by placing a bracket at the corner it will relieve the wide projection. By squaring up this angle, we find the largest square contained in the roof to be twenty-four feet eight inches by twenty-five feet four inches, a difference of eight inches in the length and width and this difference will be the length of the main ridge. In the plan, we show all of the lengths for the hips and valleys, but it must be remembered that these lengths are based on the supposition that the angles of the building are true, or square, with each other. If not, then the irregularity is bound to show up in the framing of the rafters. These lengths are estimated to a center line as at the center of the ridge tree, and the proper deductions should be made as described in the course of our regular article for the March number of the AMERICAN CARPENTER AND BUILDER. In connection with the plan, we show a front and a side elevation and by tracing the dotted lines from the plan to the elevations, the location of the roof lines in the plan are shown in position in the elevations and needs no further explanation.

A. W. WOODS.

Effect of Frost on Paint

To the Editor: Chanute, Kan.

What effect has frost on paint? Will it freeze and come off or what causes paint in cold weather to blister?

S. O. FORSLUND.

Answer: There is no reason why painting done in cold weather should not be as durable as painting done at any other season of the year, providing the surface painted is dry before it is coated. But if paint is applied over a surface covered with frost, the dampness enclosed by the paint film, is sure to cause trouble and the paint will peel or blister. When painting is done in the winter time, the work should not be begun until all traces of frost have disappeared and the paint should have rather more driers than for summer painting and should be thoroughly brushed out with a "pound" or 6-inch brush. The flat wall brush frequently used for the purpose of saving labor, is not suitable for winter painting.

EDWARD HURST BROWN.

Siding a Circle

To the Editor: Milton, Iowa.

I would like to ask the carpenters and builders to answer the question as to how to side a circle. That is so that the side will run on a line or level with the siding of the straight side. This is often met with on a building having a round corner. I would be pleased to hear from a number of the craft through your paper.

J. E. DONOHO.

CONTENTS FOR APRIL, 1906

PRACTICAL TRADE APPLIANCES

The Edwards Metal Shingle

In the accompanying illustration we show The Edwards Metal Shingle made in tin, galvanized iron and copper and in the following sizes: 7 x 10 inches, 10 x 14 inches and 14 x 20 inches, the 10 x 14 being the most popular size. The method of interlocking the sheets forms the only perfect system of contraction and expansion, thereby making them absolutely water-tight. It requires no mechanic to lay them, as anyone who can drive a nail can do the work, and no solder is necessary. They will not buckle, break or rattle like a tin roof, nor warp or rot like a wood shingle. They are fire-proof, thereby giving a low rate of insurance; are better for roofing purposes than slate, requiring lighter framing; will not break and can be taken off and relaid on another roof without any loss. They are particularly adapted for roofs of not less than one-fourth pitch, also for covering mansards, gables, window hoods, bay windows, etc., and give to a house a distinctive appearance, making it stand out prominently, a tribute to the owners and a continual source of satisfaction to the inmates. They are packed 100 square feet in a box ready for shipping and are made only by the Edwards Manufacturing Company, the "Sheet Metal Folks", Cincinnati, Ohio, who will gladly furnish samples and prices upon request.

An Explanation

The Duby & Shinn Manufacturing Company (Incorporated), of New York City, have had so many cases of misunderstanding among the dealers who have filled orders with the common squares in place of the "New Universal" because of the fact of the "New Universal" being numbered 1, 2 and 3, and on account of these being similar numbers to those on the common squares, that they are compelled to adopt new numbering, and herewith announce to the trade that henceforth their squares will be numbered as follows, viz.: The 6-inch size, No. 6; 10-inch size, No. 10, and the 13-inch size, No. 13.

Handbook on Reinforced Concrete

A valuable treatise on reinforced concrete construction, which will prove a welcome addition to the literature of modern engineering, has just been issued by the Northwestern Expended Metal Company, of Chicago.

This book deals with the value of expanded steel, and its application to reinforced concrete in every form, giving tables and calculations for its use with unerring certainty.

It shows the comparative value of concrete and steel when used together, giving simple rules for determining their proper proportions and their easy and practical application to all classes and kinds of structural work.

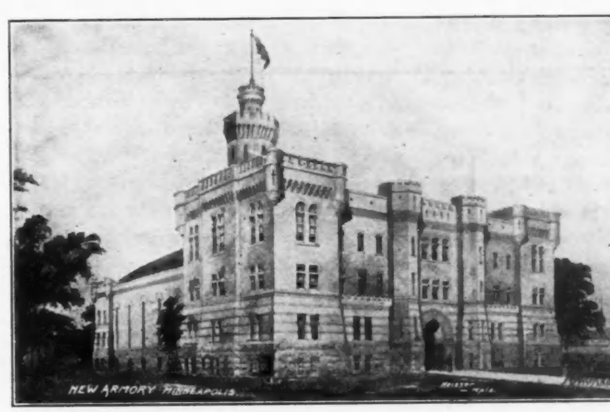
The principle and disposition of concrete and steel sections laid down are without doubt the most striking application to lines of stress ever yet seen in the field of reinforcing methods, and clearly demonstrate the superior value of expanded steel in the construction of beams, columns, girders, floor slabs and, in fact, anything made of concrete.

The book is a most convenient size for the pocket and ready reference, being free from all superfluous and useless matter, but giving just the information needed for all practical purposes.

Those interested can secure a copy by writing the Northwestern Expanded Metal Company, 780 Old Colony Building, Chicago.

New Minneapolis Armory

The new Minneapolis armory, the illustration of which is shown herewith, is an excellent example of cement brick construction. This building is 200 feet square, and is a most beautiful and imposing structure. All outside walls are made of cement-sand brick which are now being manufactured on

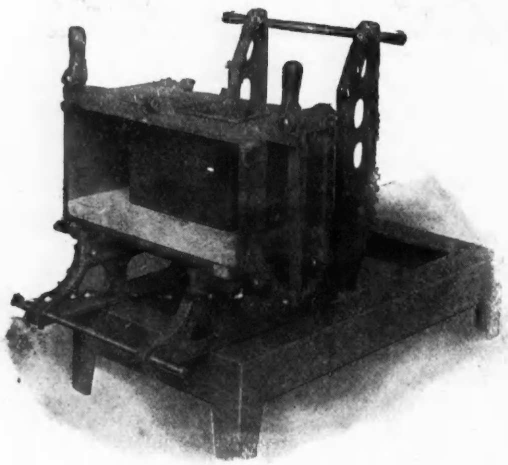


the ground by the Peerless cement brick machine. This machine is simple, durable and rapid, and one of its most attractive features is that it is easily operated by one man. The manufacturers will be pleased to send catalogue and price to those who are interested. Address, Peerless Brick Machine Co., Lumber Exchange, Minneapolis, Minn.

Perfection Cement Block Machine

No block can be made perfect unless the tamping is done on the rock face; this necessitates tipping the mold. The device patented by the Enterprise Foundry Company of Rochester, N. Y., is the simplest and easiest of them all for doing this. It does not take two strong men to tip their blocks. A child can do it with ease on the Perfection.

The Perfection Cement Block Machine is made of the best of iron and each part is carefully machined, so that it is not necessary to employ a mechanic to operate it, but any person with average ability can do excellent work with the Perfection. The following are a few of the reasons the manufacturers give why the Perfection Block Machine is the best: It is the only machine tamping on the rock face that can be operated by one man. All the rock faces are exact reproductions of expensive cut stone. It can be operated by inexperienced labor. It can produce a larger amount of better blocks per day than any machine on the market. Either wood or iron pallets may be used. It is built low down, so that a man working it stands in a natural position.



The New Hero Furnace

A striking feature of the New Hero Furnace is that it has fewer joints than any other furnace made; the radiator has no joints. It is all cast iron and is especially adapted for a combination of hot air and hot water. Those who have Hero furnaces don't have to shake a clean bar to clean a dirty one, as all have separate grate bars, without cog wheels or bolts. The Charles Smith Company, who manufacture these furnaces, also have a full line of hot air furnaces and hot water furnaces, which are all fully described in a new special catalogue just published. They also tell what it will cost to heat a building of any size by the most approved method if plans or pencil sketches are submitted. Address, Charles Smith Company, 40 Dearborn street, Chicago.

Combined Level and Grade Finder

This instrument, manufactured by Edward Helb, of Railroad, Pa., is most complete in all its arrangements, and is the only one of its kind on the market. In size and appearance it is like the ordinary spirit level, being two feet long, three and one-half inches wide and one and five-eighths inches thick. Moreover, it serves every purpose of the ordinary level. However, on account of the longitudinal recess formed in the bottom, by means of which it is possible at first sight, to find the true bottom level of any grade or surface, at any distance, the instrument far surpasses the common level, even for ordinary leveling purposes, as it will at once show the exact heights in inches or degrees needed to block up to a true level.

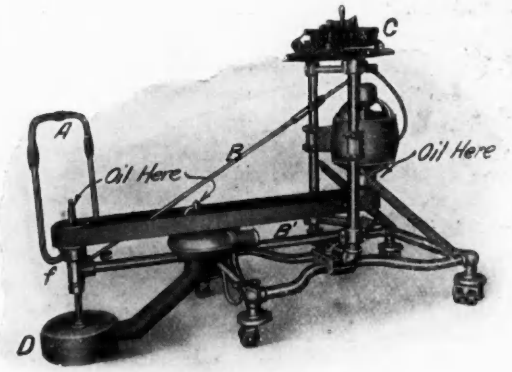
The chief distinguishing feature of the combined level and grade finder, however, and that which gives it its great value, is the graduated dial, with the pointer, in the side of the level. The dial makes the instrument serviceable to all forms of carpenter and mechanical work, and in all forms of grading, landscape gardening, excavating, etc., it enables the ordinary laborer to do work which otherwise often requires the expense of a civil engineer. Moreover the dial, in connection with the spirit level, makes the instrument a double proof of accuracy, both for horizontal and vertical positions. A booklet will be sent to all readers. See advertisement on another page.

Ransome Floor Surfacer

In our issue of February we gave an illustation and description of the new Floor Surfacing Machine being manufactured by the Ransome Concrete Machinery Company, 11 Broadway, New York City, in which an error occurred in the name of this machine. It is called the Ransome Floor Surfacer, instead of the Rapid Floor Surfacer, as appeared in that issue.

It nevertheless is a "rapid floor surfacer," as it not only will do the work of from five to eight men, but do it better than is possible in the old slow, back-breaking method by hand. In addition to its successful application to old and new floors of hard and soft wood, parquet, tile, marble, and in fact all kinds of floors to be found in large buildings, as well as residences, it is being extensively used in skating rinks and bowling alleys, and is revolutionizing the floor-surfacing industry, and creating a new field for the mechanic of small capital as well as for the large contractor.

For hospitals also it at once appeals to the authorities for sanitary reasons, producing as it does a smooth, glossy surface that can easily be kept in a sanitary condition.



This machine is shipped set up ready for attachment to the electric current, after which any ordinary mechanic can operate the machine. It is equipped with either direct or alternating-current motor of 1½ horse-power, and is manufactured by the Ransome Concrete Machinery Company, 11 Broadway, New York City.

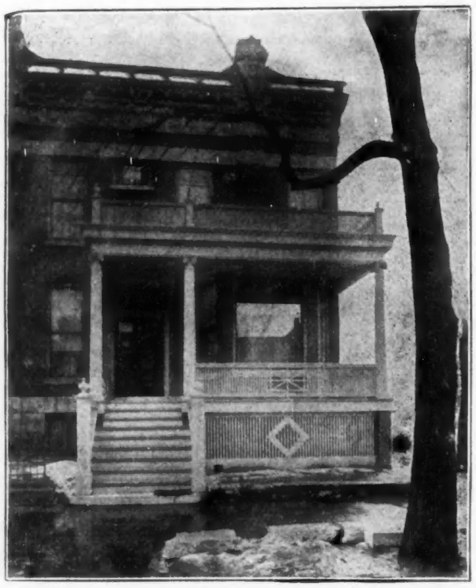
Colonial Porch Columns

Go along the streets of our suburban and country towns, and compare the different views and styles in houses, you will agree, there is nothing that will increase the appearance of a residence—and the only resource of the contractor or builder to add tone, elegance and a friendly appearance to a home, is a pretty, substantial colonial porch front.

It is usually the most inviting and welcome place during the evenings of our warm and hot summer time, for anyone to enjoy several hours of rest and recreation in comfort. The owner or builder who contemplates the erection of a porch should, to combine prominence and beauty, consider very carefully the quality and workmanship of the material required to build a substantial porch. There is a very large difference in the construction of the joint in the different porch columns which are offered in the market today.

By appearance when new they may look nearly all alike,

but as the construction of a poor and a good joint can hardly be detected from the outside, the builder who neglects to investigate this very important part of columns

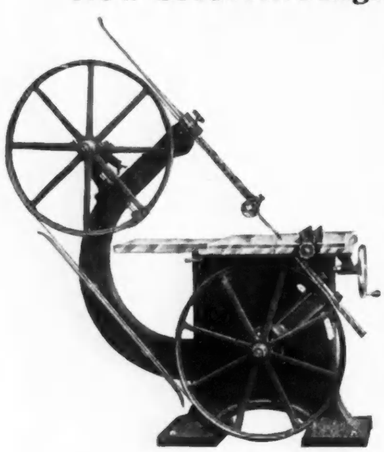


will invariably regret it within a short time, as it is almost impossible for a porch column, which is exposed to all the various changing conditions of the weather to stand, without coming apart, unless it is staved and built up with a good lock joint.

For this reason we beg leave to call attention to "Koll's (original) Patent" Lock Joint Columns, manufactured by the Henry Sanders Co., 70-80 Weed St., Chicago, Ill.

The success they have had with this class of work gives us pleasure to recommend their goods. They offer a column with the absolute guarantee that it will not come apart, or show any defects so common in solid columns or those built up in the ordinary way. We strongly advise anyone who contemplates the erection of a home or residence to ask for their illustrated catalogue and send them your bill or estimate of all porch material required.

New Crescent Angle Band Saw



The cuts of the band saw shown on this page show a new machine that is a decided innovation from the common type of machines. The machine is designed to overcome the difficulties and inconveniences incident to the tilting-table machines; and on this machine the table is always level whether doing square or angle sawing, regardless of the angle being cut. This is accomplished by tilting the arm upon which the upper wheel is mounted to the desired angle. This arm is hinged into the pedestal in a very rigid manner, making the machine as rigid aud durable as any of the common type of machines. The method employed in hinging the arm is very similar to the method of mounting the table of a common drill press to its column and in comparison is as rigid. The only operation necessary to change angle of cut is to turn hand wheel at side of table until index under table points to desired angle on the graduated quadrant. The guides keep proper alignment with saw without attention. There are no sliding throat-blocks to

Johnson's Wood Dye

"For the Artistic Coloring of Woods"

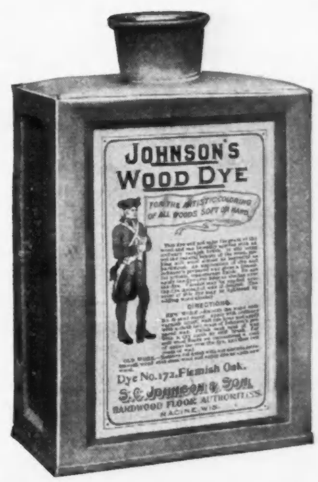
Johnson's Wood Dye is the result of years of experimentation. Because of its acknowledged superiority it has met with wonderful sale. Don't confound Johnson's Wood Dye with various "stains," now on sale. Water "stains" and spirit "stains" raise the grain of the wood. Oil "stains" do not sink deep into the wood, nor do they bring out the beauty of the grain. Varnish stains do not properly color the wood—the color being only in the finish. When varnish finish is marred or scratched it shows the natural color of wood—revealing the sham. Johnson's Dye is a dye. It penetrates the wood, does not raise the grain; retains the high lights and brings out the beauty of the wood. Johnson's Dye is the best for use on floors, interior woodwork and furniture.

Don't buy "stains" but be sure to get Johnson's Dyes if you desire best results.

Johnson's Wood Dye, any desired shade, is sold by the best paint dealers. Insist on getting the genuine—don't take a substitute.

Johnson's Dyes are Prepared in all Shades as follows:

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



One-half pint cans	**30 cents**	**Quart cans**	**85 cents**
Pint cans	**50 cents**	**Gallon cans**	**$3.00**

One gallon covers 700 square feet upon hardwood, 400 square feet upon soft wood. It is very easily applied with an ordinary paint brush.

Special FREE Offer. We will send you a sample any shade, absolutely free, for your paint dealer's name.

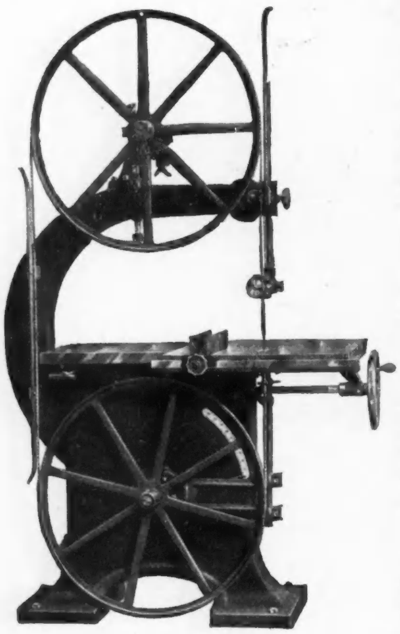
Send for FREE Book. We have just published a new edition of the interesting, practical book, "The Proper Treatment for Floors, Woodwork and Furniture," that we will send you free on request. This is illustrated from life and written by a wood-finishing authority with over 23 years' experience in this line of work. Contains many ideas for your business.

Write us now. Mention edition ACB4.

S. C. JOHNSON & SON, - RACINE, WIS.

"The Wood-Finishing Authorities"

push into position, as the table travels automatically to keep saw in proper register in the saw-slot. The one operation of turning the hand-wheel takes care of all the adjustable parts of the tilting mechanism; and if desired the machine may be tilted while the saw is cutting. This feature adapts the machine for boat work, or other similar work. The arm is suit a bl y counterbalanced so hand-wheel turns easily. Extreme simplicity is also claimed for the machine, there being but a few more parts used than on the common type of band saw made by the same manufacturers. The novel features of the machine are covered by patents recently issued.



The machine has already had an extensive sale in advance of newspaper advertising, and the manufacturers report that they have plans under way for enlarging their factory to accommodate their increasing business. A postal card addressed to The Crescent Machine Co., Leetonia, Ohio, will bring a copy of their new catalogue in which the above machine is more fully described, which catalogue also describes the common band saws, jointers and saw tables produced by this company.

Peerless Concrete Block Machine

In any new industry, improvements are rapid and decided. A machine that has been on the market for a year or two is superseded by something that is more adjustable, more automatic, more rapid, more easily operated, more elastic and adaptable in every way. This has been especially true of cement block machinery. Elsewhere in this issue appears a cut of the Multiple Automatic Peerless Concrete Building Block Machine which has been in actual operation an entire season with the result that it has increased the output of trial plants 60 per cent over the best high grade 32" machines on the market. Note its extreme simplicity and the absence of chains, racks, gears, etc.

Given two machines under equal conditions, operated by the same number of men of equal ability, tamping block equally, it is evident that that machine has the greatest output which:

First.—Forms the mold and again releases the blocks with the fewest operations.

Second.—Makes the most blocks at one machine full.

Third.—Leaves the blocks in the most convenient position on the machine so that all may be removed at once.

Makers have been trying for some time to obtain perfection in one of these lines, more especially the first and second.

In designing the Peerless, the idea constantly kept in view was to put a machine upon the market, combining both the multiple and the automatic features, a machine more automatic and having a capacity greater than that of any other machine, the theory being that both of these feat-

What Lorenzen is Doing for You, Mr. Contractor - Builder

These illustrations represent some of our expensive magazine advertising this season.

You will notice its attractiveness and high class character. It is a guarantee to people of refinement that Lorenzen Mantels are of superior quality.

Hundreds of thousands of readers are already familiar with our products and the constant repetition of the name "Lorenzen" from month to month means inquiries to contractors, builders, architects and dealers in general.

Now, if you will become the sales-agent for

Lorenzen Mantels

we will throw all our efforts your way to aid you in making sales.

Besides that, we have a plan for protecting you, no matter who receives our catalogue, or what prices we quote to inquirers.

This is something no other mantel house in the United States will do, and if you wish to learn more about it, write us *now* for full particulars.

This is well worth investigating.

Lorenzen Mantels have a reputation that in itself is valuable, and when we tell you what our plan for your protection is, you will certainly agree with us that it pays to handle Lorenzen Mantels.

Write us todayon your business letterhead, and we will tell you how our dealers make money selling Lorenzen Mantels.

Fifty Lorenzen Mantels recently selected by the U. S. Government and shipped to Pekin, China, to be used in the new Legation Buildings, evinces the merit of the Lorenzen product.

Ask for our big 100 page catalogue, a most beautifully illustrated book of Mantels, Grilles and Fireplaces. Sent Free.

CHAS. F. LORENZEN & CO., Inc., 242 North Ashland Ave., Chicago.

ures were necessary to secure the greatest output and speed in the machine. Actual tests have demonstrated that the theory upon which the Peerless was built is correct. The advertisement of the Peerless appears elsewhere in this issue, and the manufacturers, the Peerless Block Machinery Company, 353 Third avenue, Milwaukee, Wis., will be glad to explain to any persons interested in concrete blocks (whether they already have a machine or not) its labor-saving and practical features. The Peerless represents the highest type of concrete block machines, as it contains many new and heretofore unheard of adjustable features including an adjustable, divided bed, adjustable cores and adjustable pallets. It has been found in actual trials to be true to its name, "Peerless" both as to variety and output.

A New Blind Fastener

The H. B. Ives Co., New Haven, Conn., the well known manufacturers of window hardware specialties, are placing upon the market the Upson Patent Blind Adjuster and Fastener for outside blinds, shutters and sash. They cordially invite the attention of architects, carpenters and builders and house owners to the merits of this article, which are more fully described in their advertisement on another page of this issue. They have just issued a reduced size illustrated catalogue of 51 pages of Window Hardware Specialties which they offer to mail free to any carpenters desiring the same.

Round Track Door Hangers

The Allith Manufacturing Company are offering a full line of round track door hangers which have proved from actual use to be the most satisfactory hangers on the market.

The reliable Nos. 1 and 2 are used for ordinary barn and light warehouse doors. The Allith No. 3 for heavy warehouse and fire doors. The Reliable parlor-door hangers, the latest addition to their line, has met with the instant approval of all who have used them.

All these hangers are made of the highest grade malleable iron, with hardened steel roller bearings. The track is a round steel tube of different sizes and weights for the different hangers; with malleable iron supports fitting inside of the track. These supports may be spaced to fit any requirements. This round track overcomes all friction, and in connection with the roller-bearing hangers makes the strongest and easiest running sliding door fixtures possible.

The hangers are very easily applied, as there is no cutting of the door, and with the adjustable track support the track can be installed very rapidly. Especial attention is called to the No. 3 Allith hanger and automatic fire-door fixtures, of which they make a full line, guaranteed to meet the requirements of the insurance underwriters.

Book Reviews

Building Construction and Superintendence. By F. E. Kidder, C. E. Ph. D. This work is the last of the series of "Building Construction and Superintendence" from the hand of Mr. Kidder and the closing work of his life. A review of its pages show a careful and conscientious discussion of the subject, and the language throughout is clear and easily understood by all architects, builders and students of architecture. The book will be found a useful and convenient treatise on the subject of trusses and roof construction. It is published by William T. Comstock, New York.

The Woodworker's Bench Clamp

An extremely useful invention in the interest of all bench workers is being placed on the market, called the Woodworker's Bench Clamp. This clamp is placed in the bench across the head of the bench about the location the side vise is usually placed. It is set into the bench so the bed

KEITH

ARCHITECT.

MINNEAPOLIS, MINN.

Not what you PAY but what you GET!

Why? Because upon the plans you buy and more especially the **details** (these make or botch the design) depends utterly the **proper** or **improper** expenditure of the **entire amount** of your building fund.

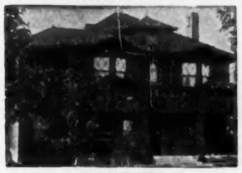
SEE LOWER LEFT HAND CORNER FOR OUR LIST OF PLAN BOOKS

Design No. 1106 as recently built near Minneapolis

The owners of "Columbia Heights," a new suburb of Minneapolis, built six cottages after competition designs of six of the leading architects of Minneapolis. **Six thousand people visited the houses and nearly 4000 voted.** Of these 4000 votes the **Keith** house **received over 2500** and was awarded the prize that had been **previously accorded to it unanimously without the knowledge of the public** by the Park Board of Minneapolis, so the public verdict was simply a most emphatic endorsement of the Park Board's official decision. The exterior of this design, as will be noticed, is made direct from a photograph aud shows the house as it appeared after completion.

The simple treatment given in this cottage home is the making of it. The large porch columns which support the second story give a solid and substantial appearance. The house is estimated to cost with a full basement, heating and ventilating system, $1,700, under our regular schedule of prices. This includes hardwood finish in hall, sitting room and dining room, and hardwood floors both stories. Particularly attractive is the little hall with its seat and half screened staircase. The little bay in the dining room has a shelf for flowers. The windows of this bay are of leaded glass, and with plants on the shelf will make a pretty feature in this room. **Price of complete working drawings, details, etc., only $15.00.** Think of what $15.00 spent for proper details will do for you in **properly** expending $2,000.00. Cost, $1,700. Width, 23 ft. Depth, 38 ft., including porch. Height of basement, 7 ft. First story, 9 ft. 6 in. Second story, 8 ft. 6 in. Blank contract and bond included with plans.

No. 841.



No. 869.

We have **1,200** tasteful, practical designs in our various books of plans as follows:

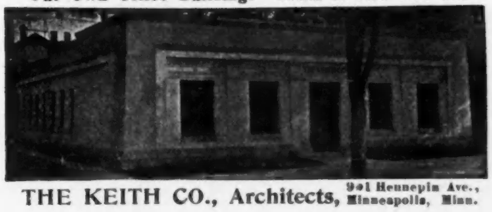
128	Studies of Sum. Ctgs.	$1.00
119	Brick and Com'n Houses	1.00
28	Stables and 2 Auto Houses	.50
55	D'b'l Houses, Flats, etc.	1.00
76	Cottages, less than $800	.50
90	Costing $800 to $1200	.50
136	" $1200 to $1600	1.00
134	" $1600 to $2000	1.00
163	" $2000 to $2500	1.00
174	" $2500 to $3000	1.00
189	" $3000 to $4000	1.00
154	" $4000 and up'd	1.00
17	Model Schoolhouses	1.00
31	Modern Churches	2.00

(A Keith Plan has ORIGINALITY)

Select With Care Your Architect

It means much to you, for the home you build expresses you personality "*Through its halls and porticos runs the story of your life.*" You want your home PRACTICAL, and a credit to you also. We can save you money by securing its wise expenditure. *That's a vital matter too.*

Our Own Office Building. Come in and See Us.



THE KEITH CO., Architects, 901 Hennepin Ave., Minneapolis, Minn.

No. 1085.

No. 1070.

No. 1080.

The Exquisite Beauty of

ENGLISH HALF-TIMBER COLONIAL, SPANISH AND MISSION DESIGNS

are charmingly illustrated and described in W. J. Keith's beautiful new book, "**Historic Architecture for the Home Builder.**" 264 pp., 127 ills., $2.00 (not a book of plans.)

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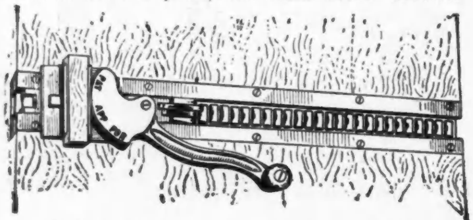
piece is flush with bench surface. It was designed to centralize in the one tool the functions performed by the side vise, the dog and the tail screw, and in addition performs a work that neither of the three tools mentioned will answer for. The principle is very quick acting. The material is inserted between the jaws, the cam lever thrown around



and the work is held firmly in position, leaving both hands free to work. The jaws are adjustable and shape themselves to any design of material that may be worked. When clamp is not in use both jaws and all mechanism above surface of bench is shoved back out of the way so there is nothing obstructing working across the entire length of bench. It will receive any width material up to 13 inches, and additional sections are furnished for any width desired. This tool is bound to save a great deal of time for all bench workers, and it is bound to come into the same universal use as all carpenter tools which are counted indispensable. There is no class of bench work where this clamp is not needed, or would not effect a saving in time and expedite work. The Woodworker's Bench Clamp Co., of Traverse City, Mich., have placed this clamp upon the market, and are giving carpenters and builders who purchase it a very liberal agency proposition. The advantages of the tool are so self-evident that it is bound to sell itself wherever seen. By addressing the above company, referring to this paper, full information will be furnished.

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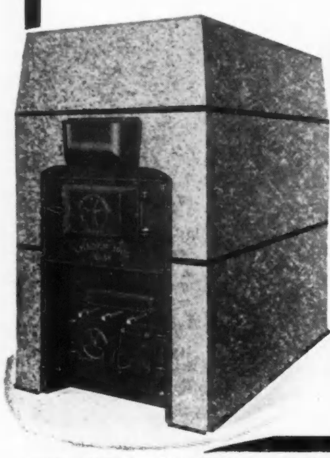

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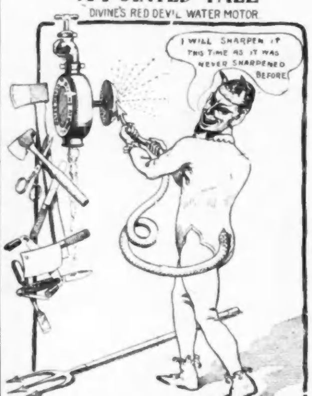

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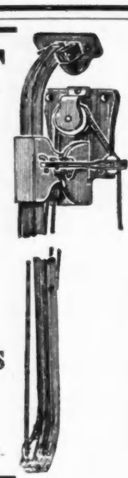

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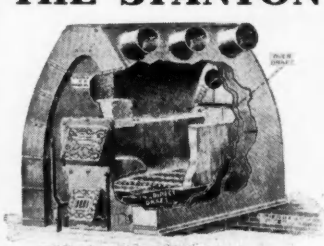

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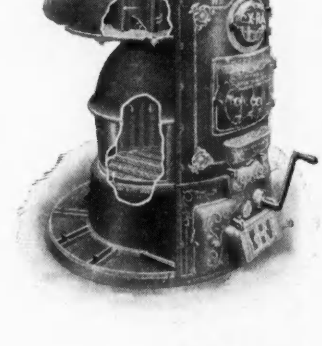

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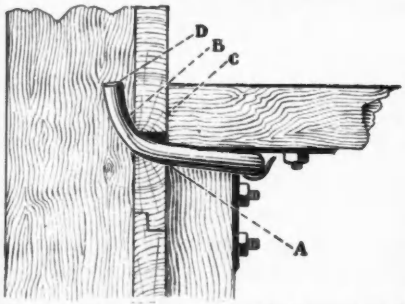

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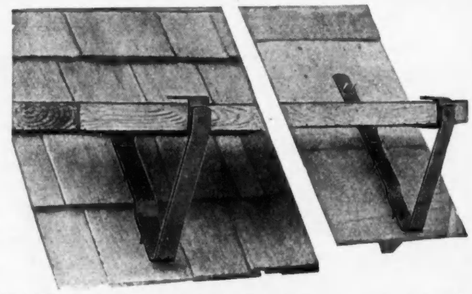

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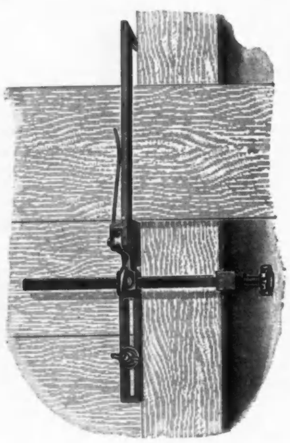

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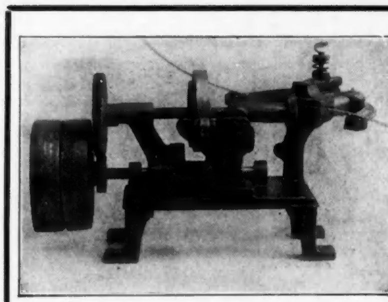

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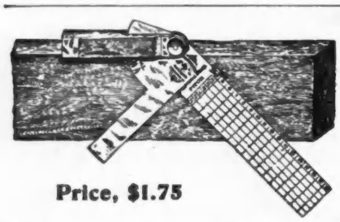

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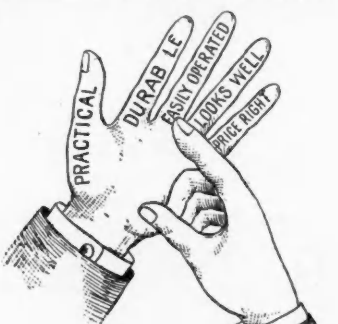

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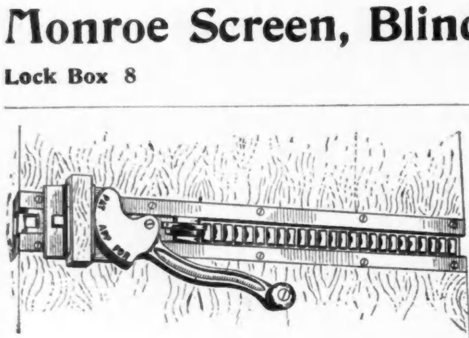

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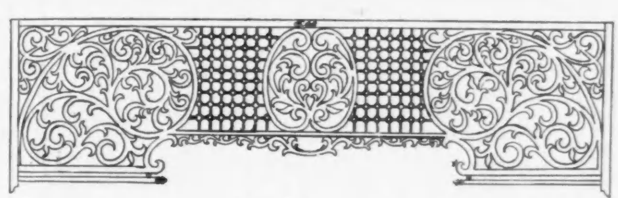

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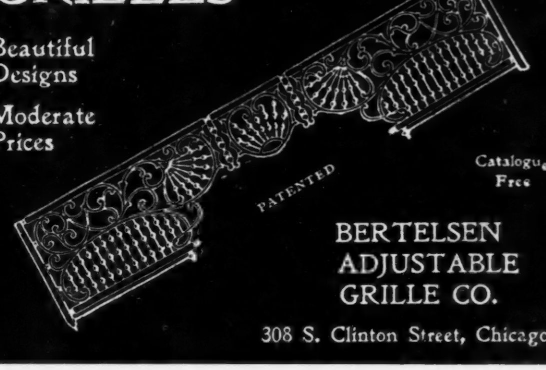

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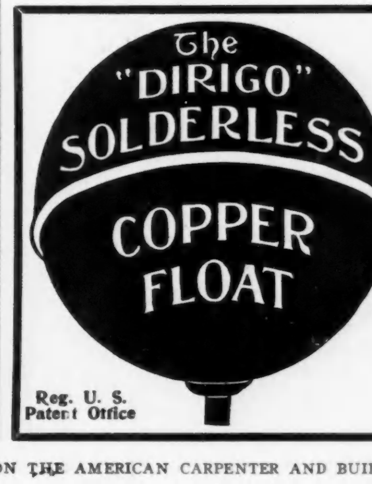

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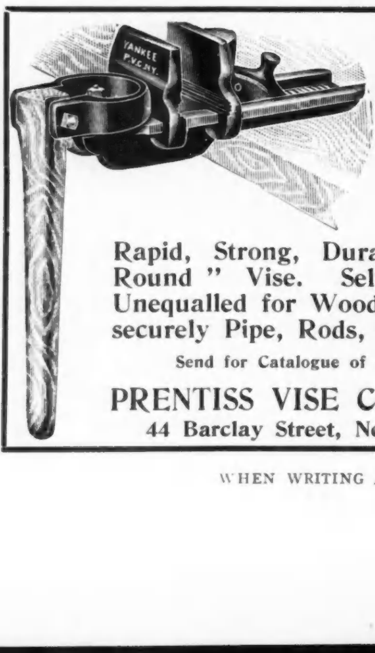

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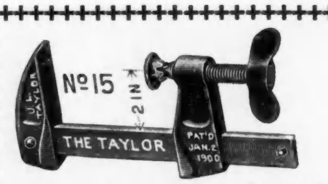

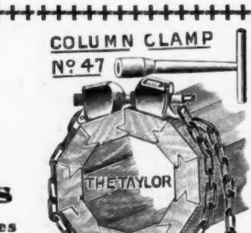

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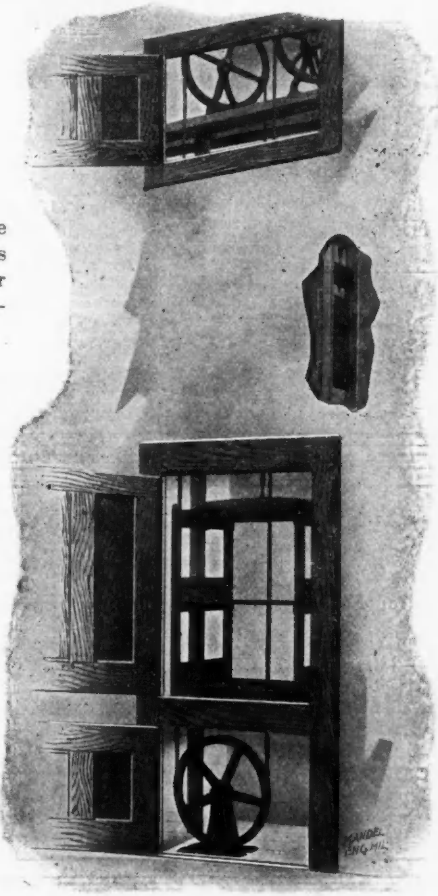

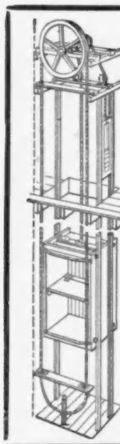

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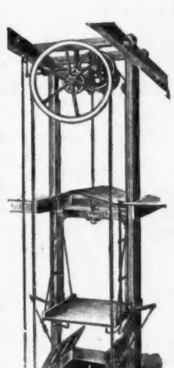

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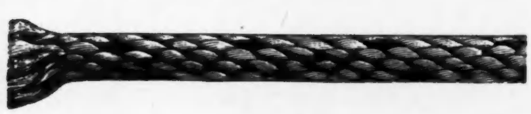

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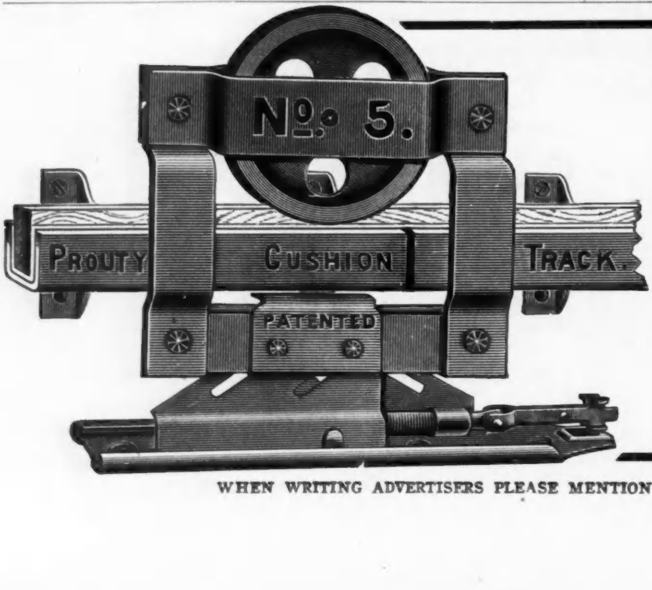

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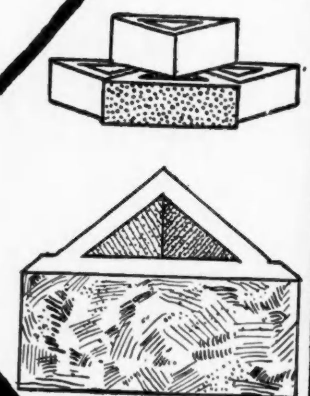

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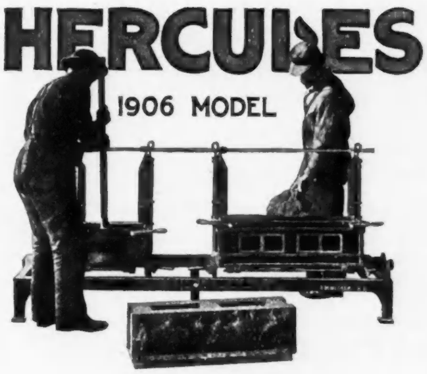


DON'T do yourself an injustice. Don't buy a Cement Stone Machine till you have looked over our handsome New Catalog and learned how vastly superior the 1906 Model Hercules is over any other machine. The strong feature of the **Hercules Cement Stone Machine** is its simplicity. Look at the illustration and compare it with the cumbersome, ungainly and intricate machines that are held up as examples of modern ingenuity.

¶ No bolts—no springs—no cogs—no chains—nothing that can possibly get out of order or cause annoyance to the operator, can be found in the Hercules.

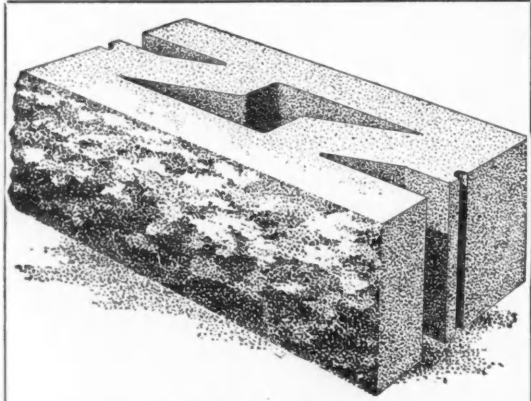
¶ Then look at the illustration of the pyramid of blocks—it is hard to believe that a machine so simply constructed can make such a variety of designs easily and quickly. ¶ But the Hercules goes further than just the making of this variety. In our newly published catalog, which we will be glad to send to you upon request, you will find illustrated, hundreds of designs, all made on the Hercules. ¶ The Hercules is not a plaything—it doesn't get out of order—it is easy to keep clean and can be operated by any man of ordinary intelligence. ¶ On the Hercules you can make two stones of the same size and design — or of different sizes and designs — at the same time. ¶ You tamp directly on the face with the Hercules — thus insuring a perfect design which looks exactly like natural stone. By our method of tamping on the face with a big flat tamper, the maker can turn out the strongest blocks. He can also effect a great saving by using a 2 to 1 composition for the face of the stone and 5 to 1 for backing. ¶ Better send for our free catalog today—it tells you lots of things about Cement Stone making that you ought to know, and in it are illustrated factories, churches, residences and apartment houses built with stone made on the Hercules.

ASK FOR CATALOG XX

Only the Hercules Can Make This Variety

Century Cement Machine Co.

273 WEST MAIN ST. :: :: ROCHESTER, N. Y.



PATENT APPLIED FOR

Rock Face Dry Stone

This is the stone that has given universal satisfaction. The reasons are clear:

FIRST—It satisfies the eye in presenting a perfect imitation of chipped stone.

SECOND—It has a new core that presents an opening on every transverse line to prevent percolation of moisture.

THIRD—It is made on the Sand Pallet, and of course is all right.

PRICES AND SIZES GIVEN ON APPLICATION

J. M. KEITH, 1190 West 4th Street Des Moines, Iowa

For FIRE PROTECTION

USE

Refractory Concrete

So called because it is worked the same as cement or plaster, and will endure heat equal to fire clay products.

For flue linings, chimney blocks and tops, floor and partition blocks, conduits for electric wires, fire proof plaster for wood and metal lath, or as a scratch coat for stucco, this is the ideal material.

A finished product of this composition can always be had in less than twenty-four hours, this permits the formation of the product on the job, and to fit any requirement.

A ventilated flue or chimney from this composition is positively fire proof, and at the same time ventilates all rooms which it enters. Cheap to construct, and will meet the requirement of any size buildings.

Refractory Concrete will prove a profitable proposition for any concrete worker, contractor or builder.

For full information address

E. R. STOWELL : New Corydon, Ind.

Mr. Contractor?

Are you satisfied with your way of estimating? Do you always get everything figured in? Do you know how much profit you are going to make on an estimate? Do you know the cost of each separate part of the work? Is your way simple, practical, rapid, accurate and above all reliable?

If not you should get a copy of the third edition of the Lightning Estimator for estimating wood and veneered buildings. This edition is one third larger than previous editions. Has much valuable advice on estimating, showing illustrations of some of the buildings that the work is computed upon. Handles the subject from excavating to painters' work, including masonry, concrete block work, plastering, brick work, veneering with brick plain cut stone, cellars, floors, sidewalls roofs, floor space, cornice, porches, windows, doors, stair work and interior finish, and the work in general required on buildings of this class.

Gives the exact time for the labor on each separate part of the work. Particularly adapted to repair work.

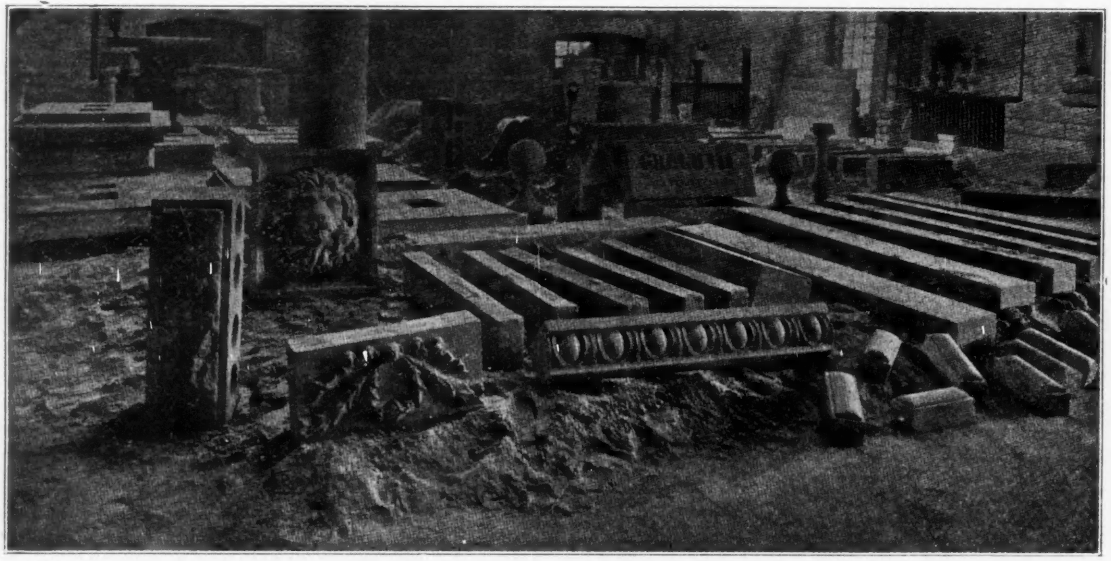
Prepared by a builder of experience on actual building construction, not theory.

A leading magazine says of it:

A Wonder of Terseness, Compactness, and Comprehensiveness.—*National Builder*

No long articles meaning nothing, but brief and goes to the subject at once in a simpl practical manner, easily understood. While this edition has been made a third larger, the price has been advanced only to 60 cents. (Money order.)

Bradt Publishing Company,
1260 Michigan Avenue, Jackson, Michigan



Granilite manufactured by the McClenahan process

CONTRACTORS and builders are amazed at the perfection of this product. Highly approved by architects everywhere.

DURABILITY UNQUESTIONED ***LESS ABSORBENT THAN NATURAL STONE***

ABSOLUTELY FIRE-PROOF

Every detail of architect fully carried out. **Our Licensees are not compelled to compete with the owners of $25.00 hollow block molds.** Parties with capital should write for illustrated catalogue.

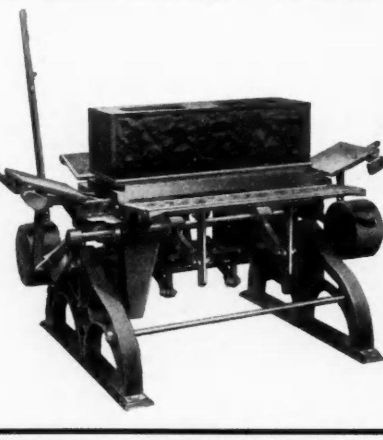
STANDARD STONE CO. OF AMERICA (Sole owners of McClenahan patents) **No. 1 Madison Ave., New York City**

The "Runyan"

Is the only machine that will make concrete building blocks of any description, pavement blocks, window and door caps and sills, BRICK and curbing. The only combination brick and block machine ever invented.
One movement of the lever through an arc of 55 degrees, forms the mould and places the cores in position; a reversed motion will release the mould and remove the cores; less than a second's time required; A CHILD CAN DO IT. Cheapest machine on the market, capacity considered.

C. M. RUNYAN & CO.

ELYRIA, OHIO



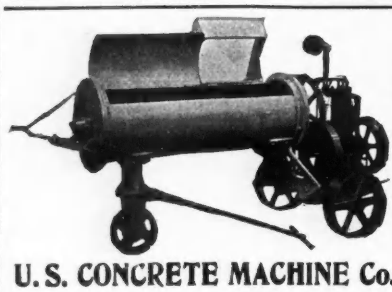
Strong, Simple, Durable
Capacity limited only by what can be fed into it. It's doing business all the time. Operated by 3 H. P. gasoline engine, the entire machine when equipped weighs but 1,700 lbs.

The GRANT

The Mixer that Mixes

DryConcrete, for it is not a revolving drum or cube

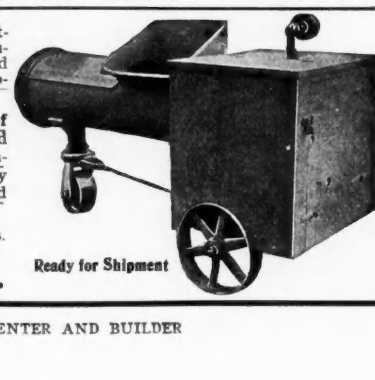
It has the dry and wet mix of our famous CONNOLLY and, of its character, is the lowest priced concrete, cement and mortar mixer equipped with power on the market.



The rapid and peculiar motion of its 23 paddles attached to the center (mixing) shaft, making 62 revolutions a minute, throwing the material over itself and giving it lateral and edgewise thrusts, the entire product gets a thorough and absolutely perfect mix.

We make and try to keep in stock our Special Type of Grant with mixing cylinder 10 ft. in length and equipped with 53 paddles, a superb mixer designed for dry concrete. This we sell with or without power, stationary or on wheels, and is essentially a machine for block and all kinds of artificial stone work.

Make no mistake but send for Booklet "G" and prices.



Ready for Shipment

U. S. CONCRETE MACHINE Co., Majestic Bldg., Detroit, Mich., U. S. A.

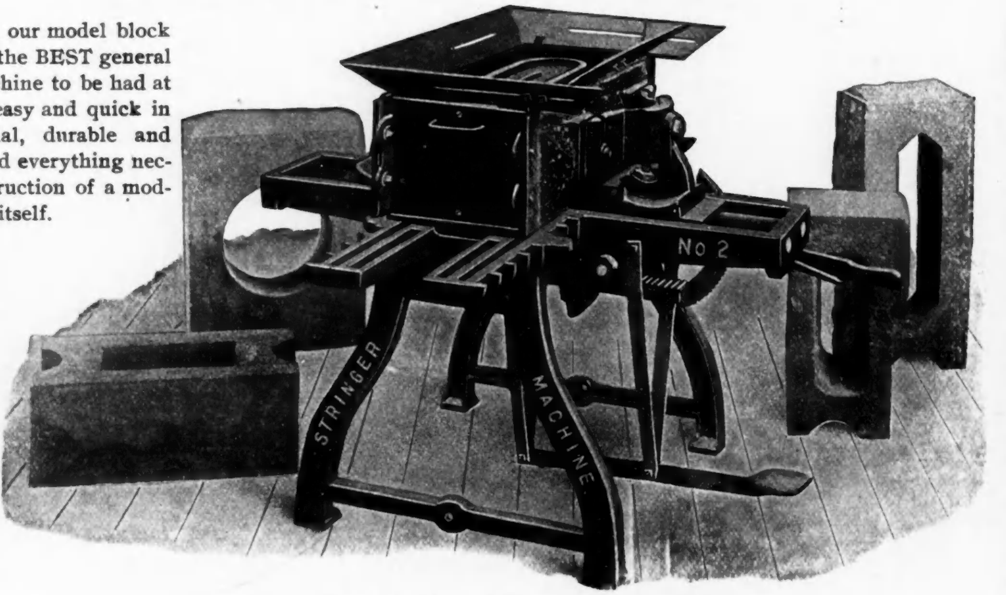
A Model Cement Block Machine For 1906

To the Public and Purchasers of Cement Machinery:

We offer you this, our model block and sill machine, as the BEST general purpose cement machine to be had at a reasonable price; easy and quick in operation, substantial, durable and strong; and will mold everything necessary for the construction of a modern building within itself.

Commence communicating with us AT ONCE, that we may be able to supply your demands with promptness and dispatch.

Keep this ad in mind, it may not appear again.



ADDRESS

STRINGER MACHINE CO., Jackson, Mich.

The Kline (1906) Model Block Machine

For Manufacturing Hollow or Solid Concrete Building Stone

The only machine making Blocks 6, 8, 10 and 12 inches wide, and 4, 8, 12, 16, 20 and 24 inches long, including our **Return Corner Block, Octagon, Broken Ashler, Veneer Blocks and Porch Columns.** All on one size Pallet Board. Buy direct from the factory and save agent's commission.

Price Complete	**$150.00**
Agent's Commission Saved	**37.50**
Pay Us	**$112.50**

And we prepay the freight. Let us tell you more about it.

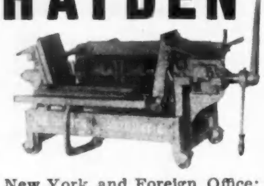
Address

The H. Z. KLINE CO., 10 So. Parry St., INDIANAPOLIS, IND.

Buy a Hayden for Results

THE HAYDEN Automatic Block Machine is rigid, well designed and built for wear and tear. It is simple, quick acting, and king of **down face** machines. Blocks made with it are impervious to moisture, and are released automatically to a support in front of the machine.

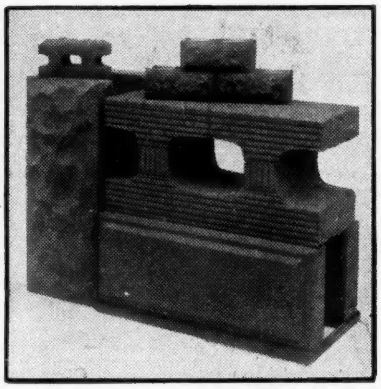
HAYDEN



Our machine received the highest award, gold medal, at the Louisiana Purchase Exposition.

SEND FOR CATALOGUE "M"
The HAYDEN AUTOMATIC BLOCK MACHINE CO. - Columbus, O.

New York and Foreign Office: Hayden Automatic & Equipment Co., 26 Cortland Street, New York City.



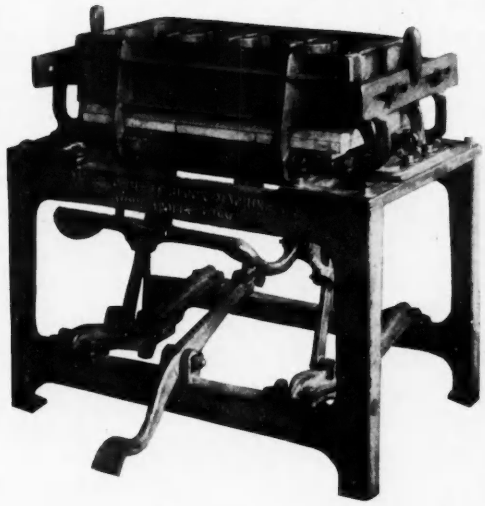
"THE WONDER OF THE AGE"

The Keystone is a face-down machine and has proven itself to have a larger capacity and produces neater work than any other machine on the market. A postal will bring you full particulars and valuable information. Address the

Keystone Cement Block Machine Co.
PHOENIXVILLE, PA.

SPECIAL OFFER

For the next ninety days we will give away ABSOLUTELY FREE a Cement Sidewalk Tile Machine to every purchaser of our 1906 Model Concrete Block Machine



The International

The fastest and simplest machine on the market. Makes every stone that goes into the construction of an ordinary building including water table and chimney blocks. **Plain, panel or rock face.** Air spaces are in conformity with the strictest building ordinances and do not weaken the blocks as the air spaces of some machines do. Over 270 different styles and sizes of blocks made with the one machine. Write for our great offer.

We have a full line of

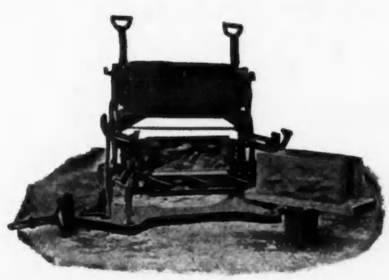
CONCRETE MACHINERY OF ALL KINDS

including

Mixers, Brick Machines, Sewer Pipe Molds, Sidewalk Tile Machines and Cement Workers' Tools. **Write for catalogue and prices.**

THAYER CEMENT BLOCK MACHINE CO., 1403 Hennepin Ave., Minneapolis, Minn.

GEORGE A. HUGHES, General Manager



THE IMPROVED "MILES"

CONCRETE BUILDING BLOCK MACHINE

MOLDS ALL BLOCKS FACE DOWN

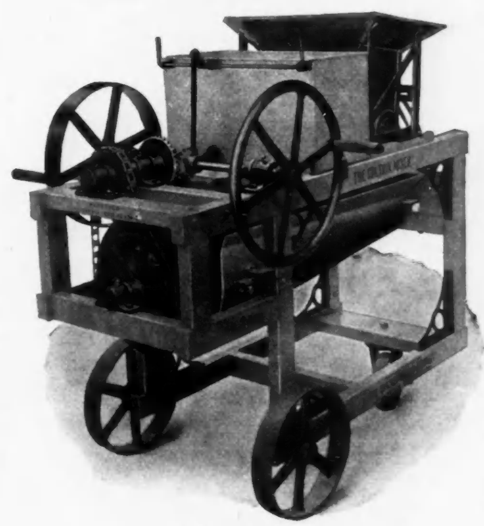
Makes circles, octagons, gables and water table blocks for hollow, solid or veneer walls.

Write us today for circulars and descriptive matter

THE P. B. MILES MFG. CO.
214 S. Mechanic St.
JACKSON, MICH.

The Improved Coltrin Concrete Mixer

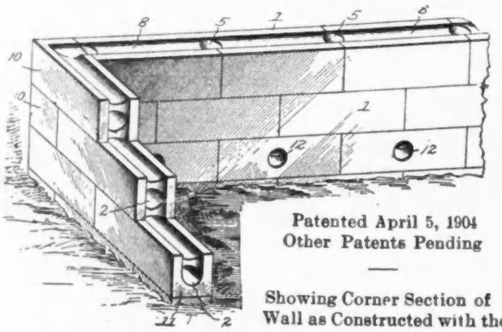
DOUBLE DRIVE—AUTOMATIC FEED



Pat'd. Feb. 21, '05.

THE KNICKERBOCKER CO., Jackson, Michigan.
525 LIBERTY STREET

An Improved Block
An Improved Machine



Patented April 5, 1904
Other Patents Pending

Showing Corner Section of Wall as Constructed with the

UNDERWOOD VENTILATING BUILDING BLOCK

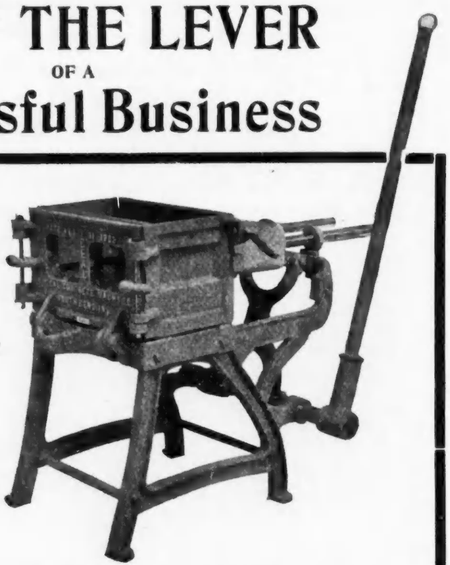
WE WISH to call especial attention to the **ventilating** feature of our block, also the **Improved Block and Machine**, the **strength** of the block, all openings being circular, the **simplicity** of the machine and the **rapidity with which it can be operated.**

This machine and block are fully protected by patents. ✤ Territorial Rights for Sale. ✤ Agents wanted. ✤ ✤ ✤ ✤ ✤

Underwood Building Block and Machine Co.
49 Bank Building, - DENVER, COLORADO

GRASP THE LEVER
OF A
Successful Business

Simplicity
Durability
Adaptability
Rapidity



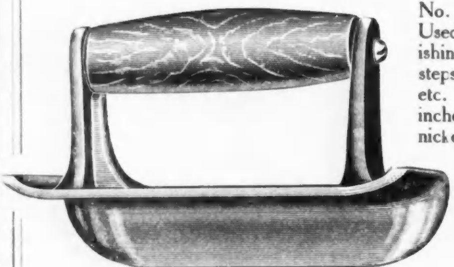
Concrete Blocks Make Ideal Building Material and "Ideal" Machines Make Perfect Concrete Blocks

MR. CARPENTER:
Now is the time to get a start in a profitable business that is in your own line and can be profitably run in conjunction with your present occupation. The "IDEAL" machine is tried and true and a postal card from you will bring full information on the subject of concrete construction; also good and substantial reasons why you should use an "IDEAL." **Send for Catalogue "R"**

Ideal Concrete Machinery Co., SOUTH BEND, IND.

ON THE HIGH WAVE OF POPULARITY

CEMENT SIDEWALK TOOLS



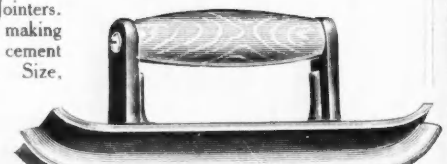
No. 4 Edgers. Used for finishing edges on steps, walks, etc. Size, 3x6 inches. Iron, nickel plated.

50c

No. 1 Jointers. Used for making joints in cement walks, etc. Size, 2¾x6.

Both sides rounded.

50c



Better write at once for our new Catalogue of "Contractors' and Builders' Supplies."

"If it's from Gross it's Good."

PH. GROSS HDW. CO.
126-128 Grand Ave., MILWAUKEE

THE MANUFACTURE OF
Miracle Cement Brick
IS A MOST PROFITABLE INDUSTRY

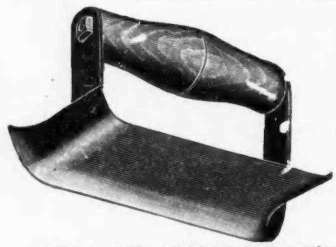
No contractor can afford to wait until other parties have established plants. It's an easy business to start. It calls for but little money and time, and yields enormous profits.

THE MIRACLE ONE-MAN BRICK MACHINE

is a small affair at a small price, but it does "Miracles." It is the most substantial machine made. It will wear longer and produce better results. It has a capacity of 3,000 to 4,000 brick every day with only one man operating. You cannot afford to pass by this opportunity. **Send for our Big Catalog K-3.**

MIRACLE PRESSED STONE CO. Minneapolis
Eastern Office: No. 1 Park Row, New York City

"Best" Cement Sidewalk Tools

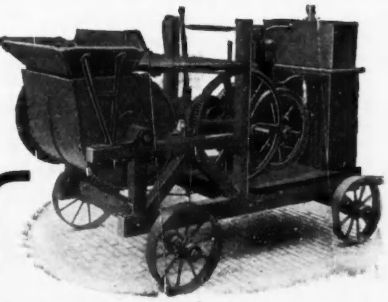


Brass Rollers, Bronze Edge Groovers and Center Groovers, Spring Tempered Edge Groovers and Center Groovers, Step Finishing Tools, Iron Tampers, etc.

SEND FOR 1906 CATALOGUE AND PRICE LIST
The Most Satisfactory CEMENT SIDEWALK TOOLS in the World

THE WOODHOUSE HARDWARE MFG. CO.
2618 So. 13th Street, St. Louis, Mo.

A MIXER IS KNOWN



BY THE MIXTURE IT MIXES

The American Mixer's reputation rests upon this fact. It **mixes.**

THE REASON

Revolving steel plow blades do the mixing. They revolve from twelve to fifteen times per minute and with each revolution four complete mixes of the batch have taken place. This means that a charge left in the machine for one minute is mixed from 48 to 60 times.

THE AMERICAN MIXER

Is easily controlled and is an economical and durable machine. It feeds while running, discharges instantly, is self-cleaning and never clogs. It does not "ball" nor "roll" the material. Send for Catalogue "O."

THE INTERNATIONAL F. & FIREPROOFING CO.,
Columbus, O.

Important to Contractors and Builders

WE want agents in all parts of the country to send us lists of all new or remodeled buildings in their towns, or of any one needing new fixtures. For all information, if we get the job, we will pay a good commission If you will send us the names we will do the rest, and you get a commission on all goods shipped to your town as long as you send us reports We manufacture a full line of Bank, Store and Office Fixtures. We draw plans, make sketches, and submit prices, free of charge. Our factory is equipped with the latest machinery, and our goods are all up-to-date. **Write us for information.**

Bloomington Store Fixture Company
BLOOMINGTON, -:- -:- -:- ILLINOIS

CARPENTERS

desiring to fit themselves for better paying positions should fill out and send this advertisement to us to-day and we will send 200-page hand-book (FREE), describing our Carpenters course and over sixty others, including **Electrical, Mechanical, Steam and Civil Engineering, Heating, Ventilation and Plumbing, Architecture, Structural Drafting, Mechanical Drawing, Telephony, Telegraphy, Textiles, etc.**

AMERICAN SCHOOL OF CORRESPONDENCE, Chicago, Ill.

Name..

Address..

City and State..

Am. Carp. & Builder, 4-06

CONCRETE BLOCK HOUSES

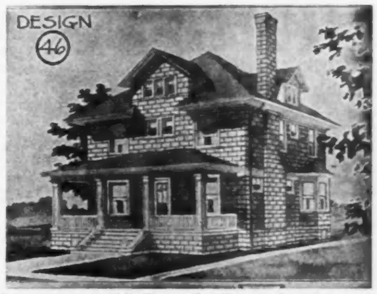
My new book of Concrete Block Houses contains handsome illustrations of exteriors, description, floor plans estimate cost, etc., of many designs for artistic modern homes. INVALUABLE FOR HOME BUILDERS. Every plan original, artistic and practical.

PRICE OF BOOK $1.00, POSTPAID.

I also have Portfolio of modern and artistic homes in frame, brick and plaster construction.

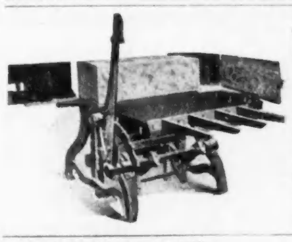
PRICE OF PORTFOLIO $1.00, POSTPAID:

COMPLETE WORKING DRAWINGS, details and specifications of any design will be furnished at moderate cost.



H. WITTEKIND, Architect

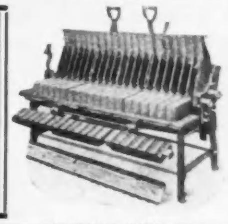
Department A. — 28 East Jackson Boulevard
CHICAGO, ILLINOIS

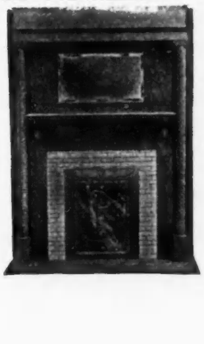


HIGH-GRADE CONCRETE MACHINERY

We have the Leaders—"9 of them"—**Normandin, Cemaco, Peninsular** and **Champion Block Machines** (2 side face, 2 face down); **Favorite Concrete Brick Machines,** with mechanical tamper, big demand; **Systematic Mixer,** mixes sand-cement dry, then wet, any proportion, very popular; **Universal Post Machines, Ornamental Ball-Base Baluster Molds, Practical Sill Cap Molds.**

We are in the business, responsible, started 1900, have world-wide reputation, square dealing and practical machinery. Products of our machines in demand because they are displacing clay brick, stone, lumber everywhere for superior excellence in modern building construction. Our machines received highest awards, St. Louis, 1904, **Portland, 1905.** Also adopted twice by U. S. Govt. We can please you. Write **CEMENT MACHINERY CO., Russell Bldg., Jackson, Mich.**





THIS MANTEL $24.00

Golden Oak, 82 inches high, 5 feet wide. Includes enameled tile hearth and facing, 20-inch oxydized finish combination grate with summer front.

Catalogue E Free—Mantels $20.00 up. Our handsome large 72 page Catalogue for 10c postage.

CALHOUN MANTEL & TILE CO.
KANSAS CITY, MO.

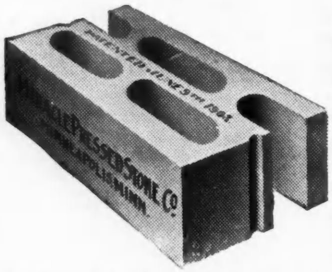
Tile Floors AND Bath Rooms

Send Sketch of Space for Prices

THE FAMOUS MIRACLE
DOUBLE STAGGERED AIR SPACE

Cement Building Blocks

offer an interesting field of money making for you



We sell you the machines for making

We give you a license to manufacture

We give you a monopoly if you wish

THE Miracle Block is the only block that is fully and safely protected by U. S. patents. Statistics show that there are less failures among the makers of Miracle Blocks than among those making any other block.

The necessary investment is very small. The profits are very large, and the field is unlimited. You must begin the manufacture of cement products if you would keep pace with the times. You must make the Miracle Frost and Moisture Proof Block if you would lead the industry in your town. Now is the best time to begin.

Our big catalog gives full information on the whole concrete industry. Ask for Catalog K-2.

MIRACLE PRESSED STONE COMPANY
MINNEAPOLIS

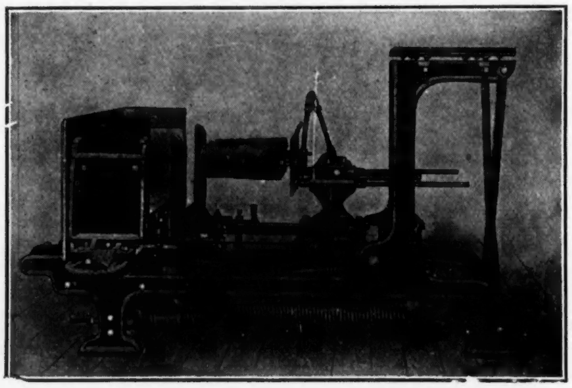
Eastern Office: No. 1 Park Row, New York City

THE GENERAL PUBLIC

is not educated as to the degree of perfection to which Block Machines have attained, many believing the cheap machines will do the work, as it is nothing more than an experiment.

However, this idea is wrong, and experimenting with an inferior machine will invariably prove a failure.

The Block business is permanent, and the trade demands that the machine prove its efficiency before it becomes a fixture on the market.



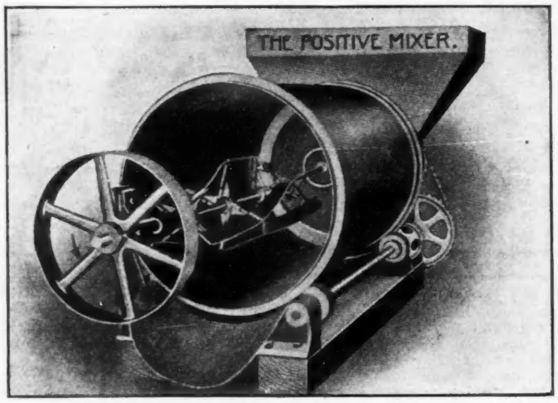
The success of our machine is established, and it is classified as permanent and invaluable because of its many superior features.

Its speed is unlimited, and you are assured of the very best results in quality and appearance of blocks, because of the fact that they are moulded with the face down.

Write us for descriptive catalogue J.

AUTOMATIC BUILDING BLOCK MACHINE CO.
126 Liberty Street, Jackson, Mich.

The Positive



"POSITIVE" ARGUMENTS

It mixes by the simplest method known in mechanics—It is always self-cleaning—It feeds positively—Uniform temper is acquired—Does not get out of order—Rapid and a big time saver—Automatic—Durable, efficient and simple. What more is desired in a good concrete mixer?

SEND FOR CATALOGUE "W"

The JAEGER MACHINE CO.

COLUMBUS, OHIO

CEMENT BUILDING STONE

The Finest Grade Ever Produced

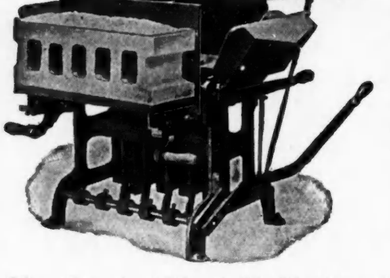
"LAKE PATENTS" A WET SYSTEM

Easily, cheaply, and readily made with crushed stone and cement, **WITHOUT A MACHINE.** Thoroughly tested and now extensively used. **Waterproof.** Territorial rights for sale.

H. A. MONTFORT 45 Clinton St. NEWARK, N. J.

A Chance to Save Money

On a Hollow Concrete Block Machine



"Simplicity"

Building Block Machines are sold **direct from Factory to Block Manufacturer,** which enables us to quote you a very low price.

Write for further information.

The Standard Sand & Machine Co., Cleveland, Ohio

Figures on Millwork

Our Line of Interior Woodwork

such as doors, stairwork, mouldings, railings, wainscoting, paneling, grilles, brackets, columns, flooring, ceiling, etc., is without a superior.

Our Line of Building Paper

tarred felts, and prepared roofings is second to none.

Samples and prices on application.

Interior Woodwork Co.
519 Park Street
MILWAUKEE, - - WIS.

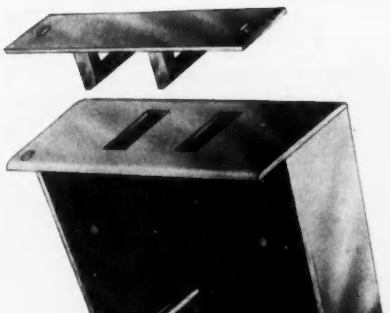
Phone So. 37 and 38.

United Planing Mill Company

HANNIBAL, MISSOURI

MILLWORK delivered to CONTRACTORS on cars YOUR STATION

Send Us Your Estimates



THE H. C. SAFETY LOCK

Patented March 28, 1905

A Solid Steel Chest Lock that will last forever. Combined Key and Combination. Easy to open when you know how, but impossible to pick. Mailed complete with two keys to your address for 85 cents.

HONORÉ COUDYSER & CO.
1010 Wells Building. MILWAUKEE, WIS.

"BALL-BEARING" GRAND RAPIDS

All-Steel Sash Pulleys

Are sold DIRECT to Builders, Contractors and Mills at prices under the common ordinary goods

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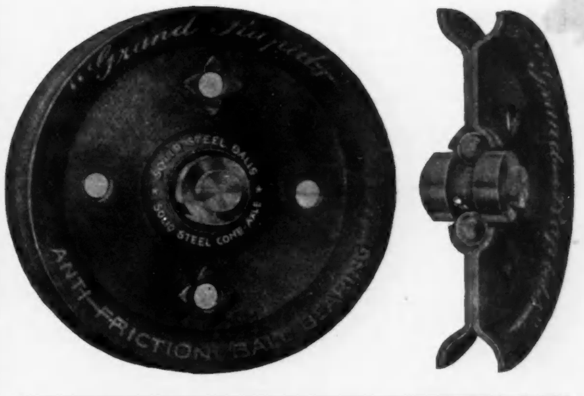

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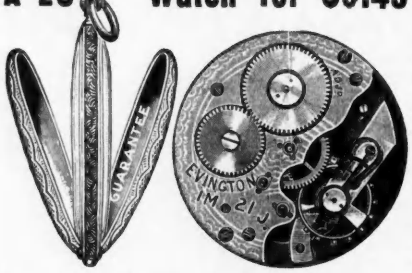

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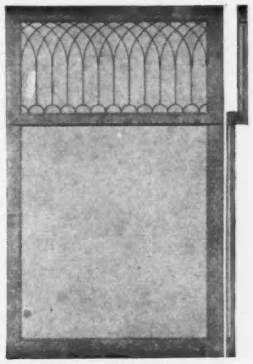

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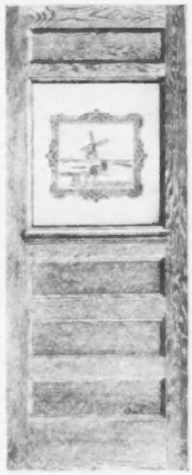

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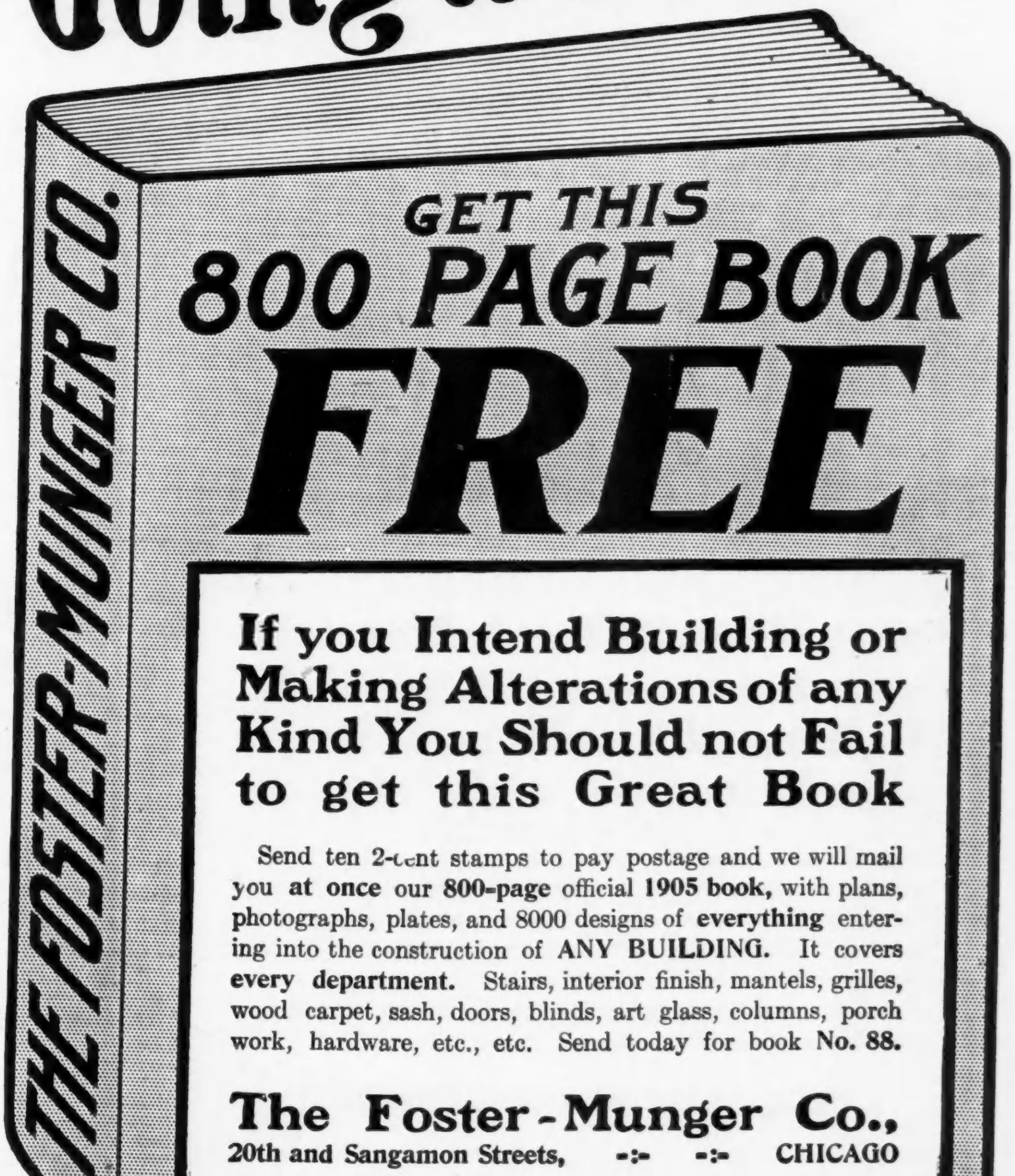

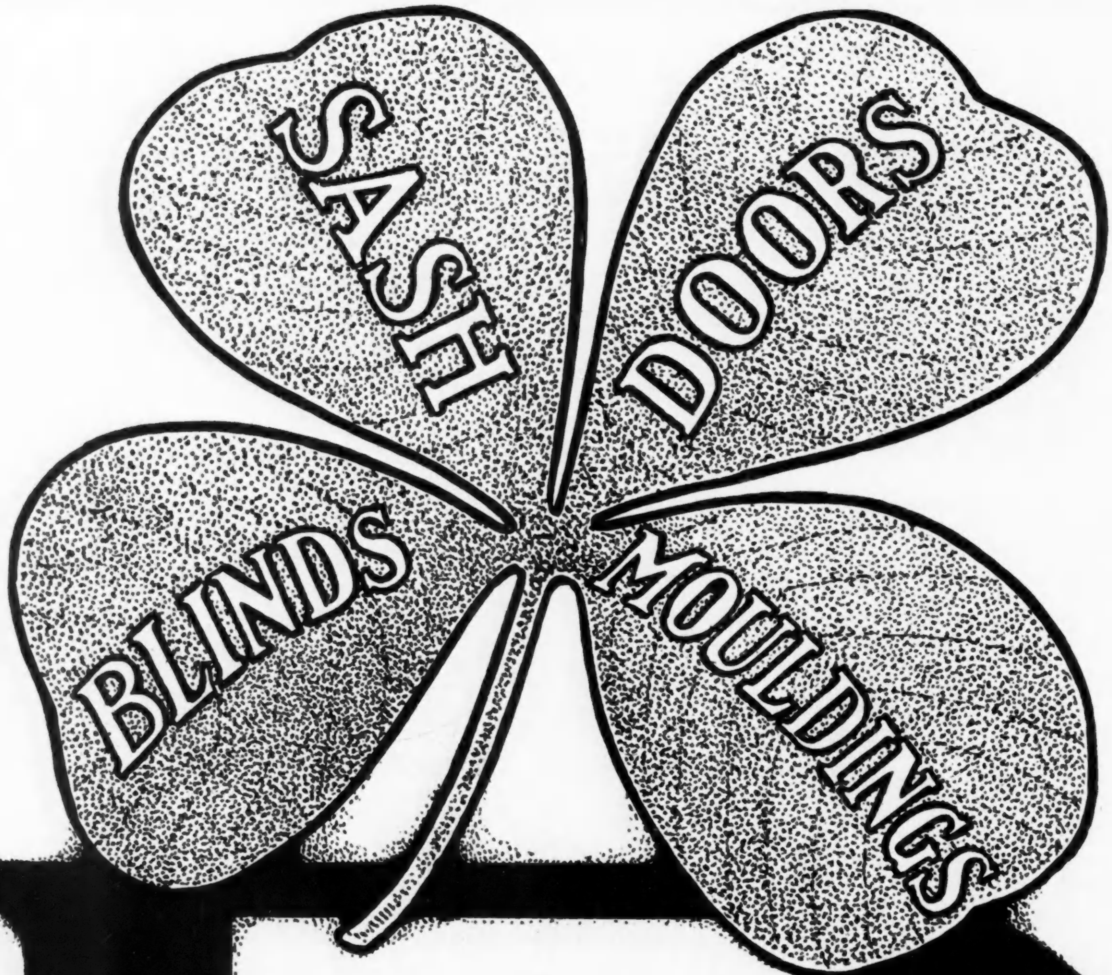

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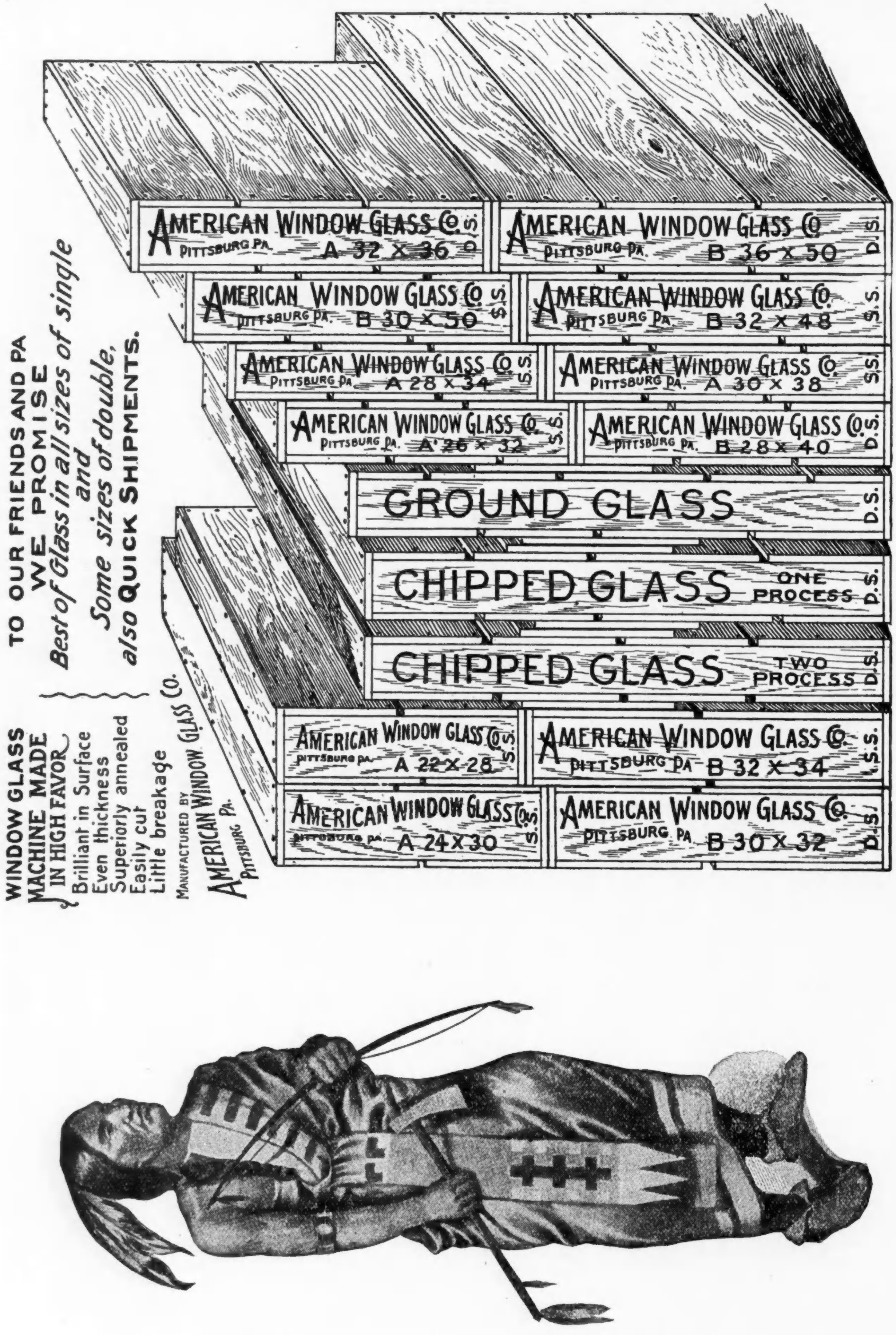
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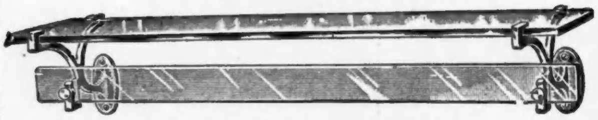

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Contents for April, 1906, see page 80

INDEX TO ADVERTISEMENTS, APRIL, 1906

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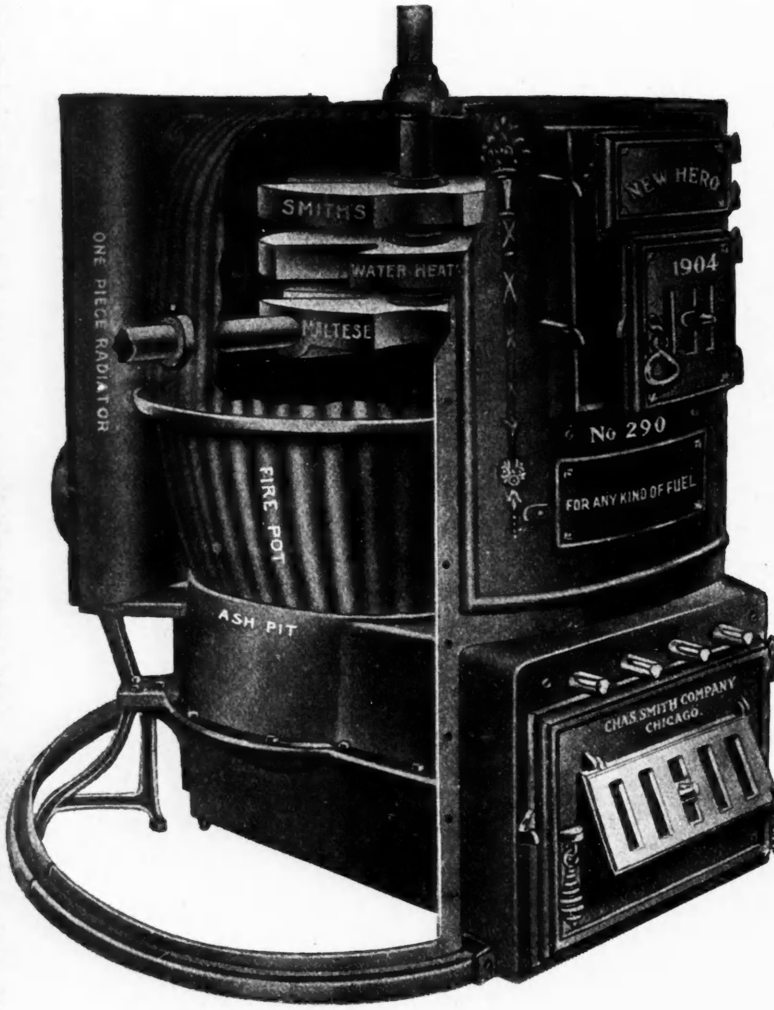

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