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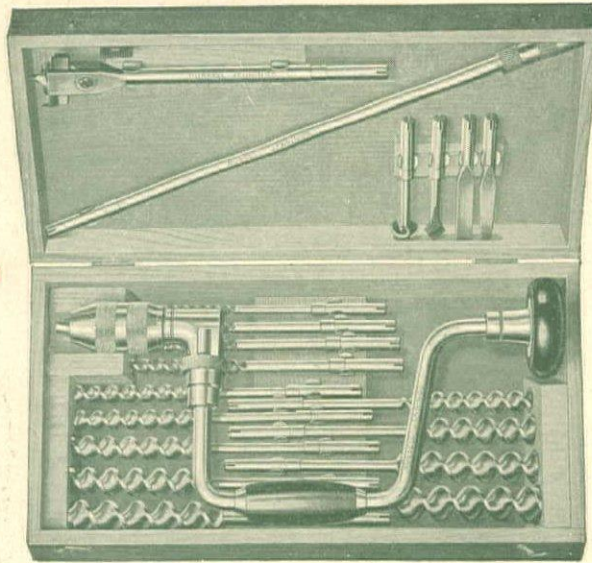
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Better Walls Inside and Out

In Less Time and for Less Money

The Only Wall Board
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Your work will pay you better, both in money and results, when you use Bishopric Wall Board for interiors.

Makes you independent of lath-and-plaster troubles and after expense. Comes in handy sheets ready for instant nailing to studding. The moment it is up the walls are ready for paint, paper, kalsomine, burlap, or any other kind of decoration.

BISHOPRIC WALL BOARD

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Needs no paneling. One man with a hammer and saw can apply it and do an expert job. It can't crack, shrink, buckle or pull loose in any climate—winter or summer. All this is guaranteed by our

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First you have kiln-dried laths, next a heavy layer of toughened Asphalt-Mastic in which the laths are imbedded, and through which vermin can't penetrate. Next a layer of heavy-size fibre board. Air-tight, damp-proof, and sanitary. Once up stays up.

Keyed Lath Keeps
Plaster In and Up



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Saves 50% of the outer material, 50% of the workman's time and 100% of all after trouble.

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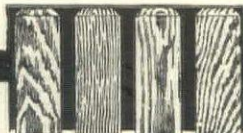
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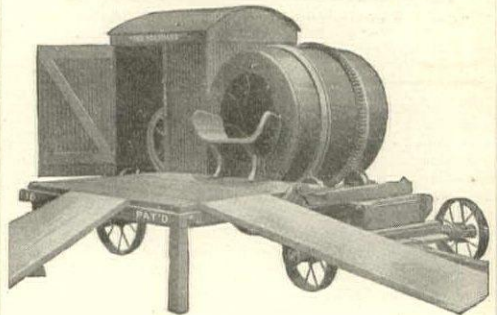
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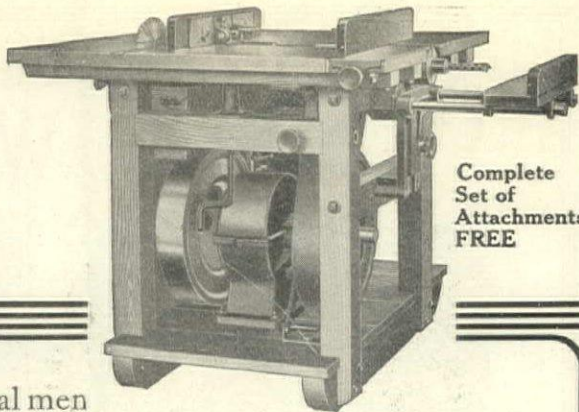
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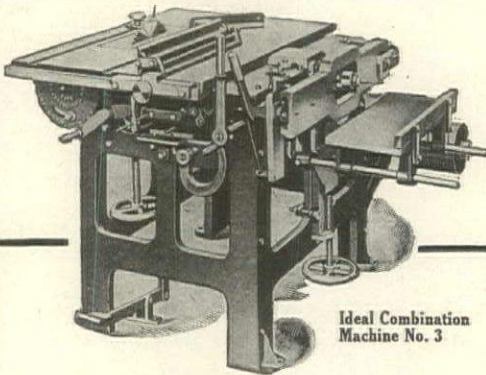


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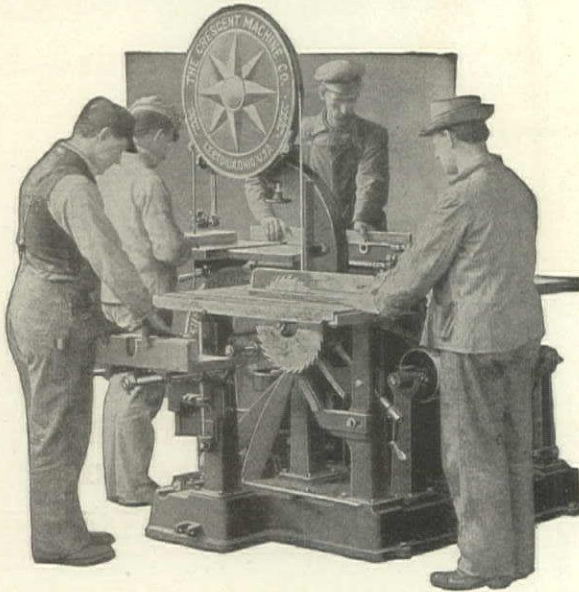
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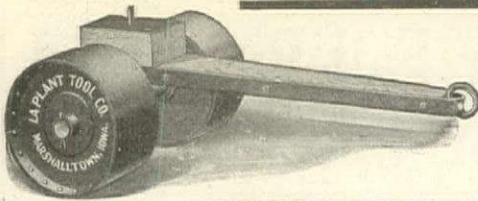
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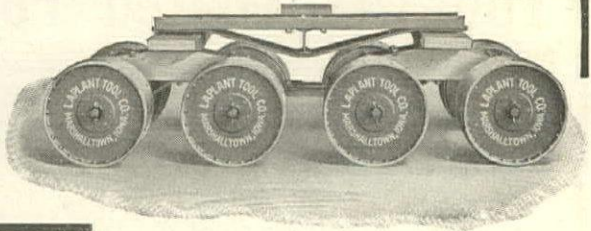
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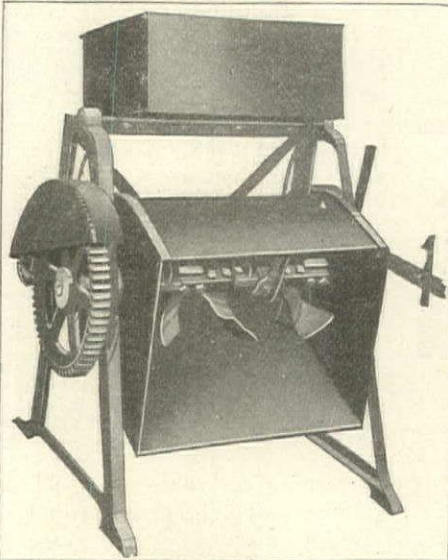


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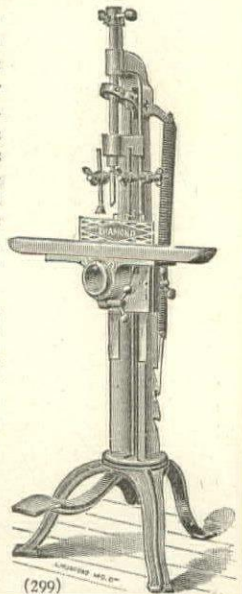
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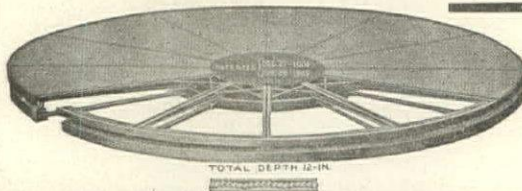
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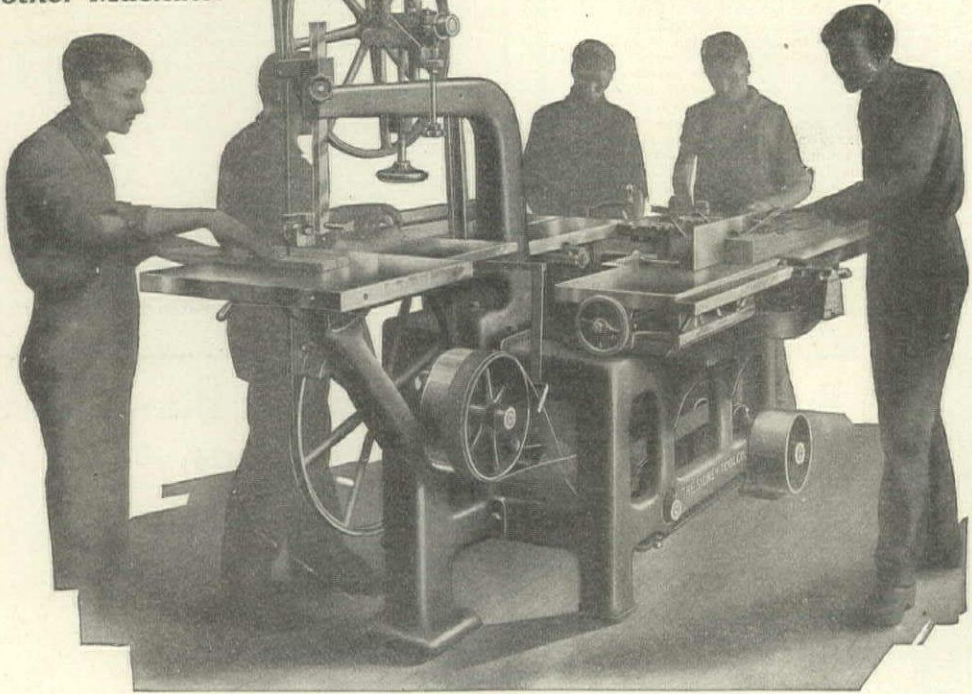
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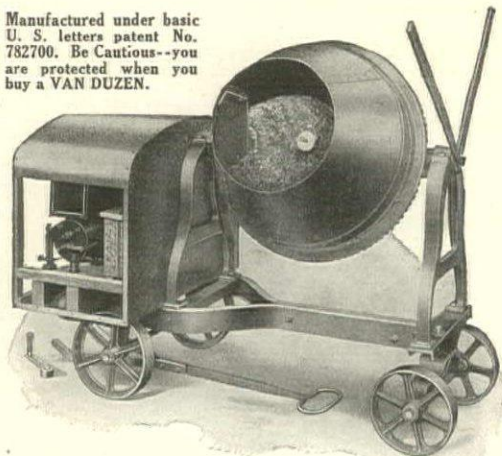
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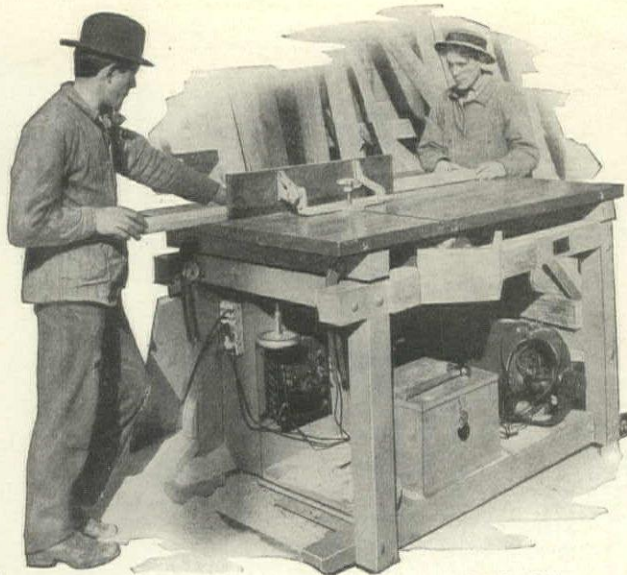


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If the lath isn't stiff — you first plaster *This Way*

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Plasterers cannot be expected to work fast on lath that is unstable as the waves of the ocean— You pay plasterers by the hour, and the more rigid the lath the more they will cover, and the more you will make on the job.

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Here is Another of the Many Modern Hotel Structures—



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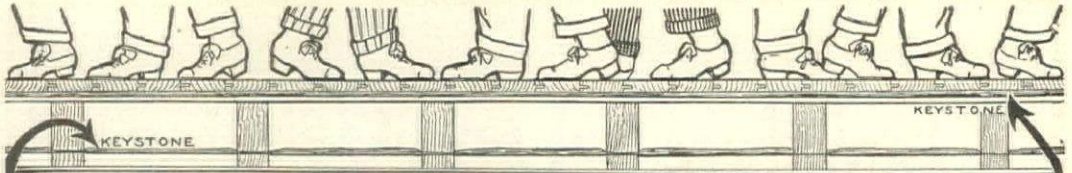
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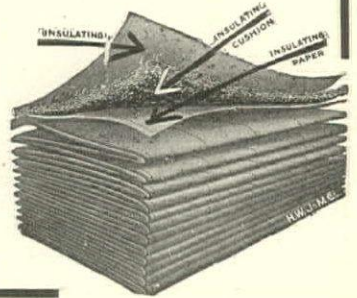
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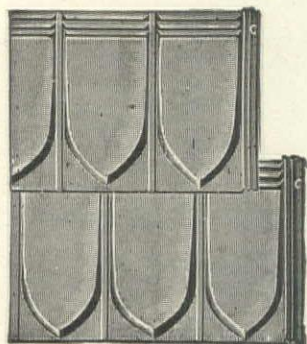
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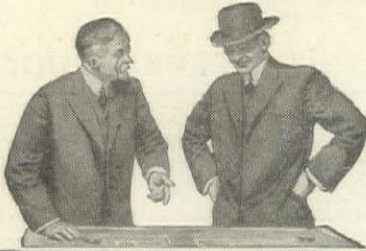
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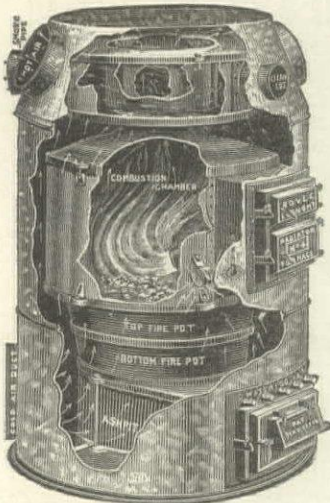
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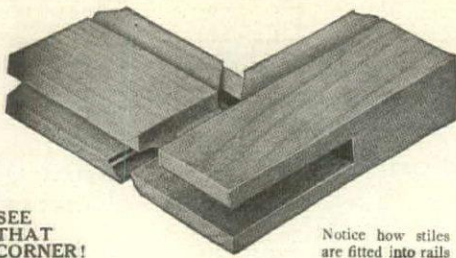
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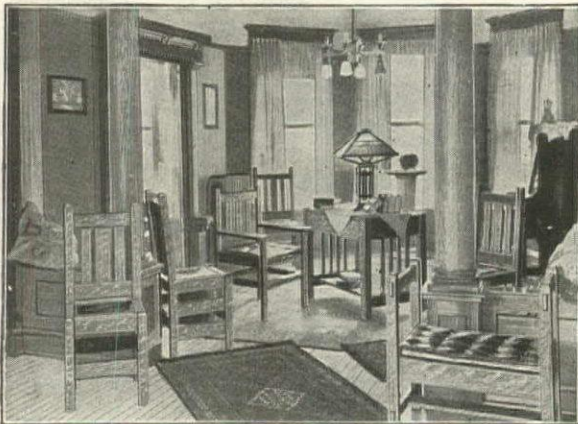
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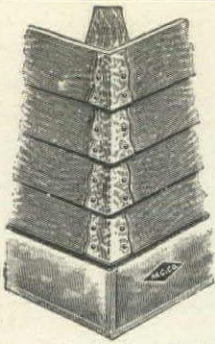
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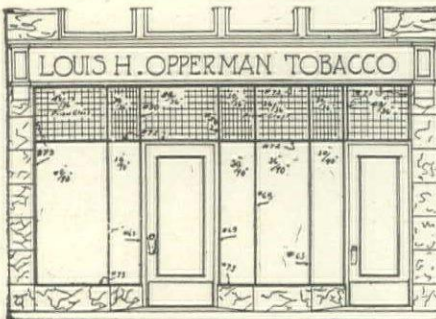
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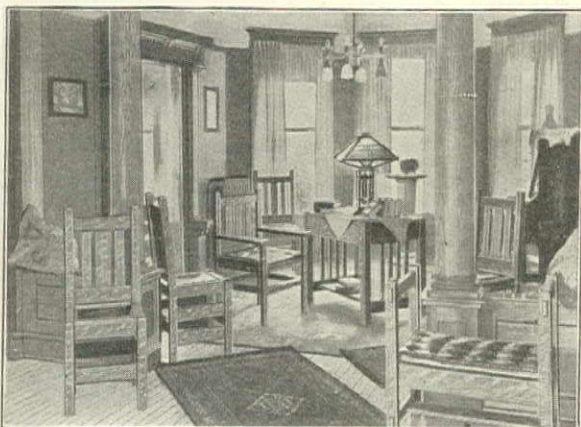


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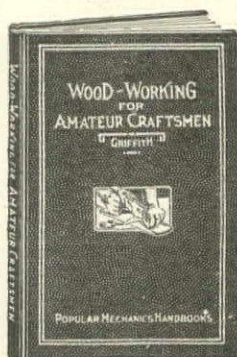
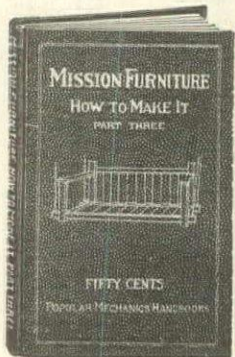
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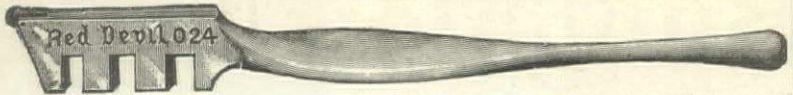
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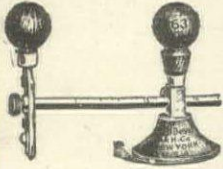
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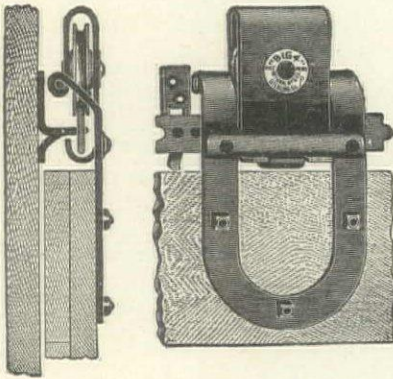


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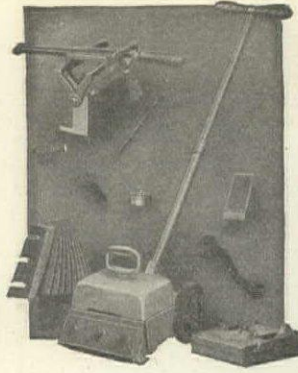
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Co-Operation

By *Elbert Hubbard*

Not long ago I visited the State Hospital for the Insane at Kalamazoo, Mich.

Walking over the beautiful grounds half a mile from the main building I came across an attendant in charge of twenty-five patients.

The attendant was a little man, a sort of half portion. Many of the patients weighed twice as much as he.

I walked along with him for some distance and in the course of our conversation I said: "I don't want your job. What is to hinder half a dozen of these big fellows getting together and setting up a job on you? If they would get at you all at once you would not stand any show at all. There is no help within half a mile and you are not armed."

He looked at me in rebuke and remarked: "You belong here, all right! You ask what is to hinder these fellows getting together and setting up a job on me? Why, the fact is if they could get together with anybody or anything they would not be here. That is their trouble. Nobody is ever sent to an insane asylum who can do team work."

The badge of sanity is the ability to co-operate with other people; and the more people you can work with and for, the bigger and better you are. It is an age of organization. Just now there are three big words. These are Reciprocity, Mutuality, Co-operation. And where do you find their principle carried out more than in your specialized trade paper?

Competition may have been the life of trade once, but it is no longer so. Competition died when the inventive genius of American engineers devised machines that should manufacture beyond the present economic wants of the people. Competition then became suicidal and destructive, and anything that is suicidal is dying—dead.

We have passed through the savage stage, the stone, the competitive, and now we are passing into the co-operative. We will not be here so very long, anyway, and soon Death, the kind old nurse, will come and rock us to sleep—and we had better help one another while we may.

The idea of the brotherhood of man is no idle, vacuous dream; and this ideal of brotherhood is coming about, not through the preaching of ethics or morality, but it is coming about as a matter of self-preservation.

Civilization is the best way of doing things. Civilization means the civil way, the mental, courteous, helpful way.

There is a natural tendency to specialize these days. The man or firm who manufactures or sells one or more products, be it soap or shoes, pianos, or cabinets, should know

their business. If they know it less than from A to Izzard they should busy themselves and get down to the source of supply (information)—their trade paper, and absorb with interest and studiousness all the meaty things found there pertaining and relative to their specific trade or craft. The specialized trade paper co-operates with, and reflects to, manufacturers and dealers, the god—the best means to a successful end. Co-operation is most essential to business life.

Simply because one is in the same line of business as another man is no reason why he should attempt to destroy him. A certain amount of mutuality is absolutely necessary to live. Increased consumption is the rule of every line of human endeavor.

There are bigger markets than the world ever before offered, and there is bigger pay for the man who can eliminate the grouch, get rid of his grab instincts, and regulate his gobble and guzzle. That is, don't over-eat, don't over-drink, smoke one cigar at a time, think well of everybody, especially yourself.

Be proud of the business you are in. Stand by the whole fraternity. Don't knock competitors. I have noticed this, that the smaller a man's bean the more room there is in it for peeve. Little peanut men live by themselves; they do not read their trade paper. They think they have secrets, and they are afraid of somebody getting the secret away from them. The fact is, however, we only grow as we give, and anybody who locks the world out shuts himself in.

I know hundreds of highly prosperous business men, manufacturers, dealers, jobbers, craftsmen, and I cannot recall a single instance in which the mentally successful man does not read his specialized paper. He subscribes for it and he pays for it promptly. In many instances he orders extra copies from time to time and distributes them. He is boosting the whole game all along the line. And this very fact puts him in a frame of mind where currents of success come swirling in his own direction. He is moving on the eternal tide of progress.

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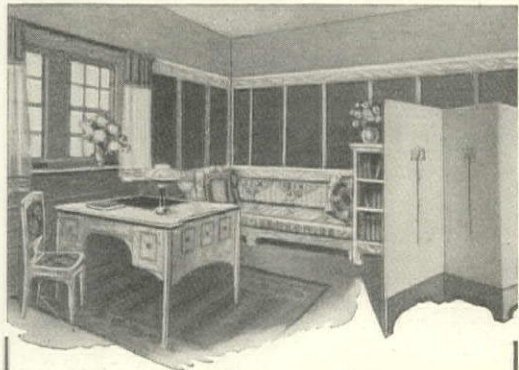
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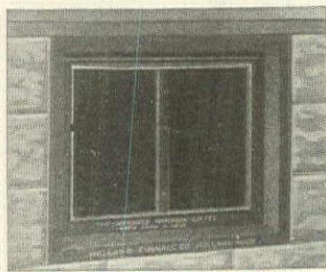
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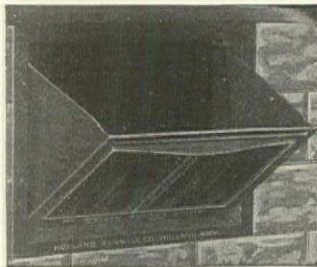
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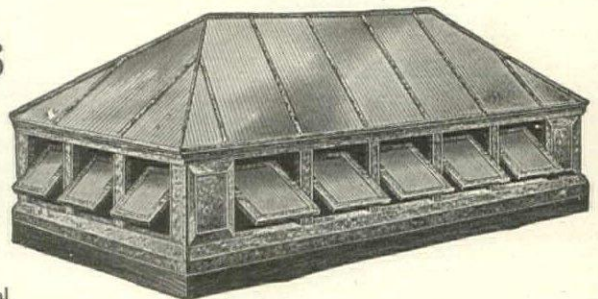
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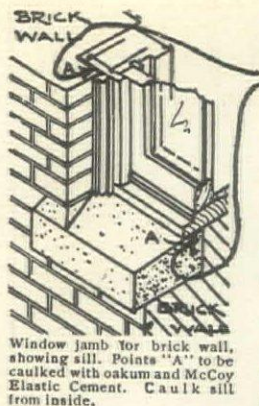
WILLIS MANUFACTURING CO.,

Galesburg, Ill.

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The Leaks Are Here— Water—Heat—Air

Be sure to have perfect window caulking by using

McCoy's ELASTIC CEMENT

Our circular tells more that will interest you as to the use of McCoy's Elastic Cement in caulking, pointing up cracks, etc. Yours for the asking.

Hydro-Bar Waterproofing Co., 519 West 19th St. NEW YORK CITY

Hurry Up! Get Yours!

I've got a Monarch Patent Cornice Mould all packed and ready to send to you by parcel post as soon as you send me your address.

I know you'd like to decorate your own parlor or dining room with a nice, fancy plaster cornice. Or perhaps you'd like to do an extra nice job in some house you are building now.

Here's your chance. It won't cost you anything. I'm going to send you this tool just to show you what a good one it is.

DON'T SPEND A CENT

I'll send you the Monarch Cornice Mould on **Ten Days Free Trial**. You don't have to buy it, but I want you to try it. Use it all you want to. If you'd like to buy it, I'll sell it to you; but I want you to test it first and prove to your own satisfaction that you won't be throwing money away if you buy a Cornice Mould.

THE MONARCH PATENT CORNICE MOULD

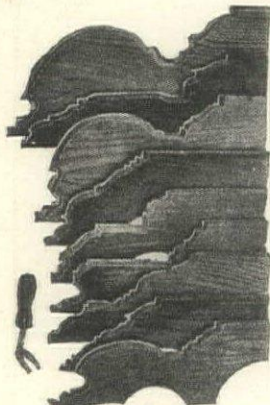
consists of an aluminum frame fitted with the best red birch guides and black cherry handles. It is light and strong. Ten assorted blades and a blade scraper complete the set. Each blade is made of white pine. The edge is of zinc encased in the wood. The pine is specially treated so plaster or water will not affect it. This tool will make straight cornices and perfect corners quicker, easier and better than you have ever seen it done. The saving in time is wonderful and the work beyond comparison. It requires no special skill to use this Cornice Mould. You can handle it as well as I can.

DON'T SEND ANY MONEY

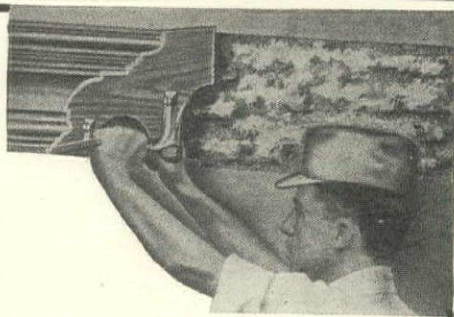
Just send me your name and address. Tell me you want the Monarch Cornice Mould on **Ten Days Free Trial**. Use it ten days and if it doesn't please you send it back, that's all.

Get Your Cornice Mould Quickly by Writing Today

Timothy F. Horan, 10 Maple Street, Cooperstown, N. Y.



Complete Set Consists of Blade Holder, 10 Blades and Blade Scraper



A BIT OF UTILITY

Guided by its circular rim—instead of its centre—the Forstner Labor-Saving Auger Bit will bore any arc of a circle, and can be guided in any direction. Doesn't matter how hard the wood is, no consequence

whether it is full of knots, or the grain awkward to negotiate. The Forstner Bit works with equal smoothness under any condition and leaves a true polished surface on every job.

UNEQUALED FOR DELICATE WORK

Supersedes chisels, gauges, scroll-saws, or lath tools combined, for all kinds of delicate work. Cabinet and pattern makers and carpenters are enthusiastic because they do more work than other bits and

cost no more. We can offer something special in the matter of price on sets packed in a sensible box. Send today for particulars and catalog.

THE PROGRESSIVE MFG. CO., Torrington, Conn.



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TIGHT!

IF you would take a glass bottle, put a glass stopper in it and then melt the glass top and the stopper together so it would be like one solid piece of glass, you would have a vessel that would be *tight*. What would you think of a steel furnace made just as tight as that; one that had all joints all **MELTED** together like the glass in the bottle, without any riveted or bolted seams, or slip joints, or sand joints, such as you find in ordinary furnaces, and which have given cause for putting furnaces in a class by themselves as "dusty and dirty?" Well, the **HESS FURNACE** is built that way; the steel plates forming the body of the

furnace are clamped together and are then melted in that position so that they fuse together and become like one solid piece of steel. No leakage there, *never, never*. Expansion and contraction won't open these joints and gas and dust never will get out.

It is a wonder, too, how long a furnace made that way will hold fire; with wood or hard or soft coal or slack, or even rubbish. You can shut it up tight and the fire will just hold there for hours and hours, for fire will not burn without air, and if air doesn't leak in there will be very little combustion.

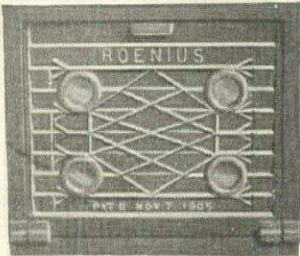
Our space here is limited and we can't tell you much more about the **HESS FURNACE** here, but we have a 48-page booklet which tells you all about it, but if you are interested just ask us for one, and it will come to you free.

We sell our furnaces *direct from factory to consumer*. The price is less than dealer charge and the service is better than any dealer can give. Send us a rough sketch of a building you want heated, and we will send back a plan made by a draftsman, showing how it would be heated, with an estimate of cost. No charge is made for this, but it's worth money to you.

We sell on trial, too, so that your money doesn't get to us until you have tested the heater and are satisfied. Want to hear more?

Hess Warming & Ventilating Co., 907 Tacoma Building, Chicago, Ill.

Roenius Wood and Coal Chutes



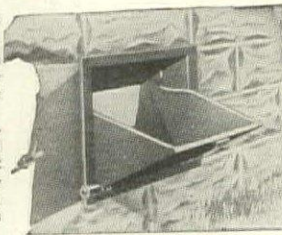
are unusually attractive in design. They add to the fine appearance of the building where the old style and easily broken windows detract.

Roenius Wood and Coal Chutes are made to stand the abuse a chute is subjected to. They are easily opened and locked, and will last practically forever.

Roenius Style B Chutes

are made with glass discs, especially for buildings where the only available light must pass through the chute.

Specify and buy **Roenius Wood and Coal Chutes** and get the best. If your hardware or lumber dealer does not carry them write us about it. Circulars and prices on request.



Grand Rapids Foundry Co., Manufacturers
GRAND RAPIDS - - - WISCONSIN

Write at Once for the Jahant Specification Hand Book—It's Free

This book tells you what you ought to know about proper heating and ventilation, and tells why you ought to specify the **Jahant Down-Draft Furnace**.

It tells how to estimate on the cost of proper heating equipment; how to reduce your bills and at the same time turn out a better job with a better profit for yourself.

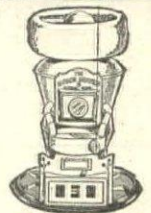
It explains the construction and operation of the **Jahant** and how it delivers plenty of heat wherever and whenever heat is needed at a saving of one-third to one-half in fuel bills.

It tells how we back your recommendation of the **Jahant Furnace** with a legal binding 360 Day Guaranty Bond—and it contains a lot of other information which you cannot afford to be without. Write for the book today.

The Jahant Heating Co.
 165 Mill Street, Akron, Ohio

Furnace Builders for More Than 30 Years

Specify the **Jahant Down-Draft Furnace**



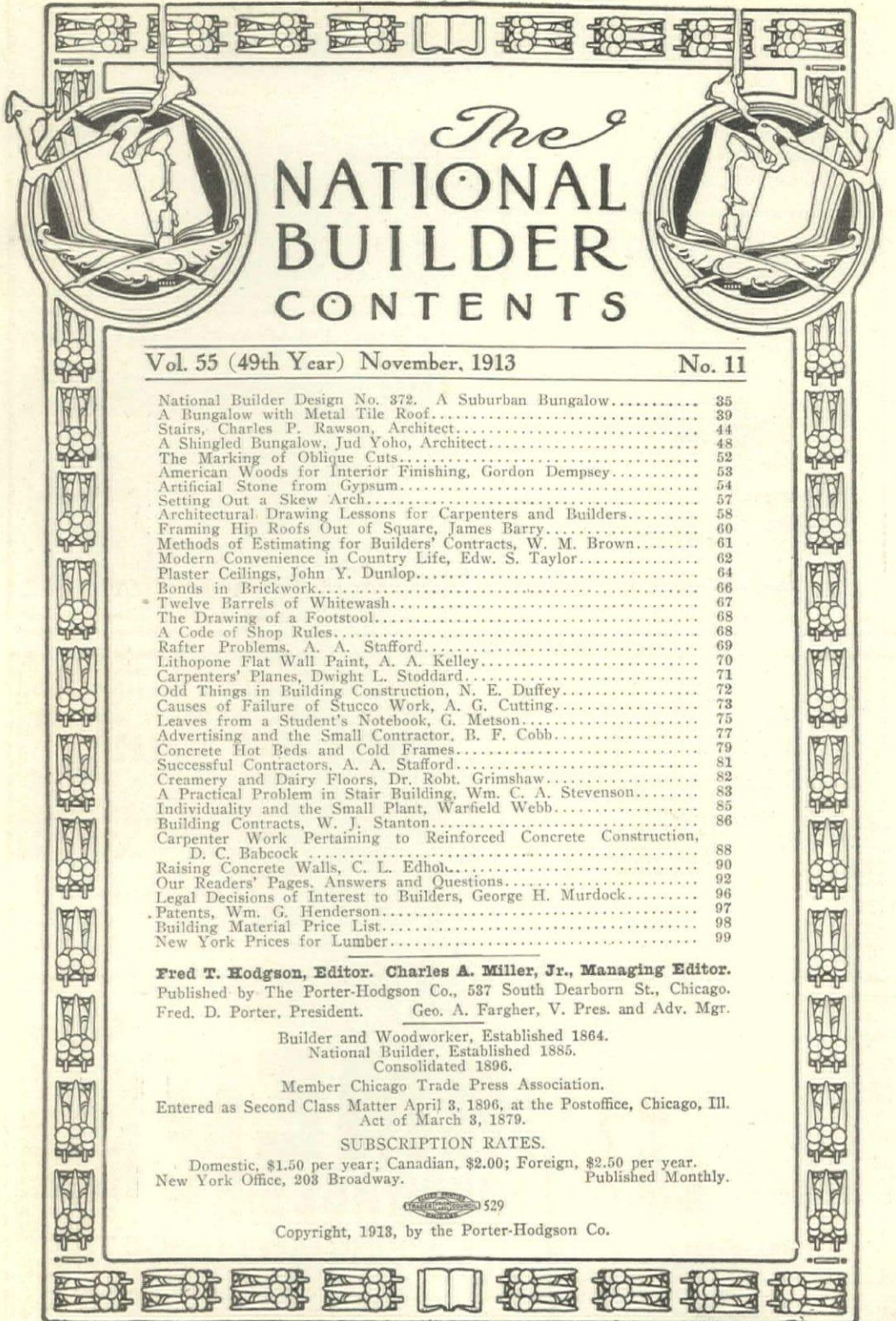
This No. 1 Jahant Down-Draft Furnace (weight over 1000 lbs.) as it stands \$48.00 cash, delivered east of Omaha and north of Ohio River.

Write for **Terms and Free Furnace Handbook**

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Carpenters and Contractors

Fasten your beams, scantlings, bathroom, electrical, heating, plumbing and all other apparatus and fixtures to brick, stone or concrete with SEBCO Expansion Bolts and Screw Anchors. They won't loosen or pull out.

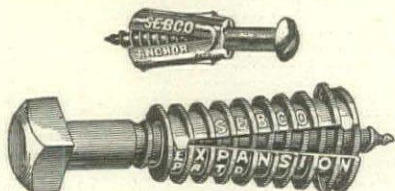
The Anchor

is made of non-rusting composition metal for use with wood screws—especially adapted for fastening small fixtures to marble, tile, etc.

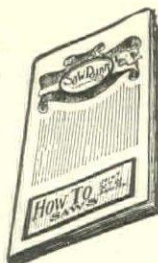
The Bolt

and shield are made of malleable iron for fastening all heavy fixtures.

Send for Free Samples and Catalog.



Star Expansion Bolt Co.
147 Cedar Street, New York City



YOU SHOULD READ THIS FREE BOOKLET

"Saw Points" tells how to properly joint, set and file any hand saw, together with other valuable information. Every user of saws should know about

The MORRILL SPECIAL SAW SET

A mechanically perfect tool. Takes out the wrong set and puts in the right set at one operation.

Chas. MORRILL 96 LAFAYETTE ST. NEW YORK

SAMSON SPOT SASH CORD



Reg. U. S. Pat. Off.

Made of extra quality stock, carefully inspected and guaranteed free from the imperfections of braid and finish which destroy common cords so quickly.

The Spots on the Cord, in any color, are our trade mark. Don't be misled by imitations. Samples and full information gladly sent.

Samson Cordage Works

Boston, Mass.



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Residence of Walter M. Collins, Builder, Bayside, lined with Cabot's Quilt, and what the owner says:

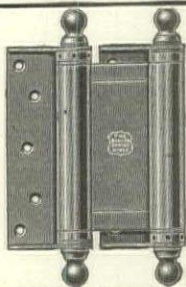
"The side walls are of 24-in. red cedar shingles, stained with your Special Gray and laid over your single ply "Quilt." The Quilt is certainly a good investment, as the house is in a very exposed position, and after the hardest winter in years, without a frozen pipe or any difficulty in heating, I feel that the small additional cost over ordinary building paper has already been saved in coal and comfort."

Make Your Houses Frost-Proof by Lining Them with

Cabot's "Quilt"

It is cheaper to build warm houses than to heat cold ones. A cold house will waste enough coal in two winters to pay for enough Quilt to make it warm for all time. Quilt is not a mere building paper, but a thick matted lining of cured eel-grass that is twenty-eight times warmer than common paper. It will make your house warm in winter and cool in summer, cut down your doctor's bills and keep the whole family comfortable. It costs only 1c a foot, will never rot or disintegrate—last forever—and is fire retarding. A full investigation will cost you a postal card—which will bring you a sample and the proofs. Will you write now?

SAMUEL CABOT, Inc., Mfg. Chemists, Boston, Mass.
Cabot's Creosote Shingle Stains



NEW

BOMMER

SPRING HINGES



THE ONLY DOUBLE ACTION SPRING BUTT HINGE THAT CARRIES THE LOAD ON THE TRUE BEARINGS

The carpenter can scribe and fit a pair of swinging doors from the same side of the opening and avoid guesswork, as he can see what he is doing while fitting both doors

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THE NATIONAL BUILDER

Vol. 55 (49th Year) Chicago, November, 1913

No. 11



A Suburban Bungalow.

NATIONAL BUILDER DESIGN No. 372.

J. B. White & Son, Architects, Clarion, Iowa.

For Floor Plans, Sections, Details and Full Working Drawings, see Supplement of this month. Estimated cost, architects' fees not included, \$3,084.72.

A Suburban Bungalow

NOTWITHSTANDING the apparent lack of sentiment in business, it still remains a fact that the mechanic, clerk or bookkeeper who owns his own little home in the suburbs is given a preference over the one who has not been so provident. Owning one's own home, modest though it may be, identifies the owner as a part of the community and in consequence there are many real favors shown him which the stranger knows nothing about. In times of prosperity a modest home is a meeting place for this friends, while in adversity the fact that he has a roof over his head relieves him

of much of the anxiety which he would otherwise feel.

The man living in the suburbs has an additional point in his favor in that his home is surrounded as a rule by a good sized plot of ground and in the case of the average bungalow, this plot of ground is really necessary to set the building off to advantage. Where houses are crowded close together, they might just as well have simply a party wall between them and present an unbroken front to the street. There would be some economy in this as far as operating expenses are concerned as it would mean that much



less wall exposed to the weather. But one would not feel the same freedom as when his house stands entirely alone. Standing, one might say, on its own merits.

The bungalow which we show on our supplement sheet this month, and which appears in colors on the front cover, was designed and built by J. B. White & Son, at Clarion, Iowa. The idea in the mind of the designer was to produce an economical house of good appearance which would serve as a real home and as an example of what could be accomplished with modern materials. The exterior in general follows the English half-timber effect with the exception that instead of a plaster surface between the beams the entire surface is first covered with asbestos lumber. This takes the place of the ordinary weather-boarding and from its impervious nature will undoubtedly prove much more satisfactory.

The planning of a small bungalow of this character requires exceptional thought as

every scheme must be considered whereby the best results may be obtained at the least cost and without sacrificing the appearance. The main idea on the part of the designer is to produce a plan in which all of the rooms are readily accessible without making a hallway of any of them. In the present case the living room and dining room are practically one with the kitchen closely adjoining the dining room in the rear. The two bedrooms are separated by the bathroom while separate entrances are provided to the living room and dining room. This arrangement provides exceptionally large closets for each bedroom.

In a house of this character the use of the attic or space under the pitched roof is limited to storage and so a separate or prominent stairway is not necessary. The arrangement of the stairs is such that very little space is taken up, the stairs to the basement going down directly under the stairs to the attic and a door from the grade meeting the stairs to the kitchen on a landing.

Estimate of a Suburban Bungalow

I. P. Hicks

EXCAVATING AND MASONRY.	
250 yds. excavating, 35c.....	\$ 87.50
1,050 cubic ft. concrete in walls, 25c	262.50
220 square ft. porch floor and platform, 12c	26.40
224 cubic ft. cement block walk, 25c	61.00
40 ft. coping, 40c.....	16.00
Cement steps	15.00
876 square ft. cement cellar floor, 8c	70.08
1,170 square ft. asbestos lumber, 25c	292.50
106 lineal ft. cement plastered and troweled base, 20c.....	21.20
1 chimney, 8x12x32 ft., \$1.....	32.00
1 chimney, 8x8x29 ft., 80c.....	23.50

Total excavating and masonry..\$ 907.68

LUMBER BILL.	
	Feet.
9, 2x6x16 ft. sills	144
13, 2x8x16 ft. sills.....	273
7, 2x8x10 ft. floor joists.....	94
38, 2x8x12 ft. floor joists.....	608
22, 2x8x14 ft. floor joists.....	418
50, 2x8x14 ft. second floor joists..	950
11, 2x8x16 ft. second floor joists..	231
60, 2x4x18 ft. partition studs.....	720
4, 2x6x18 ft. partition studs.....	72
130, 2x4x10 ft. outside studs.....	845
24, 2x4x12 ft. plates.....	192

24, 2x4x16 ft. plates.....	264
30, 2x4x12 ft. lookouts.....	240
12, 2x4x14 ft. porch ceiling.....	108
8, 2x4x12 ft. porch ceiling.....	64
30, 2x4x10 ft. porch rafters.....	195
4, 2x6x24 ft. hip rafters.....	96
18, 2x6x20 ft. rafters.....	360
10, 2x6x18 ft. rafters.....	180
48, 2x6x16 ft. rafters.....	768
20, 2x4x16 ft. dormers	220
20, 1x6x12 ft. collar beams.....	120
30, 1x6x12 ft. braces.....	180
20, 1x4x12 ft. bridging.....	80

Total bill framing lumber.....\$7,422

7,422 ft. framing lumber at \$27..\$	200.39
1,020 ft. 8-in. No. 2 shiplap sub-floor, \$27	27.54
1,000 ft. 8-in. No. 1 shiplap attic floor, at \$29	29.00
1,850 ft. 8-in. No. 2 shiplap outside walls, \$27.....	39.95
4 rolls R. R. paper.....	2.00
6 rolls tarred paper.....	7.20
1,960 ft. 2 1/4 face Y. P. flooring, \$45	88.20
1,660 ft. 1x8 No. 2 Y. P. sheathing, \$27	44.82
16 1/2 M clear R. C. shingles, \$4.50.	74.25

*Materials are figured at Omaha price. Carpenter labor at 50 cents an hour.



560 ft. 5/8x4x12 to 16 ft. fir ceiling for cornice, \$32.....	17.92
300 ft. 5/8x4x16 ft. fir ceiling porch, \$32	9.60
200 lineal ft. 1x6 fir finish, \$45....	4.50
80 lineal ft. 1x4 fir finish, \$45....	1.17
650 lineal ft. 1 1/8x6 fir finish, \$45	18.22
150 ft. 8-in. No. 1 shiplap, coal bin, \$27	4.05
Total lumber bill.....	\$ 568.81

MILL WORK.

4 cellar window frames, 12x16, 3 lt., \$1.75	\$ 7.00
1 cellar window frame, 10x8, 2lt.,	1.60
4 cellar sashes, 12x16, 3 lt., \$1.40	5.60
1 cellar sash, 10x8, 2 lt.....	1.00
1 door frame, 3 ft. x 7 ft.....	2.25
2 door frames, 2 ft. 8 in. x 6 ft. 8 in., \$2.25.....	4.50
1 outside door frame, 3 ft. x 7 ft..	2.50
2 outside door frames, 2 ft. 8 in. x 6 ft. 8 in., \$2.25.....	4.50
2 window frames, 36x20, \$2.25....	4.50
1 window frame, 20x36.....	2.25
4 window frames, 32x30, \$2.25....	9.00
1 window frame, 30x30.....	2.25
1 window frame, 24x20.....	2.25
2 window frames, 16x30, \$2.25....	4.50
1 window frame, 40x40x20.....	3.00
1 triple sash frame, 18x16.....	6.00
1 triple sash frame, 12x16.....	5.00
2 windows, 36x20, top sash div., \$3	6.00
1 window, 20x36, top sash div....	2.50
4 windows, 32x30, top sash div., \$4	16.00
1 window 30x30, top sash div....	4.00
1 window, 24x20 top sash div....	2.50
2 windows, 16x30, top sash div, \$2.50	5.00
1 window, 40x40x20, top sash div..	6.00
3 sashes, 18x16, 70c.....	2.10
3 sashes, 12x16, 60c.....	1.80
3 sets door jambs, 2 ft. 8 in. x 6 ft. 8 in. 70c.....	2.10
5 sets door jambs, 2 ft. 6 in. x 6 ft. 6 in., 70c.....	3.50
1 set door jambs, 2 ft. x 6 ft. 6 in.	.65
1 set door jambs, 2 ft. x 6 ft.....	.65
1 cased opening, 6 ft. x 7 ft.....	.90
1 front door, 3 ft. x 7 ft. x 1 3/4 in..	16.00
2 rear outside doors, 2 ft. 8 in. x 6 ft. 8 in. x 1 3/4 in., \$6.....	12.00
3 inside doors, 2 ft. 8 in. x 6 ft. 8 in., x 1 3/8 in., \$3.....	9.00
5 inside doors, 2 ft. 6 in. x 6 ft. 6 in. x 1 3/8 in., \$2.75.....	13.75

1 inside door, 2 ft. x 6 ft. 6 in. x 1 3/8 in.	2.50
1 inside door, 2 ft. x 6 ft. x 1 3/8 in.	2.40
52 plinth blocks, 6c.....	3.12
46 door casings, 6 ft.....	6.90
8 door casings, 6 1/2 ft.....	1.30
6 window casings, 4 1/2 ft.....	.68
2 window casings, 7 ft.....	.35
20 window casings, 6 ft.....	3.00
12 window casings, 2 ft.....	.60
60 ft. head casings for windows, 2 1/2c	1.50
120 ft. head casings for doors, 2 1/2c	3.00
180 ft. cap mold, 2c.....	3.60
180 ft. fillet, 1/2c.....	.90
60 ft. window stool, 2 1/2c.....	1.50
60 ft. window apron, 2c.....	1.20
168 ft. window stops, 1/2c.....	.84
316 ft. base, 3 1/2c.....	4.74
316 ft. base, 3 1/2c.....	4.74
316 ft. floor mold, 1/2c.....	1.58
200 ft. picture mold, 1 1/4c.....	2.50
24 ft. plate rail, 10c.....	2.40
2 ft. porch columns, 4x4	1.00
Stairs	20.00
Medicine case	12.00
Kitchen cupboard and china closet	25.00

Total mill work..... \$ 276.11

CARPENTER LABOR.

7,422 ft. framing lumber, \$10....	\$ 74.22
5,530 ft. sheathing, \$10.....	55.30
16 1/2 M shingles, \$2.....	33.00
1,960 ft. flooring, \$20.....	39.20
Smoothing floors	28.00
Ceiling porches	4.50
Cornice work	40.00
Casings, outside	7.00
Finishing, 45 per cent cost of mill work	124.25

Total \$ 405.47

RECAPITULATION.

Excavating and masonry.....	\$ 907.68
Lumber bill	568.81
Mill work	276.11
Carpenter labor	405.47
Hardware and nails.....	46.00
Tin work	30.00
Plastering, 450 yards, 27c.....	121.50
Plumbing	218.00
Electric wiring	38.00
Painting	110.00
Heating, hot water.....	220.00
Incidentals, 5 per cent.....	143.15

Total estimate \$3,084.72

EDITORIAL



It isn't what you were, or what you could once do, but what you are now, and what you can do today that tells!

“Run if you like, but try to keep your breath, Work like a man, but don't be worked to death.”

Again referring to the question of estimating; we cannot get away from the idea of the employment of an expert quantity clerk, as well as the architect, to ensure accuracy in measurements, descriptions of materials and calculation of quantities. But indispensable as these operations undoubtedly are, the most important and the most difficult part in estimating is the pricing of the quantities after they are correctly billed or detailed out in black and white. It is here that every expense likely to arise in the execution of the work has got to be taken into account and resolved into corresponding quotations in lineal, superficial, or cubic feet, yards or other standard measurement used in quantity surveying. There is the cost price, the carriage, the workmanship (sometimes partly done by machinery), the loss in material and other contingencies, insurance, profit, all to be reckoned, and all variable and continually fluctuating. This is where the greatest obstacle to scientific or academic estimating comes in, and where practical knowledge and experience of the work are most valuable. It is the cause of so many different methods being adopted, for no hard and fast rule can be found applicable. We may lump together all overlapping items as far as possible, as it simplifies detailing and calculating to some extent, and it has been, and is, the method used by some estimators. But here again, we are confronted

by difficulties, particularly to the quantity surveyor, when the work happens, as is often the case, to be priced out to different contractors, as mason, bricklayer, carpenter, joiner, roofer, plasterer, etc., all requiring separate schedules or bills of quantities. Perhaps some of our enlightened readers will favor us with their view.

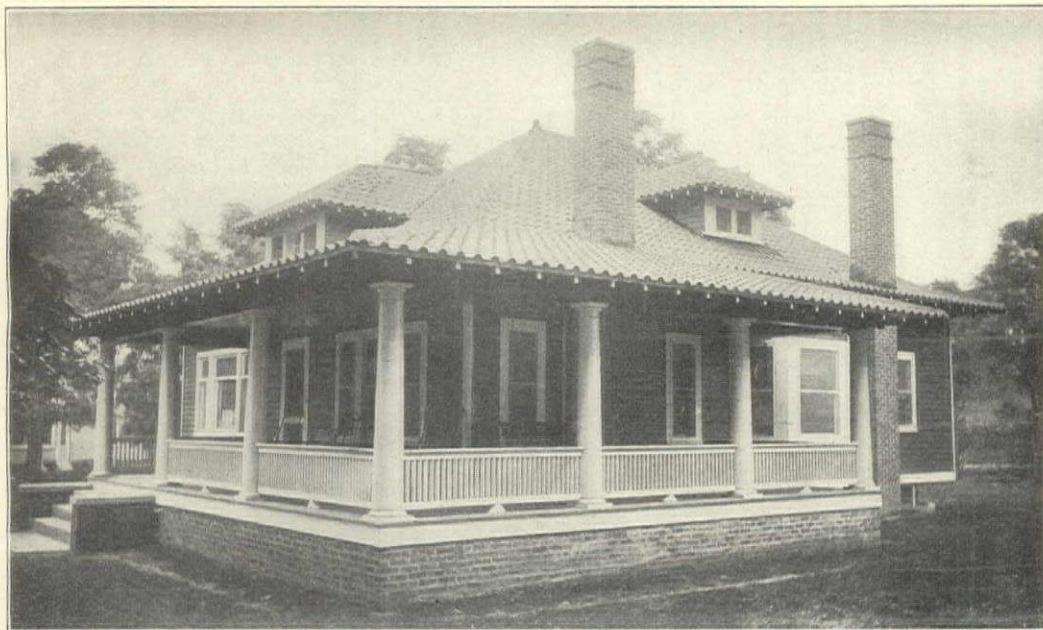
The close of the so-called fire season of the national forests has finished with the least damage that has ever been recorded. There is still some danger from carelessness of campers or settlers burning brush and clearing land, but the real danger season is over for this year.

Through the co-operation of lumbermen with the forest officials the area burned over during the year amounted to only 60,000 acres, as against 230,000 in 1912, and 780,000 in 1911. The number of fires were approximately 2,260, showing that each one was restricted to a very limited area.

The conservation of the lumber interests in this respect is of great interest to the building trades, and means that systematic efforts are being made to perpetuate the forests, especially in areas and districts which are not well adapted for any other purpose.

In connection with fire prevention and control, the reseedling of burned and cut over districts, the forest service is establishing nurseries in various sections. One of these in Montana has a capacity of 4,000,000 trees a year.

The care of our forests, however, seems to be thought a matter of comparative unimportance, the average forest ranger caring for about 100,000 acres. In Germany a man of equivalent rank cares for only 700 acres.



This Bungalow is a Year-Round Home.

A Bungalow With Metal Tile Roof

Charles Everett Anderson

THE bungalow shown herewith is one of pleasing exterior and convenient arrangement, and its moderate cost is an additional recommendation from the point of view of a prospective home builder. It is located in the town of Atlantic Highlands, N. J., a beautiful little town overlooking the Atlantic Ocean, and surrounded by the picturesque hills which border Sandy Hook Bay. With its immediate surroundings of natural forest trees, backed by the distant hills, the bungalow fits so naturally into the landscape that it seems to have been there always. Built for a summer home by Mr. W. C. Burrell of New York City, it nevertheless has all the advantages of an all-year-round house.

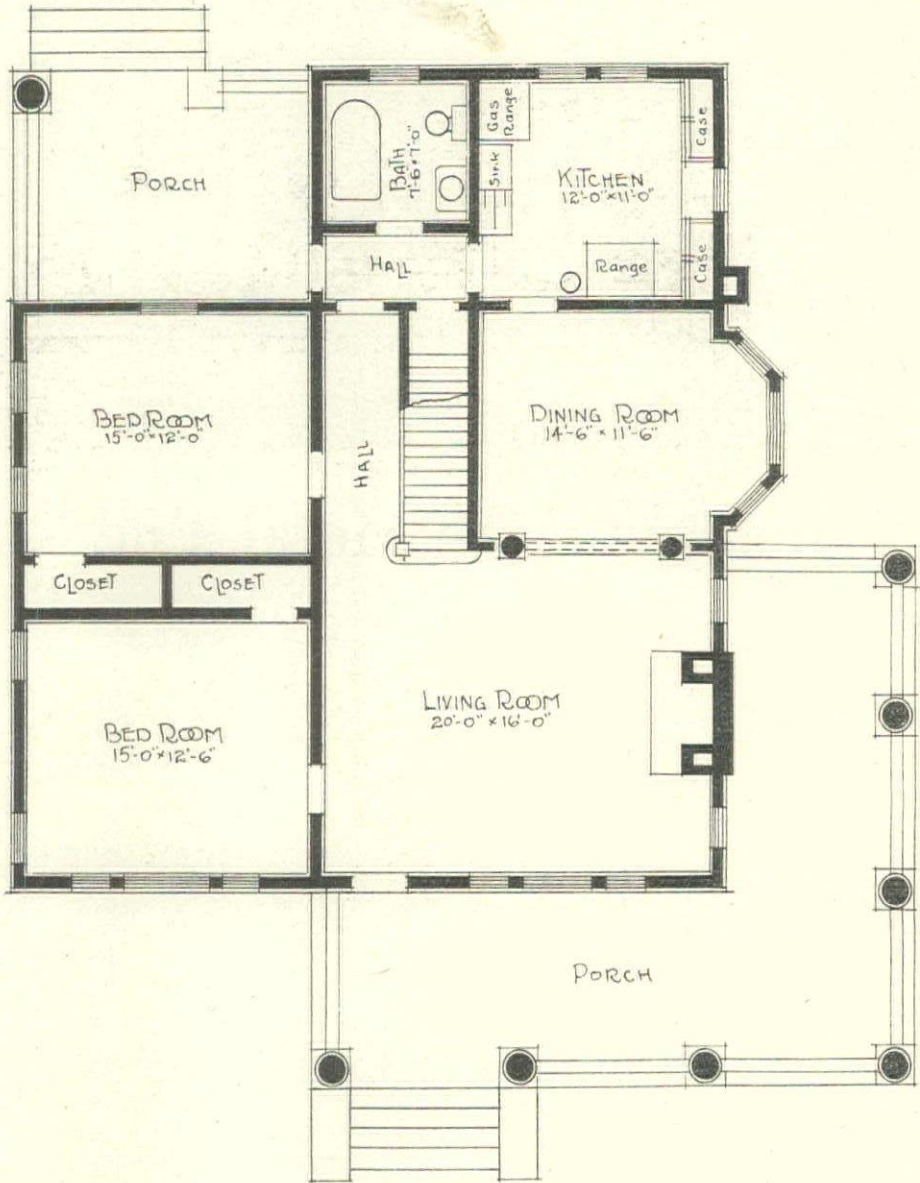
The most noticeable exterior feature of the bungalow is the roof of metal Spanish tile. Spanish tile roofs, while much admired, and possessed of long life, are beyond the reach of many, because of their high cost. They were originally a product of ancient Spain, and the tiles were made by hand. Their beauty has preserved them for modern architecture, and they are becoming more and more popular in the construction of the better

class of dwellings and other buildings. The objection of cost has to a large extent been overcome in recent years by the use of metal tiles, stamped by machinery from sheet steel, and after being stamped are dipped separately into the "spelter" or molten zinc. This gives a uniform coating and covers the edges, so there is no raw surface anywhere exposed to the weather and possibility of rust. The metal tile can not be distinguished from earthen ware tile except by an expert, and then only after a close scrutiny. Such a roof has several advantages over other roofs inasmuch as it is very durable and yet lighter than clay tile, while as opposed to shingles, it is fireproof. The metal tiles can be applied with no other tools than a hammer and nails, and they interlock with each other in such a way as to prevent any possibility of leakage.

The general exterior of the house is exceptionally good, the long roof lines being pleasingly broken by the dormers, and the windows in the lower part of the bungalow are grouped well, plenty of wide windows being used, producing a homelike effect. Doric columns of cypress are used on the porches, and are painted white as is the other trim,

contrasting nicely with the darker body of the house. The steps are of concrete, and the foundations and chimneys of brick. The square balusters used in the porch rail carry out the simplicity of the general details as do also the square cut rafter ends. The dormer windows are fitted with casement sash

The first floor has two bedrooms, in addition to the living room, dining room, kitchen and bath. The stairs ascend from the living room and a hall parallels them from the living room to the rear of the house, giving direct access to the rear door, bath room and kitchen from the living room and bed rooms. Be-



First Floor Plan.

opening inward. These are divided diagonally into small panes, giving an odd, though pleasing effect.

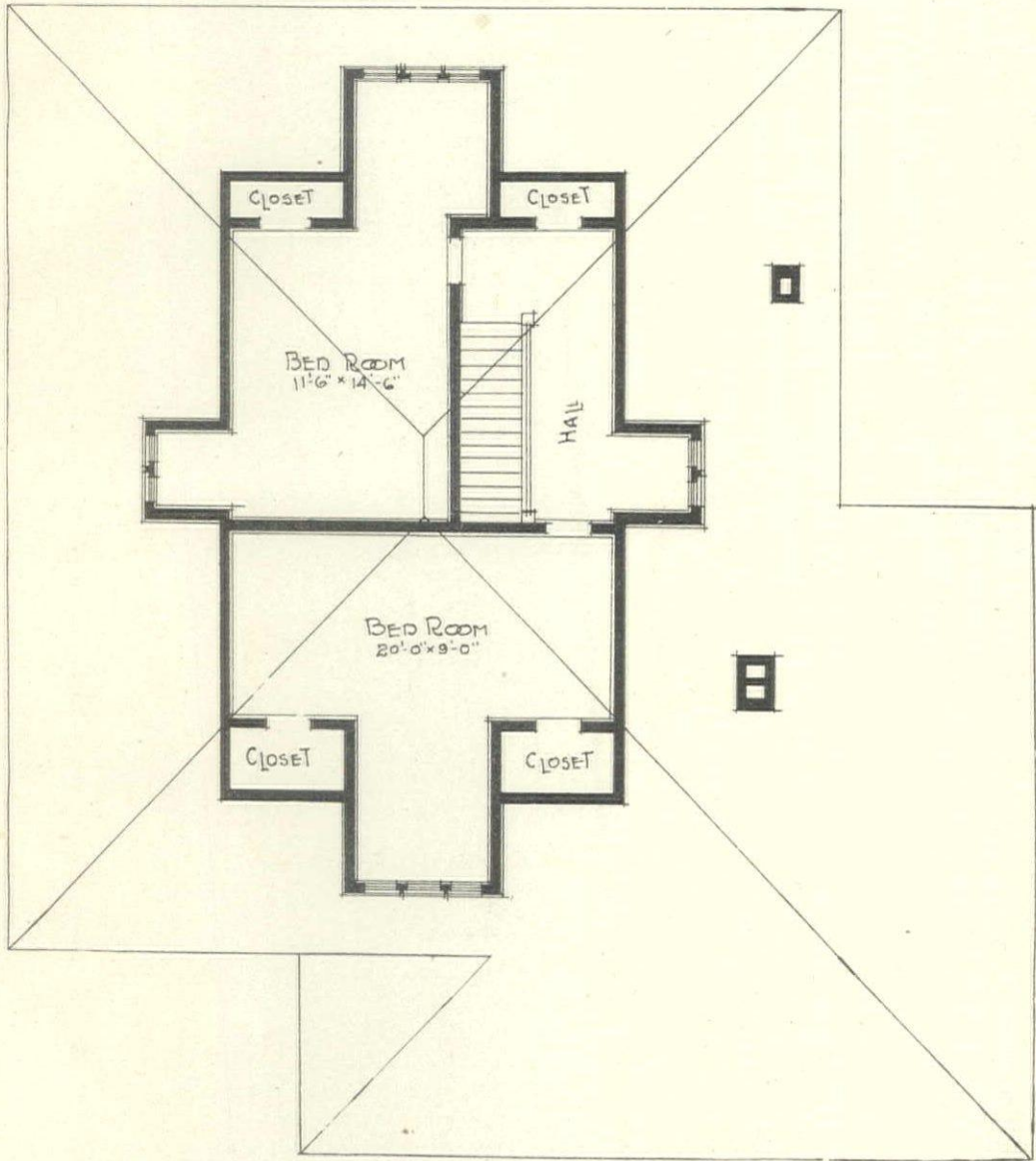
The plan of the house is well worked out and provides seven rooms and bath, as well as a front and a rear porch of exceptional size.

neath the main stairs the cellar stairs descend from the rear entry or hall.

The bungalow is entered through the front door, opening directly into the living room. The door itself is plain, with a full length plate glass, affording considerable light to

the living room. The room is trimmed with a colonial or cabinet head trim, the casings being perfectly plain, trimmed with a wall mold where necessary. All trim is stained very dark, and contrasts nicely with the white walls. A massive brick mantle is provided at one end of the living room. This is lined

of the fireplace there is a window, and in the front of the room is a triple window, the center section being three feet six inches in width and the others two feet wide. The floor is of comb-grained North Carolina pine, varnished in its natural color. The stairs leading up from the living room have a newel



Second Floor Plan.

with firebrick and is fitted with an ash damper communicating with a clean-out door in the cellar. The hearth is of face brick like the fireplace. A four light electric fixture is provided in the living room, of a square pattern with green art glass. On each side

and balusters of a plain square pattern, corresponding well with the rest of the trim. Between the living room and the dining room there is a wide opening with a fluted column at each side.

The dining room is provided with a bay,

having three windows. The walls are divided into panels by wood strips from the plate shelf to the base board. This room has an electric dome of simple pattern in the center of the ceiling. The ceiling is panelled with strips radiating from the center. The trim in this room is dark, to match the living room. The wide opening between living room and dining room makes them practically one room and gives an effect of spaciousness which would not be obtained if the rooms were more definitely separated.

The kitchen is fitted with the same style of trim, but is finished in white enamel. To the right as one enters from the dining room there is provided a counter shelf extending the full length of the room. Beneath it are a row of drawers and a row of pot closets. Over it and on each side of the window are cupboards. Directly beneath the window flour bins are provided in place of the closets. The whole, with the exception of the counter shelf itself is finished in white, the counter being finished natural, giving a neat contrast. A coal range is provided, also a gas range, while a 30-gallon boiler provides hot water for the house. A porcelain enameled sink, with drain boards, occupies the space next to the gas range. A double window in the rear of the kitchen provides light in addition to the one between the cupboards on the side of the room. The floor is of comb-grained North Carolina pine as are all the floors downstairs.

In the rear of the house, alongside of the kitchen, is the bath room. This is finished in white and is provided with porcelain enameled tub and lavatory, and a porcelain wash-down closet combination with solid porcelain tank.

In front of the bath room, extending from the kitchen across to the rear door is a short hall or entry. This also provides access to the cellar and to the front of the house through the main hall.

On the opposite side of the house from the living and dining rooms there are two bed rooms, entered from the living room and from the hall. These are finished in a similar manner to the living room. The front bed room has a large triple window in front, the center section of which is four feet six inches wide. In addition to this there are two side windows. The rear room has two side windows and a rear window opening on the rear porch. Between the two bed rooms there are two large closets, one opening from each room.

The front porch is ten feet wide and extends across the front of the living room and around the side as far back as the dining room. The rear porch is 11 ft. 6 in. long by 15 ft. 6 in. wide. Upstairs there are two bed rooms, each with a large alcove and plenty of closet room. There is also a large hall.

The foundation walls are of brick. The cellar is excavated only under the living room, dining room, hall, kitchen and bath, the space under the bed rooms being left unexcavated, but communicating with the cellar by an opening, which gives access to the heating pipes and permits a circulation of air. The laundry is situated in the cellar, and is provided with a two section tub, 24 by 48 inches. A platform or low table extends across the rear of the laundry, on which the boiler can be set, or the wash spread out. There is also a gas plate to heat the boiler and irons. Coal bins are provided at the rear of the cellar, and under the cellar stairs is built a vegetable cellar, 10 ft. by 12 ft., provided with two rows of shelves extending its entire length. The house is heated by a furnace. The cellar has a concrete floor four inches thick. Concrete footings are provided under the walls. The chimneys are built with terra cotta tile flue linings.

The framing used in the construction is spruce, studding 2 in. by 4 in., 16 in. on centers, first floor joists 2 in. by 10 in., 16 in. on centers, second floor joists 2 in. by 10 in., 16 in. on centers, ceiling joists 2 in. by 6 in., 16 in. on centers. A 6 in. by 10 in. girder is placed under the partition or rather opening between the living room and dining room. This carries the floor joists. Rafters are 2 in. by 6 in. spruce. The building is sheathed with North Carolina pine, shiplap laid diagonally. The roof is also sheathed and sides and roof covered with roofing paper. The first floor is double with roofing paper between. The siding is red cedar, laid 4 in. to the weather. Porch floors are of Oregon fir, laid in white lead. The porch ceiling boards are North Carolina pine. Porch columns and all exterior trim are cypress. Studs are doubled at door and window openings. Joists under partitions running parallel with the joists are doubled and set six inches apart on centers to carry the partition. All openings five feet or more in width are trussed over. The first story has a floor of 2½ in. comb-grain North Carolina pine. The second floor is 3 in. North Carolina pine. All interior finish is North Carolina pine. Outside

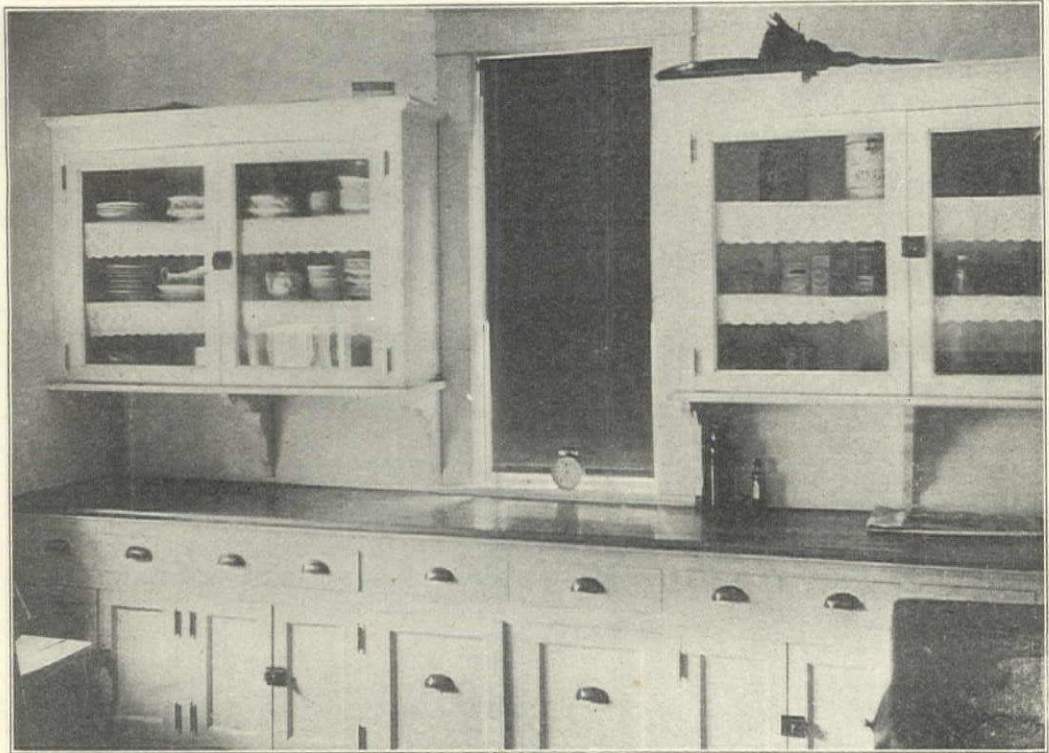
doors are $1\frac{3}{4}$ in. thick and all inside doors are $1\frac{3}{8}$ in. thick. The door from dining room to kitchen is hung on double acting hinges. Inside doors are stock five cross panel doors. Plastering is done with patent plaster and finished with hard white finish.

The house drainage system is connected with the sewer by a 4 in. vitrified tile pipe. Three feet outside the wall the soil pipe connects with the tile and runs under the cellar floor to a point under the bath room and then up, to a point one foot above the roof. A clean-out is provided at the foot of the soil pipe and a house trap and fresh air inlet where the pipe enters the house; $1\frac{1}{2}$ in. vent pipes are provided for fixtures, extending above the highest fixtures and connected with the soil pipe. There are provided one 18 by 21 in. lavatory, one five foot white enameled bath tub, one wash-down closet combination, one 20 by 30 white enameled sink, one set of two part stone wash trays.

The bungalow is piped for town water, the street main being connected with the house by a $\frac{3}{4}$ -in. galvanized iron pipe. Inside the cellar there is provided a stop and waste cock. At this point the pipe runs up and overhead across the cellar to a point under the kitchen. It is extended to the hot water boiler, and

there provided with a shutoff, and also a kitchen sink, bath room fixtures and tubs. A hot water pipe provided with a return circulation extends from the boiler to fixtures.

From the furnace supply pipes are carried to the various rooms, each pipe being supplied with a damper within two feet of the furnace. Three piece elbows are used. Exposed woodwork is covered with tin, to avoid all danger of fire. A fresh air inlet and duct are provided to supply air to the furnace. The sides of the duct are of brick with cement bottom, the top being arched over with brick. This runs under the cellar floor. A riser is built connecting the duct with the outside atmosphere, provided with a slide damper for the purpose of regulating the supply of air, and a trap door between damper and floor of basement for the purpose of cleaning out the duct. The outside opening is covered with $\frac{1}{4}$ in. galvanized iron wire mesh screen. A 12 in. galvanized iron cold air return pipe runs from the hall to the furnace pit, with a shield in front of opening to prevent air from blowing into it from the fresh air inlet. The combined area of the two ducts is about 80 per cent of the combined area of all the hot air pipes. Fifteen inch floor registers are used downstairs and 12 in. registers upstairs.



Detail of Kitchen Cases.

Stairs

Chas. P. Rawson, Architect

III.

THE staircase, now so important a feature in nearly all buildings, was a small note until about the time of Queen Elizabeth. Previous to this time, stairs were constructed on a circular plan, revolving around a central axis or newel, and were known as turret or corkscrew stairs. Many were without steps, being merely a circular inclined plane. During the sixteenth and seventeenth centuries staircases with wide, straight flights were first introduced and were made leading features in the mansions of the Elizabethan style. They had usually heavy oak balusters, elaborately carved, and with the walls adjacent ornamented with carved panels, etc. Staircases of similar character, but of lighter construction, are still the leading features of residences, and when appropriately designed and conveniently located will go far to redeem defects apparent elsewhere in the building.

Following are details of three simple staircases, all drawn to the scale of one and one-half inches equals one foot.

Figure 15 shows a very near design of the Mission order. The rail is square cornered, as are all members and moulds. The balusters are three-fourths of an inch by ten and one-half inches, with a one and one-fourth by five-inch hole cut in same near the top. The newel is plain, five inches square, with square pieces, "planted on" for ornament. A stair of this order should be built of oak and stained dark and finished with a waxed or dull finish.

Figure 16 shows a Colonial staircase designed on a much more simple scale than is usual with this style. The newel is a five-inch square shaft with a simple base and with the moulds of the rail carried around the top of it. The balusters are turned and placed three to a tread. The rail is heavy and moulded. This stair would be most appropriately built of birch, as that wood takes both mahogany stain and paint to advantage. The treads, rail, including top of newel, and the shoe strip at the floor, should be

stained mahogany and varnished, with the gloss removed by rubbing. All the balance of the work, including the balusters, shaft of newel, risers, cover mould and stringers, should be painted and enameled in white.

Figure 17 shows a stair of no particular style, and yet one which gives a neat and handsome appearance in a hall. The outside stringer is of the closed or box variety and, including the wall below, is treated with panels. The newel also is paneled and has an ornamental top. The balusters shown are one and one-fourth inches square and plain, but they could have been turned if desired. The rail is of stock design and is a very popular one. This stair would be built of oak and stained in one of the lighter tints which are being used at present.

A few additional remarks will complete this series of articles on stairs.

Where the railing terminates against a wall a half post should always be provided.

A safe rule as to the height of the rail is to make it two feet six inches above the tread on the line with the face of the riser. On landings the height of rail should be equal to that of the stair rail at the center of the trade. When stairs are built between partitions, or when over four feet wide, a rail should be placed along the wall. This should be fixed to the wall on metal brackets made for the purpose.

The rough work for stairs should be completed before the lathing and plastering are done, and no finished work should be placed until the latter is dry.

Although in some types of modern buildings wood stairs have been replaced by those of concrete and steel, the wood stair still retains its position of importance in the design of the average modern home, and renders absolutely necessary to the builder a knowledge of the design and construction of wood stairs, and we hope this series of articles has been of assistance to the builders and those who are studying to become builders.

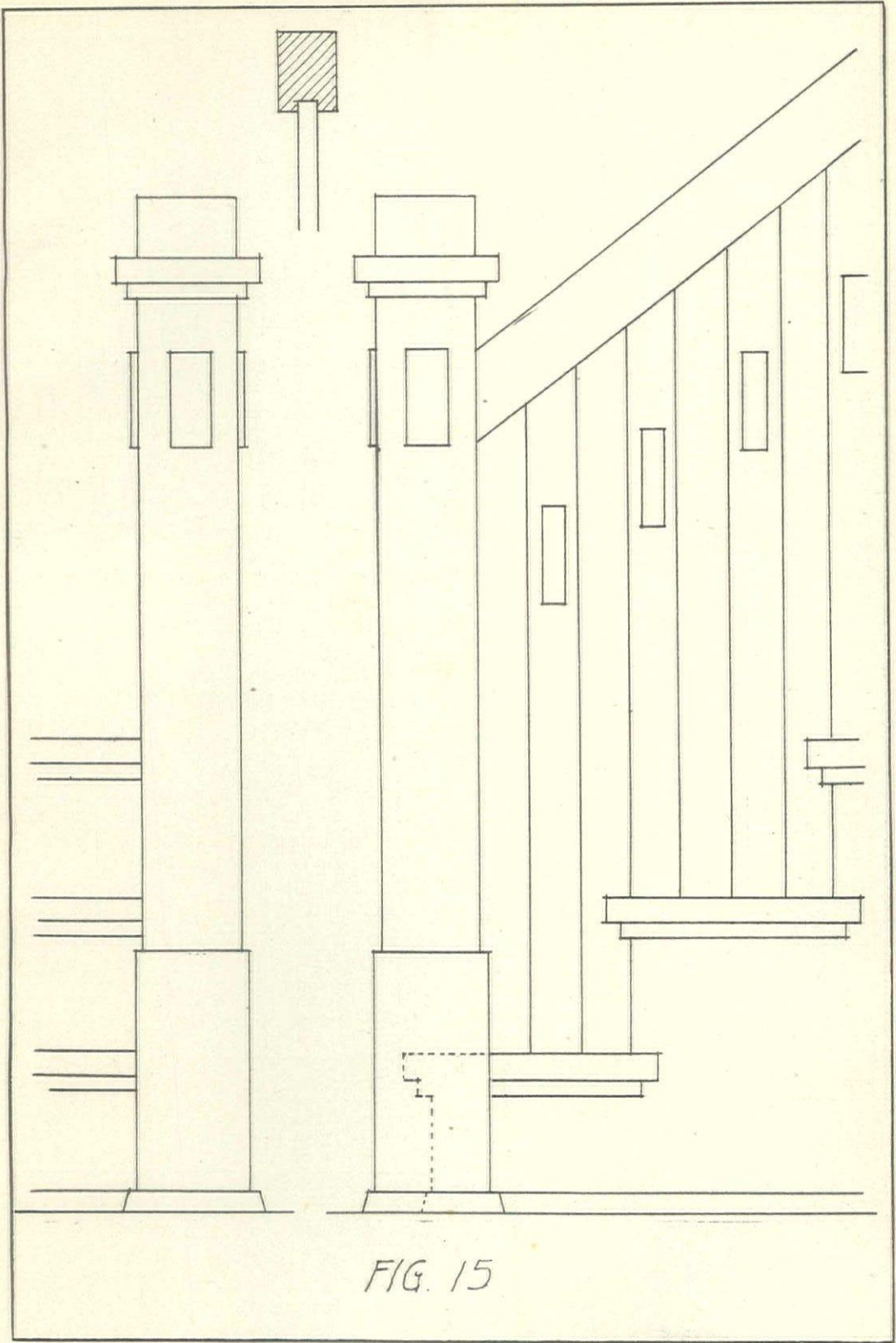


FIG. 15

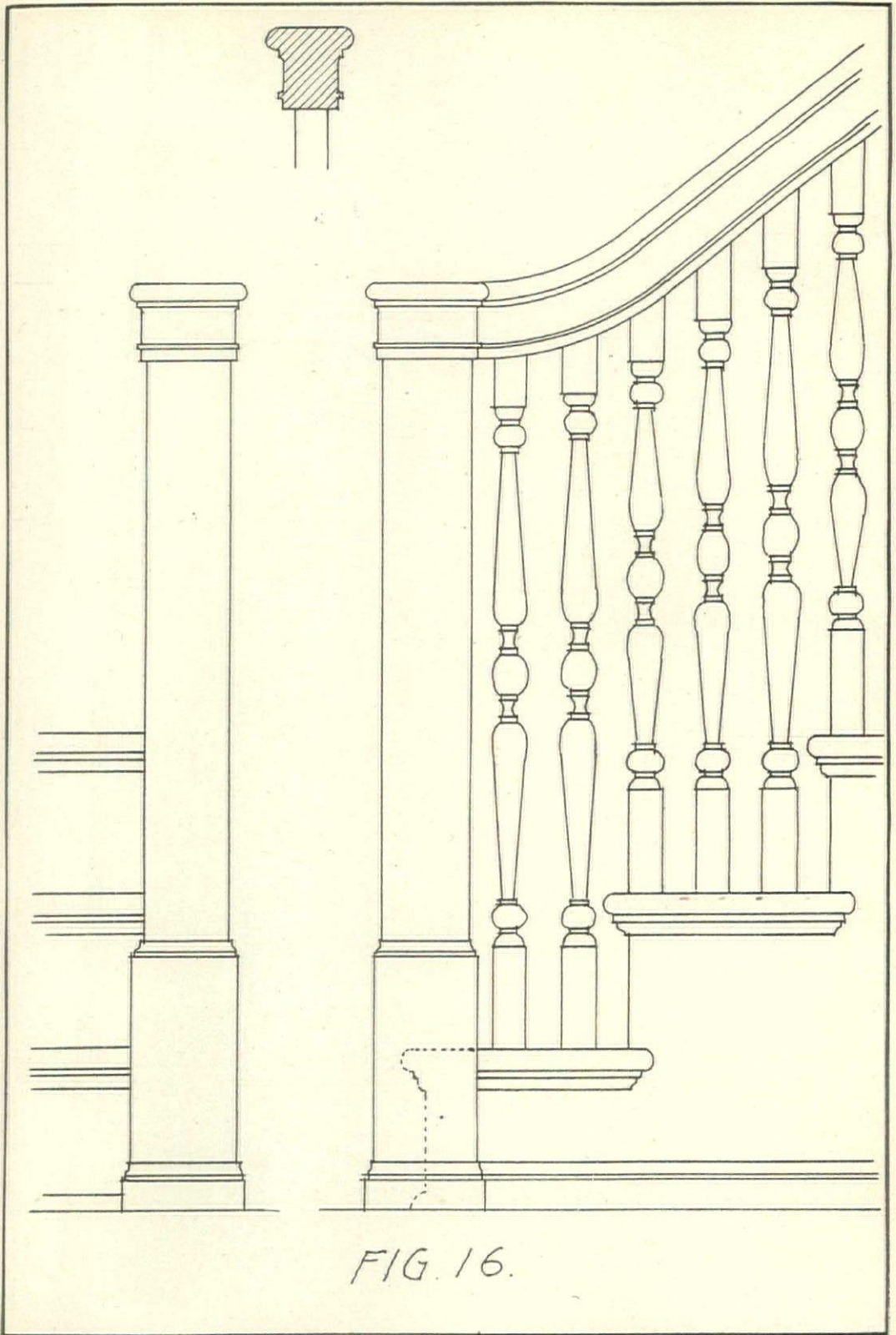


FIG. 16.

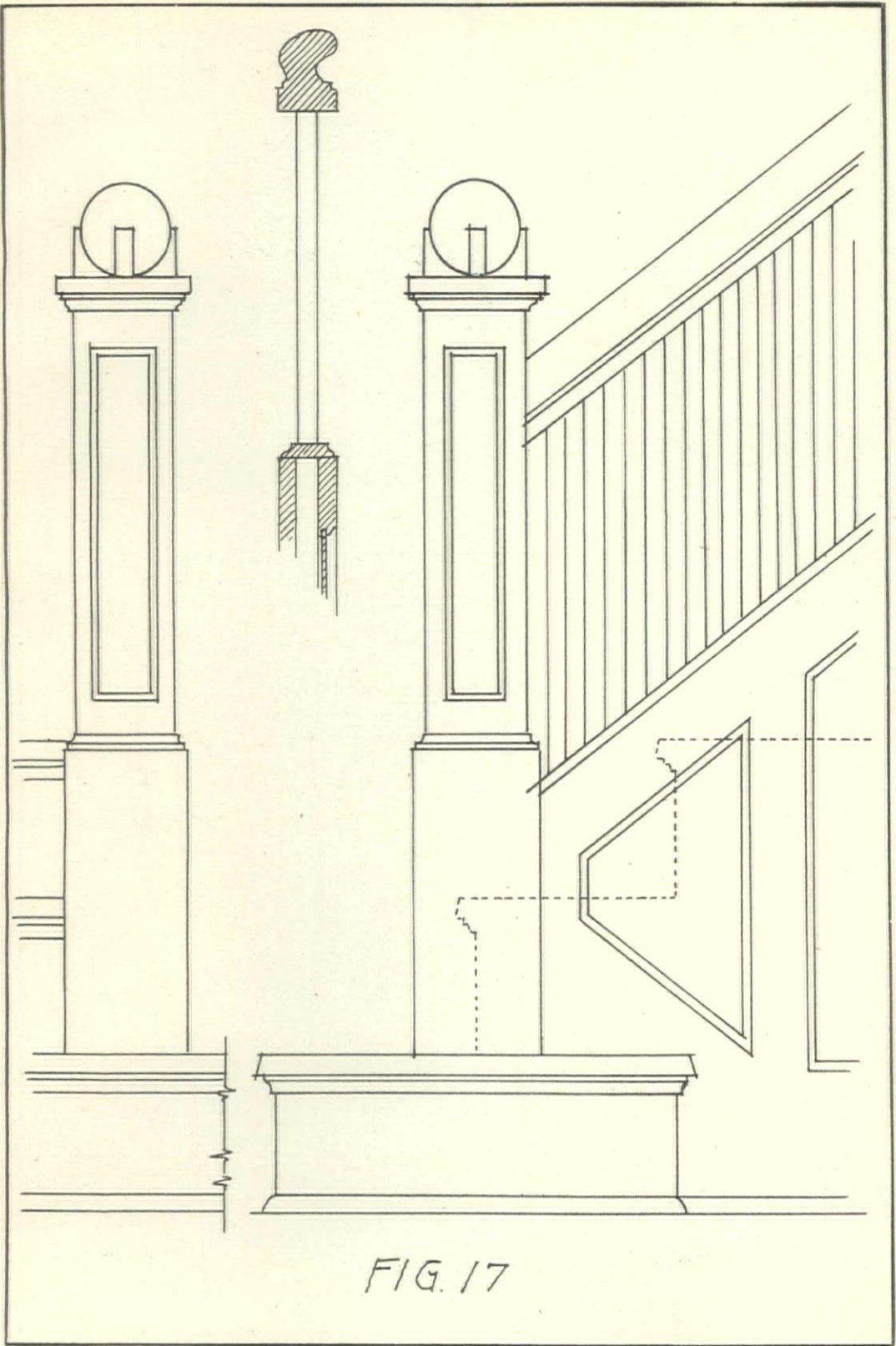


FIG. 17



A Shingled Bungalow.

Front View.

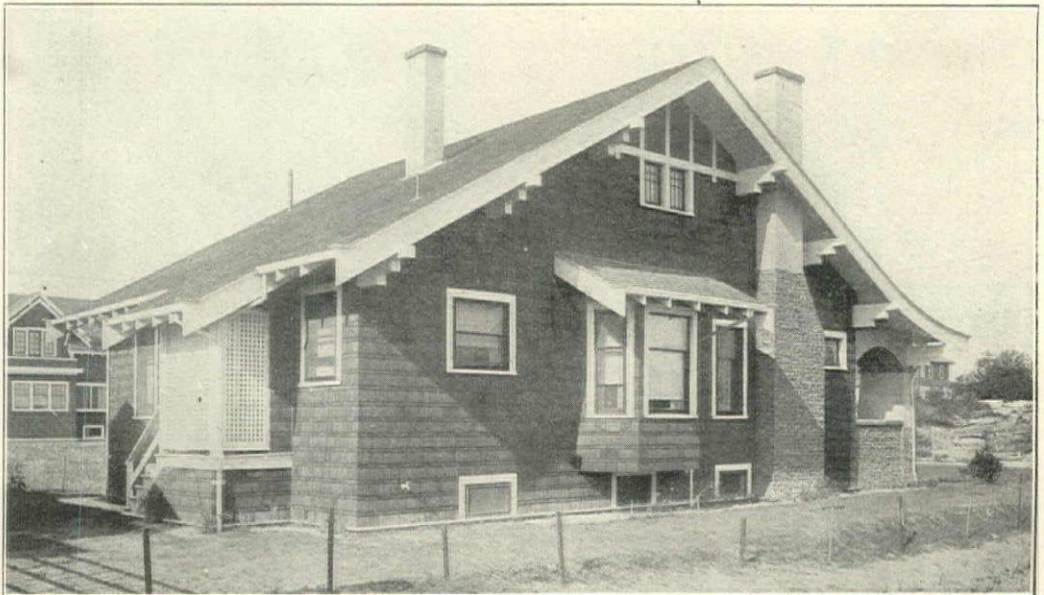
Jud Yoho, Architect

A Shingled Bungalow

Jud Yoho, Architect

THE elevation and views shown indicate at once the true bungalow type, with a long sweep of roof of low elevation, wide over-hanging eaves and large porch. The great sweep of the arch which crosses the full width of the house, springing from heavy piers, is the dominant note in the

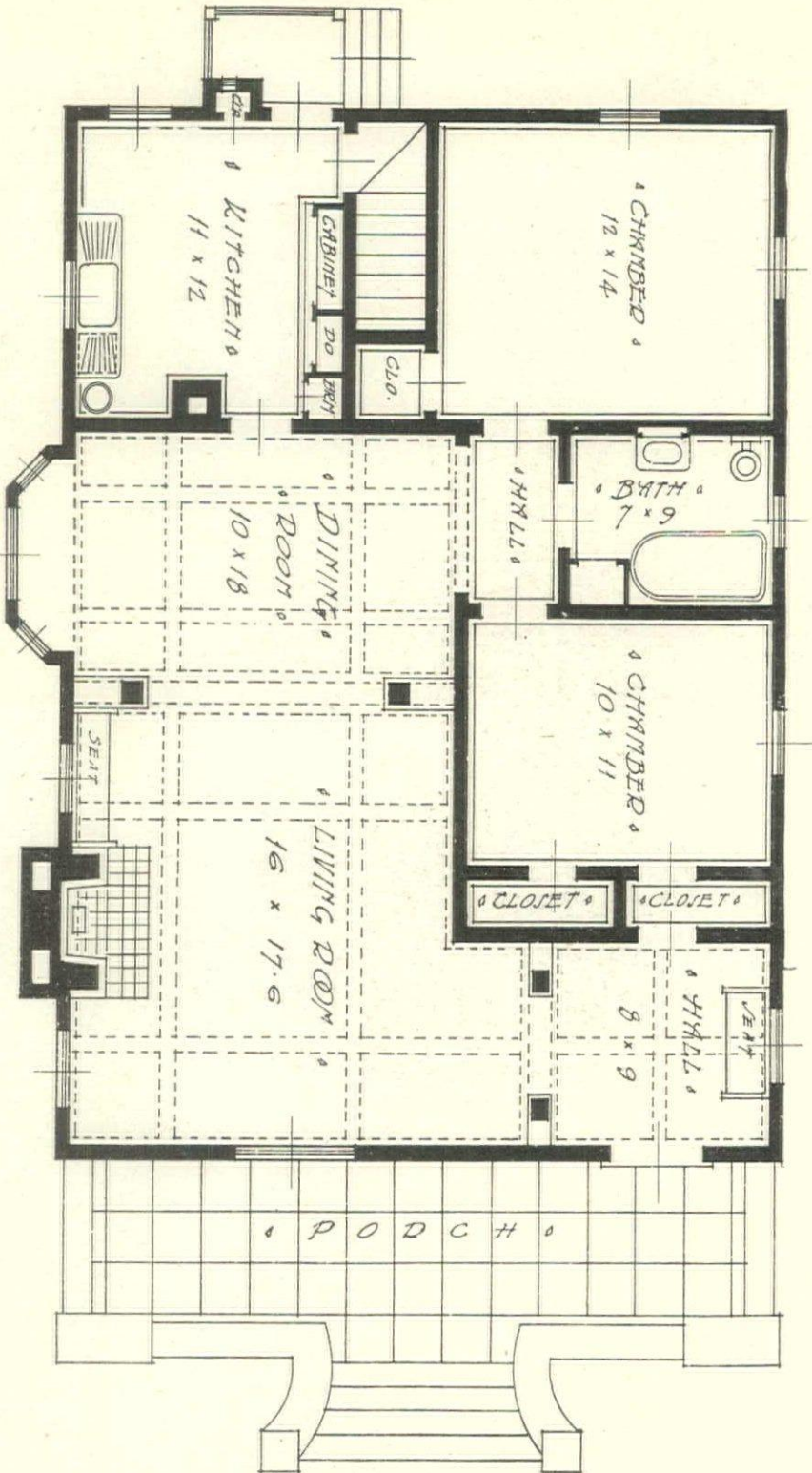
design. This porch arch or beam and pier effect in this bungalow is very well proportioned—very well balanced indeed, and there is similar harmony of dimension throughout the exterior design. The steps leading up to the porch are cement finish as is also the porch floor. The width of both porch and



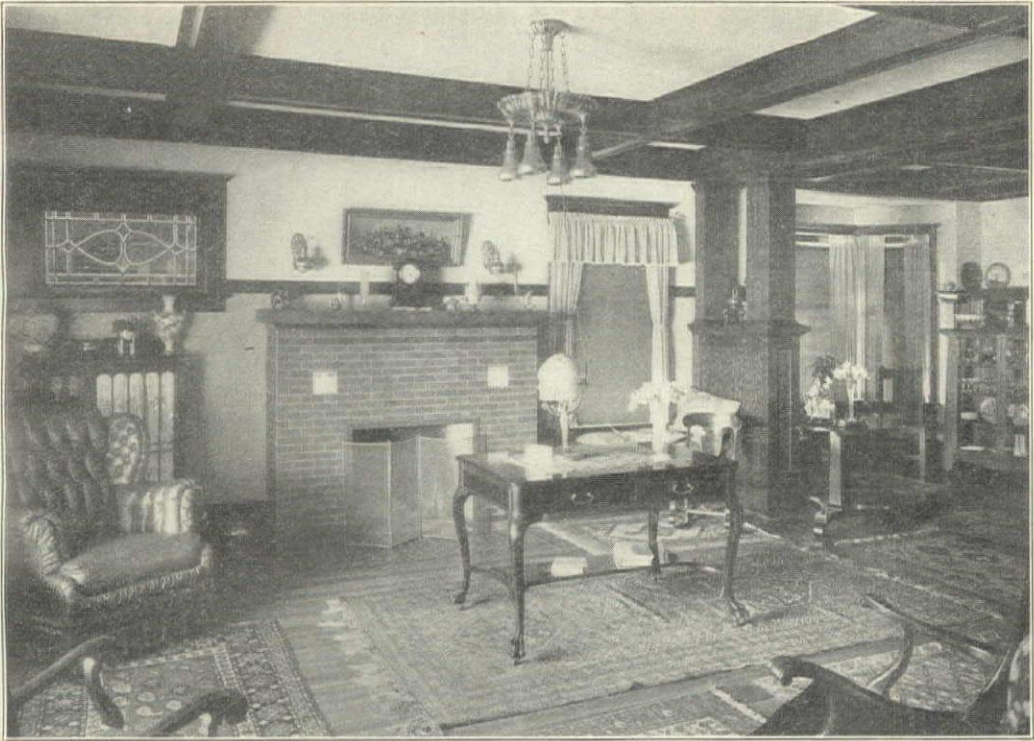
Side and Rear View.



The Hall and Living Room.



Floor Plan



The Living Room and Dining Room.

steps is very liberal. These steps and floor are red, cement coloring being mixed in with the finish coat before applying, and as this red coloring matter is of mineral origin there will be no fading of the color. Red makes an excellent cement mortar color, and can be had in practically any shade. The porch or bulkhead wall is of clinker brick, and the porch floor is placed on solid earth, the latter being filled in and well tamped between the basement and the porch walls. A special feature of construction is here, five heavy iron rods passing through the fill mentioned from basement and the porch walls, and securely holding the two walls together; in the builder's opinion these bolts will positively prevent any spreading of the porch wall due to overtamping of the dirt or other cause. The porch wall has cement coping and the piers are cement with a course of brick on edge forming a cap.

The color treatment of the exterior is simple; the wall shingles are stained a reddish brown, the red showing a golden brown in the sunlight; the trim of the windows is white while the sash is black; the fascia boards, eaves, soffit and brackets all white, the gutters white, the trim of the doors white, and the cement coping is white; the roof is a deep greenish black. The colors are all of permanent character and will look new on this house several years hence. It will be noted that the front part of the roof, where it overhangs the porch, is somewhat flat, and as this is of shingles, special constructive ingenuity is required to prevent leak; special roof mastic is used in this case, both under the shingles on roofing composition and on the exterior of the shingles. The exterior construction is generally such as to make a most enduring building.

This bungalow cost in Seattle about \$3,500.

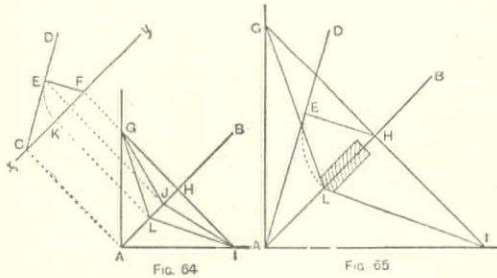


The Marking of Oblique Cuts

E. H.

THE BACKING OF HIP RAFTERS.

SINCE hip rafters are placed at the intersections of two planes, their upper edges have to be planed to form two surfaces, each lying in the same plane as the top surfaces of the adjacent rafters. This is necessary so as to form a direct support for the ends of the boards or slate battens. The formation of these two surfaces at the top edge of the rafter is known as the backing of the hip. It is evident that the angle formed by the backing of the hip rafter must be equal to the angle formed by the intersection of the two adjoining surfaces of the roof, and this dihedral angle must be found before the hip can be shaped. To determine this angle, a section must be taken in such a manner



that the intersecting plane is at right angles to both the inclination and the sides of the hip rafter, or, in other words, at right angles to its plan and to its pitch.

Let *AB* (Fig. 64) represent the plan of a hip rafter meeting two wall plates. Parallel to *AB* draw a line *xy*, and let this represent the level of the wall plates. Take a projector from *A* to *C* and from *C* set up *CD*, the elevation of the hip rafter. From any point *E* draw a line *EF* at right angles to *CD*. This represents the elevation of a plane which is at right angles to the pitch of the hip rafter. When this plane reaches the level of the wall plates, its distance from the angle of the building is equal to *CF*. Take a projector from *F* to cut *AB* at *H* and the wall plates at *G* and *I*, and another

from *E* to cut *AB* at *J*. *G* and *I* are the plans of the points where the plane intersects the wall plates, and *J* is the plan of the point where it cuts the hip. Since *GI* is perpendicular to *AB*, the plane is at right angles to the plan of the hip. Join *GI* and *IJ*. The triangle *GJI* is the plan of the section through the hip. Since the wall plates are at equal levels, *GI* is represented at its true length. The length of *JH* is given by *EF*. A triangle, whose base is equal to *GI*, and whose height when measured perpendicularly from *H* is equal to *EF*, will give the true shape of the angle formed by the meeting of the two surfaces. To form this triangle, make *FK* equal to *FE* and project *K* to *L*. Join *GL* and *LI*. The angle *GLI* gives the shape of the top edge of the hip rafter.

If the principles explained in the last paragraph be understood, the construction may be simplified by using the plan of the hip rafter as *xy*. Let *AB* (Fig. 65) represent the plan of a hip rafter meeting the two wall plates. Set up *AD*, making the angle *BAD* equal to the pitch of the hip rafter. At right angles to *AB* and through any point *H* in it, draw the line *GHI* to cut the wall plates at the points *G* and *I*. Also from *H* draw *HE* perpendicular to *AD*. Make *HL* equal to *HE*, and join *GL* and *LI*. For comparison the letters occupy the same positions in this diagram as they do in the previous one. The etched portion shows the true shape of the hip rafter.

The construction for obtaining the backing of a hip rafter may be summarized thus: From the angle formed by the wall plates draw a line making with the plan of the hip an angle equal to its pitch. From any point in the plan of the hip draw two lines—one at right angles to the plan of the hip and intersecting the wall plates, and the other perpendicular to the pitch. Revolve the latter to the plan of the hip and join the point thus obtained to the points where the former cuts the wall plates.

American Woods for Interior Finish

Gordon Dempsey

OUR American woods at one time were very plentiful and cheap, so that their true merits were not properly appreciated, and the once bountiful supply has been depleted and in an apparently reckless way; till at the present time some of them, being scarce and expensive, are highly prized.

There is scarcely anything in nature that is more beautiful than the variegated colors and grains of our American woods when properly developed and finished.

White oak and ash have been the principle sufferers, and it is probable that in fifteen or twenty years more, quartered oak, and perhaps also the best grades of plain sawn oak, will almost be a thing of the past. The demand for quarter-sawn oak is the chief reason for its rapid depletion. The method by which this is done is as follows: the log is first divided into quarters and then the plank are cut radiating from the center, making the boards narrow at the center and wide at the outside, this, of course, increases the waste a good deal. In quarter sawing the cut is made parallel to the medullary rays instead of across as is done in straight sawing, and this forms the peculiarly wavy lines by which the two can be distinguished.

Woods are commonly spoken of as being "fine-grained," "coarse-grained," "cross-grained," or "straight-grained." The wood is said to be fine-grained when the annual rings are relatively narrow, and coarse-grained when these rings are wide. When the fibers are straight and parallel to the trunk of the tree, the wood is said to be straight-grained but if they are distorted or twisted so as to be spiral in form, not growing straight up the tree but following around the trunk, the wood is said to be cross-grained.

Commercially speaking, the soft woods are classified as belonging to the conifers or needle-leaved trees, and the hardwood the broad-leaved trees, but this does not hold true in all cases. Some people classify white-wood and redwood as soft woods, while hard pine is frequently called a hardwood. Very often the term "hardwood finish" is used to designate all work that is to be finished in varnish, to distinguish it from the painted work. Painted work as a rule costs less than varnished work, for the reason that cheaper grades of lumber are used, and the same care

is not usually taken to keep it clean while it is being put up.

For finished work that is to be painted the first consideration is that it shall stand well, and next to this are freedom from pitch, knots and low cost.

For finish work that is to be stained or varnished in its natural color, the color and grain of the wood most influences the selection.

Aside from the appearances of the wood, however, the hardness is a very important quality, as the softer woods mar and get dented very easily, which greatly injures the appearance of the trim. It is for that reason that soft pine, whitewood, redwood or cypress are inferior to oak, ash, maple or chestnut which is moderately soft, although otherwise they make a very attractive finish when properly treated. Redwood is quite brittle and the edges break easily.

All hard or soft woods that are to be used for interior trim should always be thoroughly kiln dried just before being sent to the building. Care should be taken to see that the interior trim is not delivered to the building until the plaster is thoroughly dried.

In placing the American woods in their relative positions for interior finish or wood-work, the writer places the oak in first position. There are about twenty different kinds of oak found in various parts of the country, but there are only three distinctive species which are sold separate. These are the kinds red and live oak. Of the two principle kinds white oak is the stronger, less porous and more durable. Red oak is of a coarser texture and is not as easily seasoned. The wood of the white oak is of a light straw color; that of the red oak has a reddish tinge, so that they cannot be used together for interior trim as the color of the woods is increased by varnishing. They are both used for interior trim and should be thoroughly dried, after which they will stand well. When used for doors the wood should be sawn into veneers, not exceeding $\frac{3}{16}$ in. thick and glued to a pine core. Oak is always better if quarter sawed as it will then show what is known as the "silver grain." For finishing purposes red oak answers practically as well as white oak, but care should be taken not to mix the

two kinds on account of the color as before mentioned.

The second place in rank is given to the chestnut, which is quite equal to the oak in attractiveness and texture. The wood is light in weight, has a rich brown color, of coarse texture, and under very simple treatment becomes quite handsome. It works easily, and stands well.

Ash is a wood that is frequently used for interior trim and ranks next. The wood is heavy, hard, tough, straight grained and of coarse texture. The finished wood resembles bastard sawed oak very much, except that the grain is much coarser. It is easier to work than oak, and when thoroughly kiln dried is used for making solid ash doors. The wood of the ash is about the same color as the white oak.

In rooms where light colors and dainty woodwork are desired the birch and maple stand forth and fifth respectively. The birch is very hard and heavy, the sapwood is whitish in color, while the heartwood is of very handsome shades of brown with red and yellow. There are two kinds, the red and the white birch. The red birch is used the most for interior finish. The birch is used quite often to imitate cherry and mahogany, as the grains of these woods are much the same.

Almost all the maple used for building purposes comes from the sugar maple tree. The wood is hard, of fine texture, and often has a wavy grain known as curly. It is of a creamy white color with shades of brown in the heartwood. The curly or birdseye maple is one of our handsomest of hardwoods, and

at present is only used for very fine interior finishing. Some of the very finest chambers are made of birdseye maple.

Cypress, which is strikingly artistic, and very often has a wavy grain similar to that of the maple, ranks sixth. That known as gulf cypress is the best and although it resembles olive wood very closely in color, is not quite as fine grained. It makes a very pretty finish and is used for making solid doors and sash. It can be obtained in very wide boards, and if it were not for its softness would be one of our very best woods for interior finishing.

There are two distinct classes of pine used in building work, namely, the white and yellow pine, which rank seventh and eighth. White pine, when of a good quality, is a creamy white in color, soft and straight grained and easy to work. One of its valuable characteristics is that it will not crack and warp in the process of seasoning, like most of the other woods. It is the best wood to use for solid doors or sash, and is the wood used as cores for all veneered work.

Yellow pine, sometimes referred to as Georgia pine, is of a very fine and close grain, and its resinous matter is quite evenly distributed. Owing to the fact that it is not quite as interesting in grain and color as the before mentioned woods, it is not used to such a great extent for interior trim. Comb-grained pine, which receives its name from the method of sawing that leaves the grain in straight lines, is used to a great extent for finished flooring. This does not warp or sliver and is very durable.

Artificial Stone From Gypsum

THERE is not enough attention paid to the value of gypsum—plaster of Paris—as a medium for the manufacture of various substitutes for natural stone in interior work. Gypsum and water, with or without other materials, yield plaster, mortar, stucco, a sort of beton, artificial marble, "plaster lumber," "staff" and a number of other compounds, to say nothing of its use in making copies of sculptural groups.

This invaluable material, well mixed with a proper proportion of calcined lime and heated until it forms almost a slag, has very strong so-called "hydraulic" or water-setting properties. The increase in volume in set-

ting is greater than that of gypsum alone, which is only about 1 per cent.

There are several aqueous solutions of salts which increase very materially the hardness of gypsum casts. Among these are potassium sulphates, compound acetate of potash and soda, and water glass. The addition of some potash solution or Glauber's salts hastens setting, while alum and borax retard it, although the resulting mass is harder after setting than without the alum or borax. The degree of hardness and the rapidity of setting are, therefore, largely within our control.

The very fact that gypsum is so versatile, as one might say—that is, that it may be

made to do so many things in so many different ways—renders it desirable and even necessary that we should test a sample of each lot purchased before using it; and, if we burn it ourselves, should regulate the temperature and other conditions according to experience, so as to get the desired result. Otherwise we may be greatly deceived, and the deception may cost us and others dearly.

One approved method of testing is to fill a vessel of known contents full of loosely-packed gypsum and pour just half the volume of water into a shallow porcelain vessel, into which the gypsum is regularly distributed, the water being kept stirred all the time. Both gypsum and water should be at about "room temperature."

In mixing gypsum and water, the latter is never to be added to the former—always the plaster to the water. This prevents the formation of air bubbles and of plaster lumps. After all the plaster is added, the whole is to be vigorously stirred to attain uniformity of mixture, and then poured into a test-piece mould before it hardens. The test-piece is best made by laying a cast iron frame, say $\frac{3}{4}$ inch high and 4 inches on a side internally, on a smooth glass plate, casting it just full and striking off, so as to make a slab 4 inches by 4 inches by 0.75 inch. The time is noted that elapses between first pouring the plaster into the water and full hardening in the form is marked on the slab.

Then the latter is weighed, the weight marked thereon, and the slab set on edge in a room at about 20 deg. C. temperature. Every day at the same hour as that at which the slab was cast it is carefully weighed and the daily loss in weight thus established.

It is advisable to test the effects of different coloring materials and fillers in various quantities on the time and degree of hardening, for every sample is apt to be acted upon differently from others by the same materials of the same relative quantities.

Gypsum floors are now in use in Europe that are many years old and show little signs of wear. The room is leveled, then covered about $1\frac{1}{2}$ inches to 2 inches thick with the plaster mortar, and after twenty-four hours well tamped, care being taken to avoid making cracks in this operation. The whole is then leveled by a sharp straight-edge, and finally well oiled with linseed oil or varnished with linseed oil varnish and polished with woolen rags. It will then stand washing with water. Instead of the linseed oil or the var-

nish there may be used a solution of glue in chromate of potash. This is hardened by the action of light, or the gypsum may be impregnated with casein varnish (made from cheese). This smells unpleasantly of ammonia at first, but when this has passed there remains a very handsome polish.

This kind of floor may be "mosaicked" by the use of moulds forming stars, etc., in colored plaster mortar, made in place and then surrounded by the plain background.

The parts of such floors that are subject to the most wear may be readily renewed from time to time.

Walls may be very neatly covered by slabs from 40 inches to 60 inches square, cast on glass slabs in greased wooden or metal frames. It is well to reinforce these by heavy jute cloth or woven wire.

Cold retards, heat hastens the hardening: neither has any influence on the final hardness.

Plaster lumber is made in slabs of about 40 in. by 20 in. by 2 in. It is well to have the edges tongued and grooved. They are cast on glass slabs, in greased wooden frames, and it is well to reinforce them with twigs, rushes, long tough shavings, "excelsior," tow, or the like, back of the first $\frac{1}{2}$ in. poured, but not laid in before the latter is stiff enough to prevent the reinforcement coming to the face.

The addition of sharp sand and of other "fillers" makes a mortar that is much more resistant to frost and rain than that from gypsum alone.

In the manufacture of vases, statues, busts, etc.—that is, of artistic subjects, such as the plaster casters turn out—there should be used only the fine white gypsum, burned so thoroughly that it sets quite soon after being mixed with the water. In order to get casts that are free from air bubbles the trick lies in the mixing. The proper way is to put in a dish or other receptacle more water than seems necessary to combine with the plaster, and to use this in rotation with a stirrer while an assistant pours in the plaster slowly in a thin stream. When all the plaster has been added, the mass is allowed to rest until most of the gypsum has separated at the bottom of the vessel as a thick paste, and the uncombined water is still milky.

Large articles are always cast hollow, which is effected by swinging the mould round and round with a thin gypsum mass therein until the latter is so firm that it does not flow any

more. Where the articles are very large, considerable skill on the part of the workman is necessary in order to deposit the plaster in regular thickness in all parts of the interior of the mould.

In order to save expense in making large casts, the best way is to make a layer of about $\frac{1}{4}$ in. of the fine white plaster directly on the inside of the mould, and then deposit on the inside of this as thick a layer of ordinary plaster of Paris as may be necessary to attain the required total thickness. But this second coating must take place at once the first layer is firm enough not to flow, else the two layers will not unite, and the outer one will flake off. The casts when removed from the forms will, on account of the excess of water in their mass, be quite moist, and must be put in a dustless place until fully dried out. As this drying process would consume considerable time at ordinary temperatures it is well to put the casts to dry in a well-heated room. In the drying process they lose their translucent appearance, and become matt and chalky-white. They should not be left in this condition, but be given again the translucent appearance by some one of the processes for that purpose.

Casts made from pure plaster seem to the naked eye perfectly smooth and poreless, but examined with a strong convex lens they show pores, which accounts for the fact that unless protected against dust they will soon get dirty. By reason of their great softness it is well to dust them only with a soft woollen cloth.

As a rule art objects are cast in "hard plaster"—namely, a mass that is hard through and through, as distinguished from "hardened plaster"—that is, hard only on the surface.

To harden plaster with lime the best material to add is "fat" white lime (which is slacked carefully, so that it becomes a fine powder), in the proportion of about one to ten of the plaster. The mixture must be very thorough, in large quantities made in a rotating drum, otherwise in those places where there is a seam of lime there will be a certain amount of working. This mixture must be carefully protected from the action of the air, in order to prevent the lime absorbing carbonic acid from the latter.

When first cast the articles made from this mixture are not harder than those made of plaster of Paris alone, but by the absorption

of carbonic acid from the air they gradually acquire comparatively great hardness.

Besides quicklime, alum, potassium sulphate, and zinc sulphate are used to harden gypsum; further, borax and compound acetate of potash and soda.

The preparation of the mixture of alum and plaster takes place as follows:—Fine white plaster rock is ground and intimately mixed with one-twelfth of its weight of very finely powdered potash alum in a "rattle-box" or drum. The mixture is then lightly calcined in open pans, this process usually yielding a somewhat caked mass, which, however, is readily pulverized. Mixing this powder with water results in a soupy mass that remains fluid much longer than ordinary gypsum mixtures, taking forty to sixty minutes to set.

The sulphate of potash ("Glauber's salts") comes in commerce in the form of very hard crystals, and, unlike the other potash salts, is very insoluble in water. For the purpose of mixing it with gypsum the "salts" must be very finely ground and the powder very thoroughly mixed with the gypsum in a rattle-drum. The plaster must be absolutely free from lime carbonate. In order to test its purity in this respect, a small quantity thereof is stirred in a very dilute solution of sulphuric acid. When there is any lime carbonate present it will be manifested by the evolution of bubbles of carbonic acid gas.

To free the plaster from lime carbonate it is mixed, instead of with pure water, with a sufficiently dilute solution of sulphuric acid to change the lime carbonate to lime sulphate. The plaster is then mixed with the acid solution.

The double potassium sulphate forms quite large colorless crystals, and for this reason the casts made from this mass seem strongly translucent, with a silky shine, and have the advantage over ordinary gypsum casts that they have not the chalky appearance of the latter. The translucence is most marked when equal parts of plaster and potash sulphate are used.

The same property of giving the plaster a greater degree of hardness is possessed by sodium borate (common borax). To prepare the mixture of gypsum and borax, first as much of the latter is dissolved in water as the latter will take up in solution; the resulting liquid is allowed to stand forty-eight hours, and the clear liquid then poured from any crystals which may have formed in the vessel.

In this solution the calcined plaster is allowed to lie twenty-four hours, and is then again calcined at a low red heat in order to drive out from the borax all the water of crystallization which it has taken up. The calcined mass is ground fine and mixed with water containing ten per cent of compound acetate of potash and soda, well stirred, and then poured into the moulds.

As the hardening of gypsum with borax, alum, etc., is rather expensive a simple and cheap process is often resorted to, namely, placing the bone-dry plaster casts in a hot solution of eight to ten parts of alum in 100 of water until they will take up no more of the solution. The articles will at first show an efflorescence of alum; but this is readily removed by a fine brush and their immersion in water.—*The Builder*.

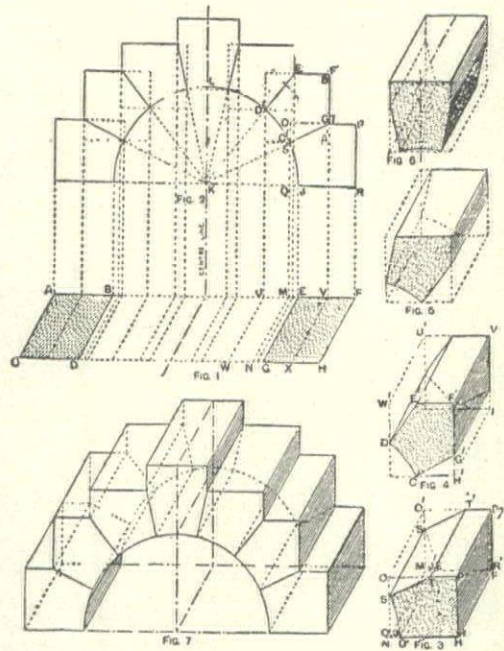
Setting Out a Skew Arch

W. C.

THE accompanying illustrations show a simple way of setting out and working the voussoirs of an oblique or skew arch. The figures are really self explanatory, but the following brief description should remove all difficulty: Let A B C D and E F G H (Fig. 1) be the plan of an oblique or skew arch, the parts A B C D and E F G H representing the under side of the springing course. Project the points B E so that they will cut a line drawn parallel with B E in the points I J (Fig. 2). The distance between I and J gives the diameter of the arch. Bisect the line I J in K, and with radius, I K, describe a semicircle, I L J, which represents the intrados of the arch. Divide the semi-circle, I L J, into seven equal parts, corresponding to the proposed number of stones in the arch,—that is, six voussoirs, three on each side, and the keystone. Draw the joints on the face of the arch converging to the center, K, from which the arch is struck, and complete the front elevation of the arch, as shown in Fig. 2, or as required. Also draw horizontal and perpendicular lines (shown dotted to avoid confusion) from the salient points of each stone as shown in the figure. The perpendicular lines are dropped from the salient points of each stone and pass over the base line of the arch, as represented by I J, until they cut the line A F in the plan (Fig. 1), from which line they must be taken across to the line C H at the same angle as that at which the arch is inclined. These lines afford facility in measuring the widths of the arch stones. The heights of the arch stones can be easily measured on the elevation (Fig. 2) with the assistance of the dotted lines, each stone being shown enclosed in a rectangle.

The plan of the jamb, E F G H, enlarged to the line M N (Fig. 2), indicates the bed for

a stone for the springing course. Work the four adjacent sides so that each shall be at right angles to F M N H. Now take the mold, O P Q R (Fig. 2), and apply it to the two ends so that Q R coincides with F M and H N. As the stone is now gauged, make the upper bed parallel with the under bed. At this stage the stone that is being brought to the square appears as shown in Fig. 3. Apply



the mold, J S T P R, at each end (see Fig. 2) so that P R on the mold coincide with P R on the stone and R P on the mold with R J on the stone. Draw lines, S S' and T T', parallel with the arris, O O', and work off the intrados, S J S' J'; also work off for the joint S T S' T', and the first arch stone or springing stone will be finished.

Architectural Drawing Lessons for Carpenters and Builders

Sixth Paper

IT MIGHT be in order now to say a little more about the drawing pen and its uses, for I have found a denseness among workmen regarding this instrument that is really astonishing. The word "pen" seems to give a wrong impression concerning it, as most men take it for granted that the word means some kind of an ordinary writing pen, made purposely to use with India ink, for making drawings, and the idea of a double nibbed tool for making lines, is a revelation to men who have never seen one used, and this leads me to believe that a few special words on the use of this instrument, giving some directions and instructions, may not be out of place at this point, so with this brief introduction, I will try and explain what the pen is, and how to use it.

The working portion of the pen is composed of two fine steel blades or nibs, and these are fastened to a neatly turned handle of ivory, ebony or bone, as shown in the illustrations. One of the nibs has a hinge joint, in the better class instruments, so that the blades may be opened apart in order to clean them, or to sharpen or adjust the nibs, which is sometimes necessary. A thumb screw passes through the two nibs or blades which is used to bring the points of the nibs close together and to hold them in that position when so desired. It is the widening or the closing of these nibs that regulates the width or thickness of the lines. To make a thick heavy line, the thumb screw must be loosened a trifle and the pen must be tried on a piece of waste paper until the weight of the line is satisfactory. The line may be made finer by closing the nibs until the line is to the proper thickness wanted. The ink may be introduced between the nibs of the pen by many ways, but the best way perhaps, is by using a small camel hair brush which should be made clean, then when the pen requires filling, dip the brush in the ink and insert the full brush between the nibs and let the ink run in until there is a quarter of an inch or more in the pen. Before using, wipe off the nibs on the outside so that no ink can be seen, then you will have no blotches on the paper. Carefulness and cleanliness must be observed when

using India ink. Later on we will have something to say about inks and paper.

A ruling pen of good quality should be selected, as it is the instrument with which most of the lines are inked in, see Fig. 30. This illustration shows a pen fitted with an ink reservoir in the handle, and it is particularly useful for drawing lines that require much ink.

Pens with lift-up nibs, as shown at Fig. 31, are handy for setting and keeping clean. It is advisable to choose a ruling pen having one strong and rigid blade which will not bend with an increase of pressure against the edge of the set-square or straight-edge; flexibility would affect the regular thickness of the line which is being drawn. The kind shown in Fig. 31 has a square portion which is useful in preserving the proper direction of the nibs of the pen when drawing. This screw should be sufficiently loose for the draughtsman to open or close the nibs with the second finger, when holding the pen as shown in Fig. 32, without lifting it from the paper. New pens are usually too tight, and a little oil will greatly improve the working of a tight screw, and the screw of all pens and spring dividers should be oiled occasionally, or in the course of time they may strip their threads. It is often convenient to be able to carry a drawing pen in the pocket ready for use, for much can be done with this instrument alone by a mechanical draughtsman who is also a good free hand draughtsman. A pocket drawing pen consists of a hollow handle in which the nib is carried secure from damage. When required for use, the nib is unscrewed, reversed, and again screwed into the handle.

For drawing parallel lines moderately close together, as in indicating roads, canals, or railways, in maps and small scale plans, a double pen, such as is shown in Fig. 33, is convenient. It consists of two ruling pens, with a screw and a milled head for regulating the distance between them. It is particularly useful where lines to be drawn are curved, or of irregular form.

Draughtmen's ruling pens should always be cleaned after using, and for this to be done, it

is convenient, though not necessary, to have one of the nibs hinged so as to lift up and allow the dried ink to be scraped off the inner side of the nibs with a penknife. This hinge is shown in Fig. 31. A piece of chamois leather pulled between the nibs of the pen after using it, will generally be found sufficient. For scraping off hard dried India ink, the thin blade of a penknife may be inserted between the nibs of the drawing pen, or a steel writing pen with half of the nib broken away may be used. The adjusting

drawing instrument, and occasionally it requires setting or sharpening. This is not a very difficult operation after a little practice, yet many draughtsmen make a practice of sending their pens to the instrument makers to be set. By taking out the screw and looking directly at the point of the pen, it will be seen that the worn part has a flattened surface. If only one nib of the pen has become worn shorter than the other, hold the pen upright on the stone and grind both nibs level before removing the screw and



Figure 30.—Ruling Pen.

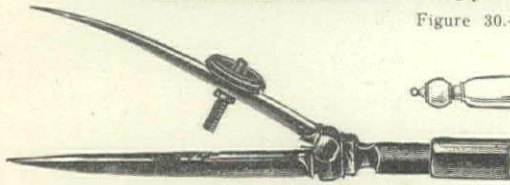


Figure 31.—Lift-Up Nib.

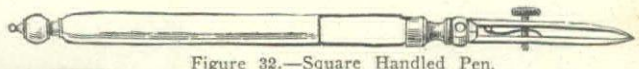


Figure 32.—Square Handled Pen.



Figure 34.—Inside Screw.



Figure 33.—Double Ruling Pen.



Figure 38.—Dotting Pen with Mid-Rib.

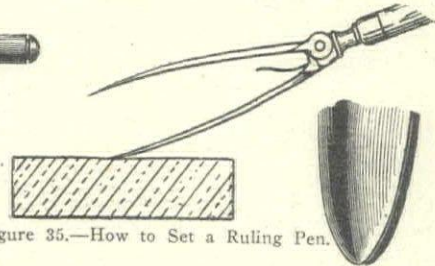


Figure 35.—How to Set a Ruling Pen.

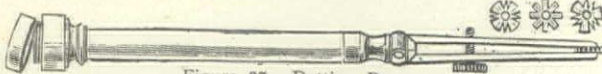


Figure 37.—Dotting Pen.



Figure 36.
Point of Ruling Pen
Enlarged.

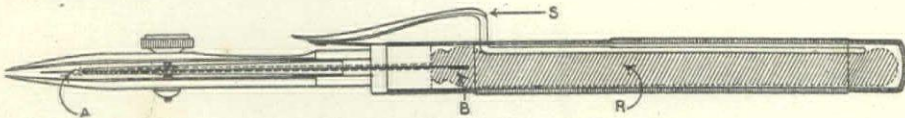


Figure 39.—A New Fountain Pen.

screw for setting the pen nibs to rule lines of various thickness is often made with its milled head too small. A good arrangement is to have the milled head placed between the nibs of the pen, as in Fig. 34, and these are adjusted by right and left-hand threads on the screw of which the milled head forms part. Some ruling pens are made with the ivory handle to unscrew and serve as a pricker or station pointer. This form weakens the instrument at the screwed joint, and there is little gained in providing in this way a simple tool which can, by driving a needle into a penholder, by any draughtsman, be made in five minutes.

The ruling pen is more used than any other

setting. To set the pen place the nib on an oilstone in the position shown in Fig. 35. Move the pen backwards and forwards, at the same time slightly rocking it horizontally and vertically. Wipe and examine the pen occasionally, and stop just short of bringing the point to a sharp edge. If the nibs are too sharp, they will cut the paper, and it will be necessary to take off the keen edge by using for a few minutes on a piece of brown paper. A pen of good hard steel will keep its edge for many months without being set. In setting the pen, each nib should be brought to a rounded chisel edge and both nibs should be of exactly the same length, as shown enlarged at Fig. 36, so that when the pen is

held upright they shall both bear evenly on the paper.

Dotting pens are used for the purpose of drawing lines composed of dots and of dashes, the ordinary pattern being such as is shown in Fig. 37, where a small roller or rowel is fixed between the nibs of the pen. Ink is supplied to this roller, which has its edge cut to the desired pattern of dots, and imprints them on the paper as it is rolled along. Several patterns of dotting wheels or rollers are usually supplied with the pen, and are stored in the cavity shown at the top of the handle, covered by a screwed lid. Another pattern, shown in Fig. 38, is provided with an internal tongue or midrib, coming almost into contact with the dotting wheel. It is claimed that with this pen sufficient ink can be retained to draw a dotted line 60 feet in length. Other descriptions of dotting pen have been produced, some being elaborate pieces of mechanism actuating an ordinary pen by a cam movement, which derives its motion from a roller moved by drawing the instrument along the desired line. It is generally admitted by experienced draughtsmen

that a dotting pen is an instrument which can easily be dispensed with, and it is rarely used by an expert.

A new fountain drawing pen has been invented and patented by Mr. Smith and is being made and sold by Keuffel & Esser Co., of New York. It is shown at Fig. 39, and seems to be quite a practical arrangement. The directions to fill and care for it are given herewith:

To fill the pen, swing the blades to one side. Remove the wire A from the feed tube and press down lever S to expel the air from the rubber container R. Dip the feed tube into the ink and gradually release pressure from lever, when the ink will be drawn up into the reservoir. Replace wire, taking care not to entirely stop up end of feed tube, return the blades to their normal position and the pen is ready for use. If the feed tube becomes clogged after use, it is only necessary to withdraw the wire A, which is fitted with an enlarged end B, and effectually remove all obstructing matter.

(To be continued.)

Framing Hip Roofs Out of Square

James Barry

Until recently it has been the universal custom to set jack rafters parallel with side plates where building is not square.

There are many reasons why such a custom is faulty.

If you make the jacks on sides and ends of such roofs meet together on hips, they will be much nearer on one hip than on the other. (See Figure 1.)

Besides jack rafters will all be different

lengths and bevels, and each one must be separately fitted.

But in Figure 2, each pair will be of the same length and bevel and same distance apart, and will all meet together on hips and roof boards will all cut square.

The side bevels for these jack rafters against hips will be found the same as roofs with two pitches, which is the easiest way of getting bevel cuts of jacks that are not set at right angles to hips.

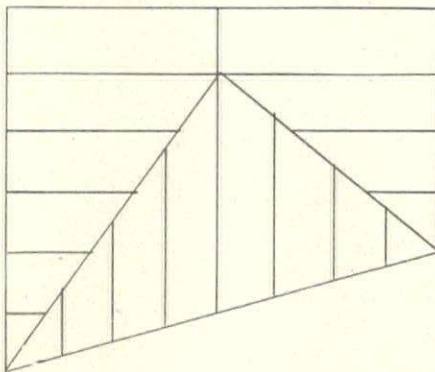


FIG. 1.

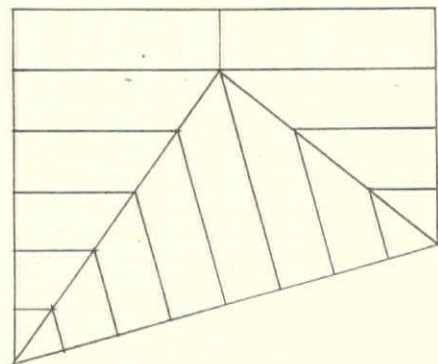


FIG. 2.

Methods of Contract Estimating

W. M. Brown, Quantity Surveyor

AN UNIFORM SYSTEM OF MEASUREMENT.

THROUGHOUT America in many cases it has been the custom of contractors when tendering for contracts to figure in their own method the cost of their several departments of work in building operations. The result frequently has been that there is a great disparity between the amounts of the tenders returned; and being generally lump sum offers, the owners or parties building have no assurance or way of satisfying themselves that the estimates have been carefully and accurately prepared. There are various methods of measuring adopted, according to the locality in which the building is proposed to be erected. In some localities the builders or contractors measure their work according to certain rules known to themselves; but this practice does not give a basis that would be applicable in every locality. Now, a system of measurement that can be uniformly adopted and practiced in any locality is one which would be of great value in giving data for finding the various items of details. Such a system has already been introduced into America, but is not yet uniformly adopted. In some future articles this system may be explained and illustrated.

THE SYSTEM OF "CUBING."

There is another method known as "cubing" which is sometimes adopted. But it requires considerable experience in the estimator to come to anything like an approximate cost of the work measured and computed by this method. Usually the extreme length of the building multiplied by the ex-

treme width and then by the height from the bottom of foundation to wallhead will give the cubic content in feet. Where there is a pedimented roof, usually the length and breadth of the building is multiplied by half the height to find cubical content. After the cubical content is obtained, the price per cubic foot is calculated upon the basis of the total cost of a building of a similar character, ascertained at the price per cubic foot.

MEASUREMENT BY THE FLATS.

Another simple method of ascertaining the cost of a building is by taking the contents of each flat or story. Thus, we take the superficial content of the flooring, the lath and straps on walls, the lath on ceilings, the number of windows and doors with their trimmings, and the sundries of each flat separate. The items of each flat are calculated at current rates, and if the flats are similar in construction they can be multiplied by the number.

These are some of the methods that may be adopted to ascertain an approximate estimate of what a building will cost; but the most reliable method is by the adoption of a uniform system of measurement having well-defined and formulated rules that will give justice to both owner and contractor alike.

It would be advantageous in large cities and towns that an uniform system of measurement with properly defined rules be adopted for making out accurate estimates and qualified quantity-surveyors employed for doing the work connected therewith.

Standing from under is sometimes prompted by understanding.

If you will go at it right, you can eliminate those unproductive days.

The slow-paying customers are always the ones who do the most complaining.

The most valuable machines in your plant are of flesh and blood, not of metal or wood.

Is the man who can, but does not, of more service than the man who cannot, but tries?

While it may be true that you cannot sat-

isfy all the people, you should be able to satisfy most of them.

When you start to climb the ladder to success, be sure it has spikes at the bottom to prevent it from slipping.

Remember, the world succeeded in getting along before you arrived, and will doubtless do so after you depart.

The knowledge of today may be the ignorance of tomorrow; so read your trade papers and keep yourself well informed.

Conveniences in Country Life

Edward S. Taylor

ELECTRICITY, gas and water under pressure seem to be the real necessities for modern comfortable living. All or part of these are usually to be had in cities, but the country dweller has had to do without until very recent years, either from their prohibitive cost or from lack of desire for them. The increasing wealth, however, of the planter, rancher and farmer, together with the better traveling facilities, giving them a broader knowledge of what the other third of the world is doing to be happy, has changed this condition so that now there is a demand everywhere for small, safe and economical installations for electrical lighting and producing water under pressure.

The city man who has built his country house and occupies it all or part of the time must have these conveniences as a matter of course. This desire for better things has been met by a development in machinery and methods that is remarkable. Electric lights, pressure water and even small refrigerating units are available to practically everyone at comparatively small cost.

It would seem, in reading the country life journals, that every boiler and pump maker in the country had gone into the so-called pressure system business, one as an outlet for his tanks and the other for his pumps. These so-called systems, with one or two exceptions, show very little originality and are much the same all the way through. They, as a rule, consist of a pressure storage tank, a pump for hand or power operation and a lot of fittings. The only variation is in the quality of the material furnished and the length of the credit term extended by the seller. As a rule the selling is done by mail. Elaborate literature and advertisements are sent out showing the lawn and garden being copiously watered, the automobile being washed, the bath tub being filled, the laundry tubs in use and in many cases a lot of domestic stock are seen to be quenching their thirst. This is all very alluring. An information blank is usually sent out with this literature, asking a lot of questions, and when the answers are received, and these, as a rule, are not very intelligent, quotations and recommendations are made, and in many cases the sale is consummated. A dozen pertinent items peculiar

to the local conditions are overlooked by the purchaser, and even if he had taken them into consideration they would not have had any bearing on the recommendations made by the manufacturer.

The purchaser or the nearest general utility man installs the system when the material is received. They may get it right, but more often it is all wrong, and the blame is put on the system, when in fact it is perfectly good in every way as far as it has gone. In a very large percentage of cases the purchaser has a system installed that is far from satisfactory or has by no means received his money's worth merely because there was a great lack of care in the original recommendations and design.

The greatest mistake seems to be in supplying an utterly inadequate storage capacity particularly to meet emergencies. This comes from a lack of intelligent analysis and explanation on the part of the seller who wants the order at any cost, and the desire to save money on the part of the buyer. The fact that this system is to be a very important part of his domestic economy does not at the moment appeal to him. So in order to save a little money he puts in something that is not fitted to do the work he desires it to do and he is disappointed.

As a general proposition it can be stated that where a single tank is used, only a third of the total capacity of the tank is available for water under useful pressure. One-third must be used for air and the balance contains water, as a rule under a pressure too low to be of service. A thousand-gallon tank will therefore give a man less than four hundred gallons of water that can be used at all points in his system, and in this kind of design it is the highest point that must be considered. This amount would ordinarily be enough for domestic purposes and general house and garden use, but in case of fire would be utterly useless. It would seem that this very important item is given scant consideration by those who are selling the material. A country home should never have less than a supply that will take care of a three-quarter-inch stream from ten to fifteen minutes under a constant pressure of not less than forty pounds. Anything less than this will not meet

the emergency when it comes and is therefore inadequate.

The habit of burying pressure tanks is to be condemned. No one would think of doing this to a steam boiler, yet the conditions are much the same only in a minor degree. Pressure tanks should always be placed where they are accessible all around, so that any leak can be quickly found and remedied.

The worst feature of the ordinary single tank system is that the pressure must be far too high to be comfortable at its highest point if it is to be high enough to be of any service when the water has been lowered to the low limit. Also in order that these pressures may be obtained it is usually necessary to start with an initial pressure in the tank of perhaps ten pounds, adding a complication that is not to be desired. This is usually obtained by arranging the pump to deliver air and water together. This arrangement also allows for the replacing the air in the tank that is carried out with the water. The device works very well when carefully and intelligently watched, which it seldom is. Some systems are fitted with automatic arrangements to take care of this, but as a rule these require even more careful watching than the others.

The best results in maintaining this air supply are undoubtedly obtained by the use of an auxiliary compressor of a definite fixed output to that of the pump and fitted to unload when the tank pressure has reached its predetermined maximum.

In certain case very good results are obtained by the use of a system whereby the water is lifted from the well and distributed by the use of air pressure alone. No water storage tanks are provided and its capacity at any given moment is limited by the flow of water into the well or cistern. This system

should never be used except in cases where the power conditions make it almost impossible to used direct lifts and pressure. Air compression at its best is very uneconomical. Also except where very deep wells are concerned the number of small parts involved in this class of apparatus makes it liable to get out of order easily.

The best system to be had is none too good for a home, as it may be the very foundation of comfortable living and safety. Each case is, as a rule, entirely individual and should be so treated. The purchaser should always seek the advice of some one who has had experience in this kind of work and who would treat it from a technical rather than a commercial standpoint. If this important adjunct of the home is worth considering at all it is worth as much care and thought as would be given the home itself so far as the details are concerned.

Every water system should be large enough to afford an ample supply in case of emergencies, for it is there that its real value lies. It should be arranged so that all water is discharged under a constant pressure instead of a varying one as is usually the case. Never more than half of the available stored water should be taken out without the pump starting to renew the supply, and this renewal should go on while the rest is being used. All water used should be replaced in from one to one and a half hours and pumps should be large enough to do this. When a new house is being planned and built, architects are, as a rule, the first ones on the job. It would seem therefore that the interests of their clients, as well as their own, would be very well served if they would give a little pertinent advice as to this important matter and see that the proper thing is done as to the water system.—*The Pacific Coast Architect.*

Try to do today what you must do tomorrow.

Good resolutions often spoil before they are used.

A man is as old as he feels, but not always as important.

It is hard for one to form an impartial opinion of himself.

Why should Monday be washday everywhere except in the laundry?

The mere matter of taking space in a newspaper does not constitute advertising.

You cannot justify the faults of your service by proving that your competitor has them.

An ounce of efficiency is worth a pound of hustle.

It is indeed a dull employe who has no good points.

You never will know what you cannot do until you try.

Imitation is the meanest, as well as sincerest, form of flattery.

Silence may be golden, but silver will shut a man's mouth just as effectively.



An Ornamental Plaster Ceiling.

Plaster Ceilings

John Y. Dunlop

PLASTER is the popular material for the internal finishing of the walls and ceilings of dwelling houses.

This plaster consists of slaked lime and sand, the lime being a fat lime, devoid of hydraulic properties, and slaked by being mixed with a large quantity of water and allowed to stand in a pit for some weeks.

The most of good work with this material is done in three coats, which insures a truer and better surface than if done with fewer coats.

Three-coat work consists of the first, or rendering coat, which is coarse stuff, laid to a thickness of about half an inch.

For ceiling work, the plaster should be soft enough to allow it to well work through the lath to form a key.

The surface is then scratched with a lath to form a key for the next coat.

The composition of the first coat consists of lime and sand in the proportion of 2 to 1, with plenty of hair, so that when a

trowelful is taken up it holds well together and does not drop.

The second coat, which is known as the straightening, is done in four processes.

First, screeds are run on the ceiling about 3 or 4 feet apart, each being straightened out and straightened across.

Then the spaces are filled in.

The scoring is then done with a hand float, the surface being sprinkled by a brush during the process.

The keying for the finishing coat is done by lining the scoured surface with a broom or nail to form an adhesive surface.

The composition of the straightening coat is much finer than the first coat. It does not contain so much hair.

The plasterers would now proceed with any rough backing required for the cornice, which is built up in such a way as to leave a sufficient surface for the pure lime moulding.

The third coat is the flushing. Great

care must be taken in laying this coat on in order to obtain uniformity of surface, color, smoothness and hardness.

The finishing consists of fine stuff, made from pure lime slaked and then saturated till semi-fluid and allowed to stand until the water has evaporated and formed a paste.

This is then mixed with fine washed sand in the proportion of 2 parts sand to 1 part of fine stuff.

Plaster cornices are run with gauged stuff, which is plasterers' putty and plaster of paris, mixed in the proportion of three or four to one.

If too much plaster is used it cracks in

form and color in the decoration of the plaster walls and ceilings.

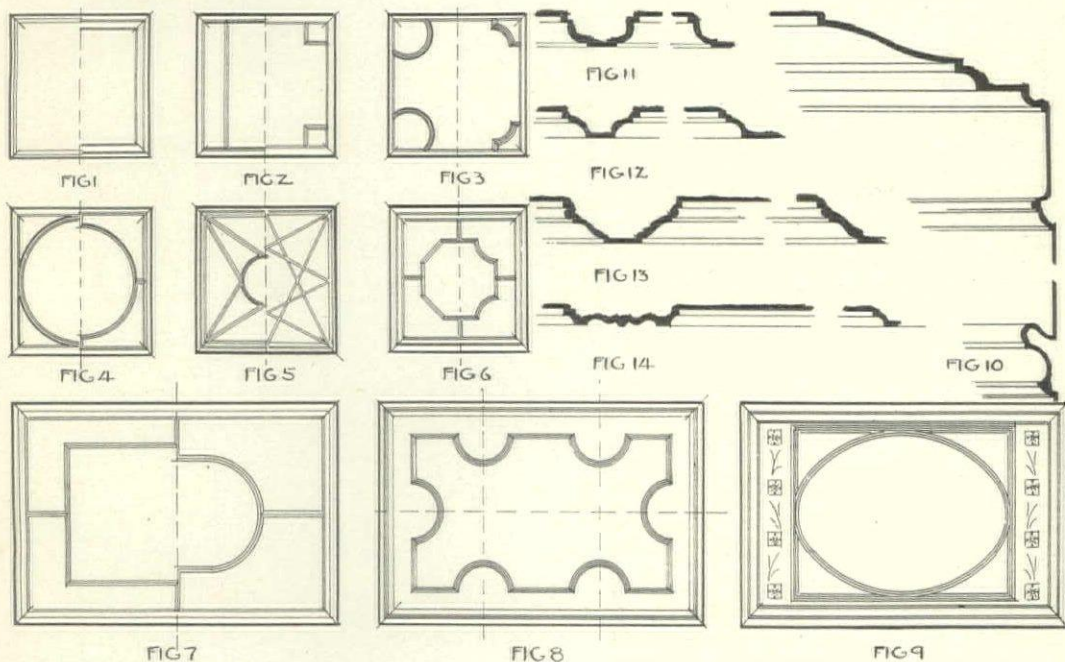
Still, by the practice adopted by some architect contractors, the cornice has become a receptacle for dust, and difficult to clean.

What is wanted is no deep and hollow mouldings and no bold enrichment to harbor dust.

A simple and effective cornice without any dirt catching members is shown at Fig. 10.

No doubt the proper treatment of plaster lies in elaboration of surfaces and not in constructing massive beams and ornament in high relief.

The elaboration of ceiling surfaces by



setting. Of course, cracks in plaster work are caused also apart from the natural settling of the building, by the use of inferior material, by too fast drying of the work, the laying of plaster on walls of too great suction, by laying one coat on another before the lower one has properly set and by the use of too little sand.

Other very unsightly disfigurements are joist lines on ceilings, which are caused by the filtration of dust through the intervening space. This may be prevented by using a good ordinary thickness of plaster and working it well, that it may be hard and non-absorbent.

The artistic effects of plaster cornice has no doubt added greatly to the beauty of

forming the space into a number of panels by geometrical arrangements is very simple.

Figs. 11, 12, 13 and 14 show section of plaster moulding suitable for paneled ceiling, and are all of such a design as could be made with a running mould either on the table or in position.

The running mould in each circle member being wrought with a trainer and the moulding being run solid with gauged stuff.

Various methods of simple rectangular planning of ceiling panels are shown.

Fig. 1 shows a simple cornice and a cornice with a moulded band on the ceiling.

Fig. 2 gives a ceiling divided into three rectangles and one with square panels in the

corners. In each case the moulded boards are of the same section.

In the first instances the moulding on the band should be of the same section as the the first member of the cornice with which it intersects.

The band in the second design not coming in contact with the cornice, can be treated independently.

Fig. 3 shows two designs with circles. To me the first method is preferable, being simplest and most effective.

Fig. 4 shows how an inscribed circle could be used, in the one design forming spandril by touching the cornice, and in the second spandrils by the addition of straight bands.

Fig. 5 shows straight members intersecting on a circle, and straight members throughout.

In each case care should be taken to avoid the appearance of indifferent mitres. Remember that in a straight moulding and a circle moulding of the same section intersecting the mitre is not straight. Certainly in small moulding it is not perceptible, but the larger the moulding the greater the irregularity.

Fig. 6 shows two designs on the same plan, the bands being of equal width as they communicate.

Figs. 7 and 8 show designs on a rectangular base, and Fig 9 one in which the inscribed band is an ellipse.

This member should be drawn from four centers so that the plasterer would have the benefit of the various trainers for running the mould.

In the halftone print is shown a drawing room ceiling in which a great deal of softness and interest has been introduced by varying the ornament and size of the parts.

The elements of this design are themselves in the corners and the points which are emphasized are the corner treatment.

The border on the frieze is in relief, the pattern repeating all around, turning the corner without alteration.

All the relief work in this ceiling was cast in pieces and after the straightening, and the cornice was run, was set in position.

For successful work of this kind it should be borne in mind that what is needed is good material, skillful mixing and careful workmanship.

Bonds in Brickwork

Various Methods Briefly Discussed

MUCH attention is now being given by architects to brickwork. This is noticeable in nearly every new house of architectural merit. Bricks with texture and fine color tones, and bonds that make a pretty pattern in the wall are employed. Less and less is being seen in new work of the old-style "running bond," or the representatives of it that house painters used to block out with red and white paint.

The way in which bricks are laid or the bond, is an important consideration. In House and Garden of recent date, Harold Donaldson Eberlien describes several of the bonds employed. He says the most common bond, in fact almost the only one employed during a great part of the nineteenth century, is the running bond, in which all the courses are composed of "stretchers," that is to say, bricks laid lengthwise, the only "headers" or endwise bricks visible being at frequent intervals where their use is made obligatory by the local building laws to tie the face-wall to the backing. Each course breaks

joints vertically with the courses immediately above and below. Running bond is perhaps the simplest and certainly the least interesting and artistic way of laying brick and has little to commend it except considerations of economy when a misguided desire for smug precision outwardly prompts the use of a pressed brick facing.

The Flemish bond, in which every course consists of alternate headers and stretchers is, after the running bond, the one we most commonly meet with, having been generally used in our brick building of Colonial date, in which the black header and red stretcher effect is so often noticeable. Flemish bond is constructionally honest, artistic and satisfying, and its almost universal employment in modern building of Colonial style cannot be too strongly commended.

The double-stretcher Flemish bond which, as its name denotes, consists of two stretchers together, followed by a single header in all courses, the headers being laid above the joints between the two stretchers in the course

next below. It is coming more and more into vogue in America and has been used in some of our largest buildings with signal success. For the vertical joints between the contiguous stretchers, mortar colored to exactly match the bricks is often used, thus making a blind joint and giving the effect of one double-length stretcher. The use of double-stretcher Flemish bond sets a big, broad scale and can be employed to advantage in large wall surfaces, particularly where it is desired to take off somewhat from the appearance of height as the strongly marked horizontal lines have that effect. This feature can be further emphasized by slightly increasing the thickness of the horizontal mortar joints.

English bond and Dutch cross bond, like both the single-stretcher and double-stretcher Flemish bond, are replete with artistic feeling and deserve to be far more widely known and used than they now are in America. Not only are they essentially artistic, but they are strong and honest in structure. Both English bond and Dutch cross bond have alternate courses, the one wholly of stretchers and the next wholly of headers, but in the English

bond the stretchers of all the courses come directly above each other, while, in the Dutch cross bond, the stretchers of the first and fifth courses break joints with the stretchers of the third and seventh courses respectively, and thus throughout, giving a half-invisible, diagonally diapered appearance if the mortar joints and the hue of the bricks be judiciously arranged. If one chooses to put it so, running bond might be termed a degenerate form of Dutch cross bond with all the headers left out. Take out the alternate courses of headers and bring the course of stretchers together and you have running bond. One is tempted to remark that this is only an example of its being but a step from the sublime to the ridiculous.

The bonds hitherto mentioned are the most usual kinds, although there are others and one also meets with special adaptations of recognized types, but it is quite sufficient for general purposes to remember the five enumerated. In fact, many people, who are supposed to have some knowledge of such matters, have difficulty in keeping the differences clear.

Twelve Barrels of Whitewash

IN this age of great undertakings it is well not to lose sight of the little things that so often make them possible, says *Youths' Companion*.

A newspaper man who was writing a series of articles about the men who are at the head of large and successful businesses called upon the general manager of a factory where concrete blocks are made. This man had brought the business from a precarious and feeble infancy to a condition of great financial strength. The interviewer wanted to hear about the first practical thing the man had done to improve the working conditions, and increase the efficiency of the plant.

"The first thing I did was to buy lime enough to make twelve barrels of whitewash," said the manager.

"Good," exclaimed the reporter, quick to recognize the kind of story he wanted.

"The first thing I learned after coming here was that the company had difficulty in keeping good laborers. The hours and wages were right, and nobody could understand why so many left, or why the ones who remained were surly and discontented. I went out to take a look around the factory, and I found

the trouble in about five minutes. The place was too dark and dirty!

"Making concrete blocks is not a clean job, at best, and it is impossible to keep a factory free from the flying dust, but there was no reason why the place should be so dark. We could not put in any more windows, so I decided to light the great, dingy, barn-like structure from the inside. In the center of the room was a pit about five feet deep, in which the base of the engine rested. That pit made me shudder; it reminded me of one of Poe's tales. It was so dark that every time a man went down to oil the machinery he had to carry a torch, and grope his way down a ladder.

"That very day I ordered the whitewash; it was the cheapest artificial light I could provide. I gave every available man a long-handled brush and a ladder. They went to work with enthusiasm, and in a short time we could hardly believe we were in the same building. The men even whitewashed the pit, and after that it was never necessary to carry a torch. The surly, discontented laborers turned into well-behaved, decent workmen, and we had no more labor problems to solve.

nothing but best planks, ropes, etc., for scaffolding, taking every precaution to avoid accidents. Workmen are expected to do all they can to assist in preventing accidents, and are instructed to decline to work upon scaffolding believed to be insecure, and to report to the foreman, and if necessary to the office, about material for scaffolding when that furnished is believed to be insufficient or unsuitable; to examine scaffolding before working on the same if the workmen had no hand in putting it up.

There are orders also that any one using ropes must test them before using them, or before trusting oneself on them. They must

be tested by putting on more weight than they will be subjected to and they must be examined to see if they are worn, cut with acid or otherwise defective. Acid must not be put in same package with ropes in going to and from buildings, and extreme care is urged to keep them from coming in contact.

Employes must give their address each week, so that they can be reached without delay.

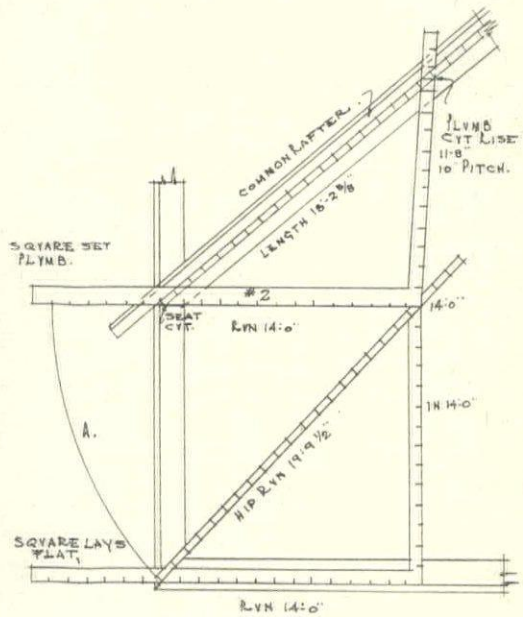
These rules are printed on the back of a weekly, ruled time card 7x7 inches. Spaces are allowed for name or number of job, kind of work, number of hours for each day of the week, total number of hours, rate of pay and total pay, and space for amounts of carfare.

Rafter Problems

A. A. Stafford

SAY, Steve, did you ever ask yourself how many things can I find out by those two notorious tools?" (the rule and square). This little drawing ought to give an idea of a wide scope of things, not only in roof work, but go as far as you like. Just by calling one inch equal to one foot and reading it down to very close fractions on the rule. Don't let $\frac{5}{8}$ of an inch go for $\frac{1}{2}$, as every $\frac{1}{8}$ inch equal $1\frac{1}{2}$ inches, and your length would be that much short. Use a good, plain figured rule and square, and be accurate. Note the way square No. 1 and rule lays, to ascertain hip or valley run, even angle or not. One thing, now then, use this same system, squaring up a foundation, setting stakes at right angle, getting the length of a brace, finding the length of some rafter stuff you must have when making out a bill of timber. In fact, the most accurate square root a man ever figured. Now, turn drawing a little to the left, and look at square No. 2, which is supposed to be plumb, and gives the run and rise of a common rafter. To get the length is done mentally, say 10 inches pitch, 14 foot run, $10 \times 14 = 140$ inches. This is 11 feet 4 inches rise. Rise and run must cut top and bottom, and see how the rule sets to get the length right where it should be, from $11\frac{8}{12}$ inches to 14 inches. Measure the length of your rafters—don't do that fool trick of spacing 14 times on rough timber, and then wonder why the—it ain't the right length. Now, if we swing square No. 2 on dotted line A to the corner of the place, it is plain to see the

run and rise of hip, and the figures to cut top and bottom. The rule from one to the other tells the rest. A 3-foot, 4-foot rule is very handy (No. 66 $\frac{1}{2}$, made by Stanley Rule & Level Company, is a good one). When you get numbers too large to work on the square,



like 20x20 inches, use 10x10 inches and then double the reading on rule. This gets the same result. No one has to be a college graduate to figure out this dope. It is absolutely correct, without many figures. You see most of the lengths on the rule, if you learn to read down close.

Lithopone Flat Wall Paint

A. Ashmun Kelly

LITHOPONE is not a new pigment or large way is of quite recent date. As paint base, yet its use as a paint in a there is considerable fogginess in the minds of many as to the nature and uses of this pigment I will as briefly as possible give a few salient points regarding the matter.

Lithopone is made from zinc and barytes. The metal zinc is brought into solution and the barytes is furnaced and converted into a clear, transparent solution of barium sulphide. These two solutions combine, undergoing a chemical change, resulting in a close molecular mixture, which we call lithopone. This pigment is then dried and ground in China nut or wood oil, and is then ready for the painter, to mix and apply.

Flat wall paints are all made on the same fundamental formula. The paint has many uses, as on steel ceilings, plaster boards or fiber boards, etc. It makes a good under-coating for enamel paint, being very easily sandpapered. It looks fine on burlap, on window shades, radiators, etc.

Lithopone paint is most useful inside, rather than where exposed to the weather. And it must be handled rather different from white lead paint, as it cannot be used in connection with certain pigments that do well with white lead, such as chrome green or yellow. Nor can lithopone and white lead be mixed together, though a coat of the one on top of the other, the under-coat being dry, will work no harm. But lithopone paint is more opaque than white lead, covering or hiding better. It is also whiter than white lead and retains its whiteness longer, when properly mixed. It works freely under the brush, costs less per hundred weight than lead or zinc, it is not a brittle pigment, like zinc white, nor is it discolored by sulphur as lead is. As a wall paint, it is very good, flattening out well, taking more oil than lead will, and being therefore more elastic. Stippling is not necessary, the brushing on is done quicker, and the wall may be washed repeatedly without bad result.

But, has lithopone wall paint no faults? Yes, many, a few of which will be named. It does not combine with linseed oil to form a tough film as lead does, and owing to a moisture absorbing tendency it goes to pieces on

exterior work much quicker than lead paint. Good varnish, however, tends to correct this fault. Exposed outside, a lithopone paint is liable to chalk and fail.

In paste form many of these so-called leadless paints are difficult to break up, a fact probably due to the presence of rosin compounds that combine with the zinc oxide. An examination of many samples showed that most were composed of lithopone in combination with other pigments, some containing whiting. Very few of these samples could be applied easily. Some even contained lead, and hence were off color. It may be said that some of the tests have proved greater failures than others owing to a lack of knowledge of the best method of mixing leadless paint.

Flat wall or lithopone paint cannot be used by the painter in the dry form, because it requires careful grinding in oil to secure the best results. So that it is offered in paste form, to be thinned by the painter, using thinners furnished by the manufacturer, or it may be had in ready mixed form, ready for the brush.

When thinning these paints with naphtha, which may be used alone or in connection with turpentine, the paste being ground in either varnish or oil, or in both, it is advised to use the heavier naphthas, or add one pint or a little less of clean coal oil to the gallon of naphtha, to slow it up, or decrease evaporation of the solvent and decrease the flowing properties of the paint. This will prevent the ridging or piling up of the paint which is quite common in flat work of this kind. And if the thinner added to the paste paint dries too slowly, add a little gasoline to it.

Painters agree that the addition of raw linseed oil will help the flow and general working of flat wall paint.

There is nothing poisonous about lithopone wall paint, though many painters have complained of feeling bad while using it. The worst thing in it is benzine, and that is not as bad as wood alcohol, nor is it quite as bad a thing as turpentine on painters. China wood oil is not poisonous. However, have plenty of ventilation when using this paint, and no trouble can ensue.

Carpenters' Planes

Dwight L. Stoddard

AFTER working at the trade for a short time, my father got a job in a furniture shop to make extension tables, and I worked there on tables and other work for nearly two years. The table tops were made of hard wood first ripped into narrow pieces and then glued together to keep them from warping. Dressing them with the grain of the wood on one piece one way and the grain of the other piece the opposite way caused me, in my young days, to think of carpenters' planes and learn how to use them. I soon found that in using a common smoothing plane you would soon strike the grain the wrong way and make such a rough place that, even if you were able to smooth it with a scraper and sandpaper, you would likely make a low spot in the table, and therefore the point was to avoid making any bad breaks by hitting the common plane against the grain.

Many would say to use a scraper only, and you would avoid it, which might be true, but it was not true that the scraper would do the best and easiest job possible. Therefore, I bought all the kinds of smoothing planes there were on the market and could not get one to do the work to suit me, so finally when I was about eighteen I took a piece of an apple tree and made a smoothing plane like the one I have illustrated. It worked to perfection, and as the occasion requires it continues to do good work. Now, the only trick of it is, as you will note, that the plane bit is set up steeper or, you might say, it is about a half-breed between a smoothing plane and a scraper. At that time I invented a plane with an adjustment that you could set the bit at any desired angle. I wrote to a big manufacturer of planes and he wrote back that there was another ahead of me, and that he would soon have it on the market, and while there has been something, I have never seen anything to really fill the idea I would have advanced.

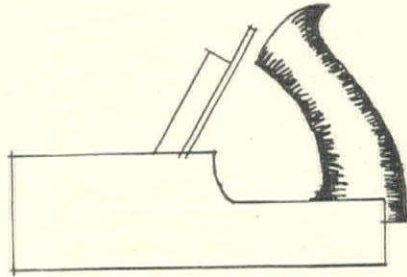
I found by constant use at that time that of all the lack or jointing planes on the market, there was nothing equal to the iron Bailey plane. It is true that the iron plane sticks to the wood and runs hard, but that can be overcome with a little parawax.

Now a block plane to cut the end of wood should be made so the bit sets down to as

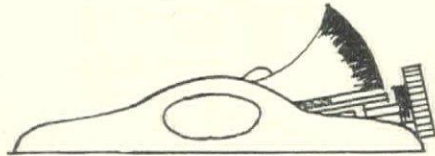
much slant as possible, and in this respect there is much difference from the block plane of thirty years ago.

A scraper, to do the best work, should set up about plumb, while a block plane, to cut the end of the wood, should be as near level as possible, though the bit has to set up a little over 10 degrees. I think the very lowest one we have is about 12 degrees, while they have to be ground back pretty well to give the front edge of the bit 20 degrees.

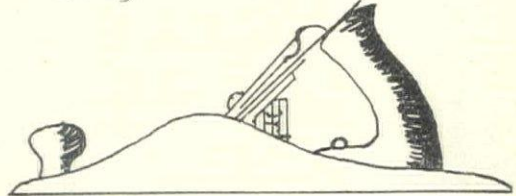
The common jack, jointers' or smoothing



A Scraper Plane.



Plane for End Wood.



Ordinary Bailey Plane

planes for general use should be about half way between, or the bit should be set at about 45 degrees, while a special smoothing plane for work like I mentioned should be about half way between 45 and 90 degrees, or somewhere about 67½ degrees.

I have a great many bead planes, moulding planes, matching planes, circle planes, plow planes, etc. There is no end to the kind of planes the carpenters used to use, but today most of the circle work, as well as all plowing, matching, beading and moulding, is done by machinery at the mill.

Odd Things in Construction

N. E. Duffy

IT is surprising in the construction of buildings what a variety of opinions stand out for one to notice in the construction and arrangement of an ordinary dwelling. Generation after generation have been building, changing and improving, and yet we seem to be as far from being perfect as they were generations ago, while we are constantly making improvements in the line of tools, materials and arrangements. One who makes a study of the work can readily see how necessary it is to have and make the best out of our expenditure. I have been asked the question, why we have such an endless variety in style and arrangement of buildings. My answer is like a Yankee, who answers one question by asking another, Why do we have so many minds? And while you might with your mind think I was odd, I with my mind might think you were odd, and so we are both odd. Odd things in building construction, when plain, practical and useful, are things that attract attention and so often the means of selling property. I knew a case where a front door, the style of which was taken from the NATIONAL BUILDER, attracted the attention of two home seekers, who were walking down the opposite side of the street, crossed over to look at the door which was on the front of that building, that was just about finished, when the owner, who was inside, stepped out on the porch. He was complimented on the door, invited them in, and sold them the house on sight. That Odd Door. Another case was called to my attention of a den that was just about being finished, when I complimented the builder on the completeness of that den. When he inquired if I liked it, and what there was about it that I liked, my answer was, in its plainness, neatness, and completeness. It was plain, neat, and complete architecture, cozy, quiet comfort in all its arrangement. The builder informed me that that den was the means of selling that house. A man and his wife were going the rounds in search of a home came in before the house was finished completely, and while one would suppose the woman would be more interested in the kitchen, dining room or other parts of the house, she was so completely taken with that den that she wanted her husband to have

it, while you might suppose the husband never knew what a den was for, for he only passed a favorable remark. The house was sold, there and then. The principal attraction was that odd den. I could go on from one thing to another, and continue this article on odd things, like odd doors, odd windows, odd seats in halls, odd closets, odd chutes in walls, odd corners that have been finished up with odd seats, all of which seem to attract the attention of the people who come in contact with such things and are looking for comfort and convenience.

Some time ago while I was in a building I was attracted by the offset in the building, that contained the fireplace, set back about four feet, and on each side extended out along the four feet a wide cozy seat, and across the front formed a colonnade that made that offset one of the most odd and cozy corners it has been my experience to notice in connection with my work; a place where six could sit and chat on this and that beside a fire, that odd men or women could admire. And while that corner was so cozy, one improvement could be made by having an odd window, oval, diamond shape or any small window in an agreeable shade to shed its rays in that odd corner. When I mentioned the window as an improvement it caused regret that the window was not thought about sooner.

I find so much in the odd things that have been the means of attracting people's attention who have become the purchasers of the properties. This article may seem odd all the way through, and is an odd thing by an odd man, representing an odd paper—the only one on the Continent, the NATIONAL BUILDER, where these things have been found, can be found and will be found, if you are a progressive in the work.

I find men are making a study now as they always have been, on odd, attractive things in building construction, and if some of those odd fellows or even the odd girls would give the readers of this paper their odd ideas on the odd subjects on buildings, what a grand, odd paper we grand, odd people would have on odd things in our odd moments. That would be a means of helping all to make more odd as well as even dollars.

Odd mantels made plain and artistic in design, are things that attract the attention of people, and especially when made without the frills and fancy parts that are regular dust catchers and require constant care to keep clean and neat.

Fireplaces, whether made of stone, brick or tile, can be arranged with all of the same material combined in various forms. A plain brick fireplace with a center under the mantel in length about double the width can be set in small cobble or large pebbles shaded and arranged that the shades of cobbles will not all run in groups. Any material that will harmonize can be arranged to form a diamond, square, oblong shield, keystone or ellipse.

Windows, odd, that can be arranged at the head or side of stairs in various odd shapes with leaded glass, colored to suit the taste, will throw a ray of welcome light that will add to the exterior appearance and interior comfort and advantage. My attention was called to a small window in a deep closet that improved the building on the outside and

gave light so that anything in that closet could be plainly seen and readily found. Such things that can be made with little expense will add to the improvement of the building, attract the attention of home seekers, and be the means of selling the property—such are found in *THE NATIONAL BUILDER* in every issue.

Sometime ago in passing a building, or rather three that were being built, I noticed a design in shingling that was odd, neat, artistic, and inexpensive. From the square in the gable end the shingles were arranged with first, two courses plain; second, course with six inch painted from weather line to point. The third row was plain four inch. Run in that manner, it made a design that was artistic, attractive and good in every particular. We see the circular butts that look very nice, but the above design will make a house attractive and the circular butts can be arranged with the above. But straight lines and circles do not work together as artistically as when all are of a kind—straight or round.

Causes of Failure of Stucco Work

A. G. Cutting

A NUMBER of years ago stucco was quite generally used in certain localities, but owing to failures of the material to withstand the action of the elements and to other causes, this type of construction was almost entirely abandoned. During the last few years, however, there has been a very marked tendency by the building public to take up this class of construction again. Therefore, this word of caution.

We do not want to have the same experience with this type of construction as the concrete block industry has had, and yet unless due care is used in drawing specifications and in their application, there are going to be a great many failures as in the past. Our architectural friends are very partial to stucco exterior, and if it is properly mixed and applied will come up to their expectations in every way. So much depends on the selection of the material, proper mixing and proper application that only skilled mechanics who are familiar with this class of work should be employed.

The writer has had opportunities to inspect a great many stucco residences in the

past few years and is very sorry to say that the greater percentage of them are unsightly, due to cracks, discolorations caused by improper application, and lack of proper ingredient, etc. I wish to illustrate briefly by stating facts regarding two or three of the houses that have come to my attention.

I remember one residence in particular, where there were a great many horizontal cracks in the stucco running almost the entire length of one side of the building. These cracks were about two feet apart and were very pronounced. The whole area of sides and ends was very unsightly. After a very careful investigation it was found that in nearly every instance where cracks had developed that they were at a point where the wire lath was lapped and in many places less than one-fourth of an inch thickness of stucco was over these laps. In some instances by cutting out the cracks it was found that the metal lath was not even tacked solidly in place, and yet stucco work in general was condemned by a number of parties on the results obtained on this one building. It was quite apparent that the trouble was not

due to any fault of the material, but in this particular instance was due entirely to the application of the wire lath and stucco. In addition to the large cracks at the laps of the wire lath, there were a number of hair cracks throughout the entire area, which apparently were caused by too much troweling of the concrete mass, and as was found by investigation, there was a coating or frosting of Portland cement on some of the areas and the cracks penetrated just through this frosting.

In another case regular lime mortar plaster without any Portland cement was used for the scratch coat. The second and finishing coat consisted of a poor mixture of Portland cement and sand. The finish coat was only about $\frac{1}{4}$ -inch thick. Moisture penetrated through the finish coat and the mortar composing the scratch coat, being subjected to continued moisture, disintegrated and the stucco came off in sheets.

The third case was very similar to the second, although wood lath was used instead of wire lath on a small building near the sea shore. The scratch coat material consisted of regular interior plaster and the second coat consisted of Portland cement, asbestos rock and asbestos fiber. The second coat was very thin and the damp salt air and moisture penetrated through to the first coat. The lath became swelled and the stucco came off in sheets. The stucco on this work was condemned and the faults were laid at the door of the asbestos and Portland cement. Upon investigating the matter thoroughly, it was readily proven that the entire trouble was due to the nature of the lath and the materials entering into the first coat.

I have referred to these buildings with a view of cautioning people interested in stucco construction to see that this particular part of the building is given proper attention. In the past stucco has been applied in two coats, the total thickness being about $\frac{1}{2}$ inch to $\frac{5}{8}$ inch. Past experience is teaching us, however, that 1 inch is by far better, and if the material is applied in this thickness, house owners and architects should not have reason to regret its use.

Another point of considerable importance is the color. A uniform color is rather difficult to obtain on smooth surfaces particularly, but it can be obtained if proper attention is given to the selection and mixing of the ingredients and if the stucco is properly applied. When Portland cement and sand

are used it is very essential that the sand should be absolutely free from any organic materials which have a tendency to discolor. It is also of vast importance that the ingredients be mixed very accurately and carefully, and that a sufficient amount be mixed at one time to cover certain areas exposed to the same lights and shadows.

For example, the work should not be left in an uncompleted condition half way between windows or half way down the side walls, for just as certain as this is done, there will be a streak showing where the later work was started. If it is necessary to do a certain given area at two operations, care should be used to get the materials properly blended and the new stucco floated or troweled to correspond exactly to that already done.

Portland cement and sand as a stucco mixture has been used with fair success where work has been carefully supervised, but there has been such a lack of proper attention to the mixing and application that there have been some very bad failures. The use of asbestos rock and fiber to take the place of sand is meeting with considerable success. The asbestos fibers have a tendency to hold the water which is used to mix the concrete mass longer, thus giving the Portland cement ample opportunity to become properly set, and in this way stucco mixtures are possible that are more uniform in color and less liable to crack, as the fiber also furnishes additional bond.

There is one point which is frequently lost sight of, that is, it is possible to manufacture or make concrete slabs that are free from cracks and that can be exposed to the elements for an indefinite period without discoloration. Therefore, should cracks develop in a well-constructed stucco work, it can be invariably traced to setting of the building or the shrinking of the frame. By insisting upon thicker stucco walls, the liability of the stucco cracking is reduced to a minimum.

The price of lumber is readily advancing and the desire for fireproof exteriors, especially in the suburban districts, as well as artistic effects that may be obtained from stucco, are creating a universal demand for this type of construction, and while the initial cost may be slightly more, it is such a small part of the total outlay and such an important part of the structure that the best is the cheapest in the end.—*American Contractor.*

Leaves from a Student's Note Book

G. Metson

Elementary Notes on Cantilevers

IN a previous article the strength of rectangular beams was considered, under various conditions of loading, viz.: (1) concentrated at the center, (2) distributed. In this paper the subject of cantilevers made of rectangular section of timbers will be gone into.

A cantilever may be described as a beam, fixed at one end only, the other being free. For the present we will only treat of a wooden beam acting as a cantilever, but, of course, a cantilever need not necessarily be only one member. It may be built up of several members braced together, and may be of timber or of metal, or of both combined.

The difference between a beam supported at both ends and one fixed at one end only is that the stress is greatest at the point of support, and that instead of the top fibers being in compression, they are in tension, whilst the bottom fibers are in compression, i. e., the conditions are reversed.

The strength of a beam fixed as a cantilever is one-fourth that of the same size beam of the same length supported at both ends. For example, the breaking weight of

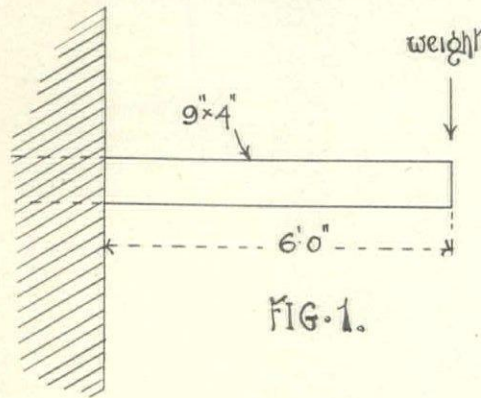


FIG. 1.

the first cantilever, shown in Fig. 1, is

$$c b d^2 \quad 3\frac{1}{2} \times 4 \times 9 \times 9$$

$$\frac{\quad}{L} \div 4 = \frac{\quad}{6} \div 4 = 47\frac{1}{2}$$

whilst as a beam supported at both ends, its breaking weight under the same conditions would have been four times as much.

Similarly, a cantilever would carry twice the load, if distributed, that it would if concentrated at its center, so that the breaking

weight under a distributed load would become $c b d^2$

$\frac{\quad}{L} \div 2$: in this case it would be 95 cwts.

L

The same factors of safety as used in the previous article for beams will be employed

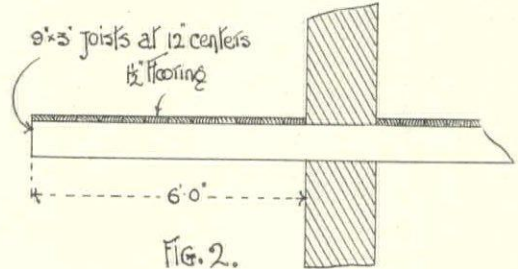


FIG. 2.

for cantilevers, according to whether they are live or dead loads, and the structures permanent or temporary.

It would perhaps be an advantage to work one practical example, showing the use of this formula.

EXAMPLE: Suppose that a number of joists, say four, are run through a wall and are boarded over to form a platform or balcony. Let it be required to find the safe distributed dead load that can be put upon such a platform, assuming it to be a permanent structure. See Fig. 2.

SOLUTION: The 6-foot 10-inch length can be treated as a cantilever and the safe distributed load on one joist will be

$$c b d^2$$

$$\frac{\quad}{L} \div 2 \div 7 \text{ (factor of safety)} =$$

$$\frac{3\frac{1}{2} \times 3 \times 9 \times 9}{6} \times \frac{1}{2} \times \frac{1}{7} = 10\frac{1}{8}$$

but as there are four joists, the total safe load will be $10\frac{1}{8} \times 4 = 40\frac{1}{2}$ cwts.; but from this we must deduct the weight of the floor board, which will be about 4 ft. \times 6 ft. = 24 feet super of $1\frac{1}{2}$ -inch flooring, at 32 pounds per cubic foot = 4 pounds per foot super of $1\frac{1}{2}$ -inch flooring, or the total weight of the flooring will be $24 \times 4 = 96$ pounds, so that the safe distributed dead load that can be put upon this balcony is $40\frac{1}{2}$ cwts. — 96 lbs. = 39 cwts., 72 lbs.

It is rarely in practice that a cantilever

in a permanent structure would be merely a beam, but rather it would take the shape shown in Figures 3 and 4. Here there are entirely different conditions. In Figures 1 and 2 the beams are subject to a bending stress. It is obvious that in Figure 3 the strut supporting the beam would have to crush before any bending stress could begin to act, and in this case the strut therefore, is in compression and the cantilevers in tension. In Figure 4 it is evident that before a bending stress can act on the cantilever the hanging member must give way, or if this hanging member be replaced by a rope, that the rope must break, so that here the cantilever is in compression and the hanging piece in tension.

A beam will bear a greater weight when in direct tension or compression than under a bending stress. For instance, if the beam in Figure 1 was stood on end, it would require a load of nearly 40 tons to cause fracture, assuming the pillar will not fail by buckling or bending. It has been proved by experi-

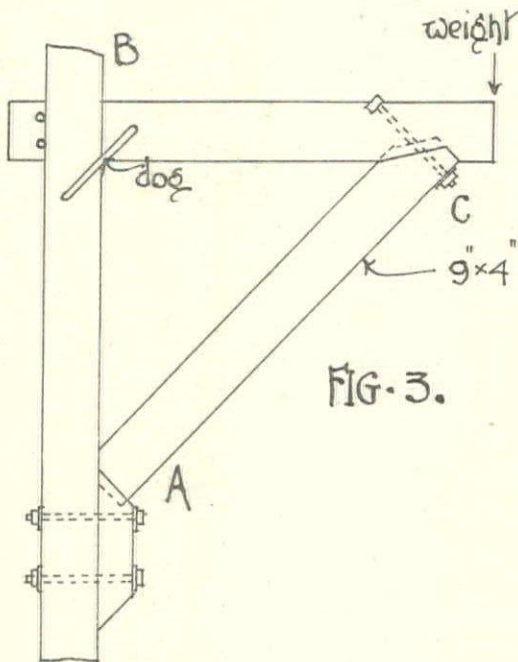


FIG. 3.

ments that a pillar, when its length does not exceed ten times its least dimension, will fail entirely by crushing, and when its length is thirty times its least dimension it will fail entirely by bending or buckling, and between these two ratios it will fail partly by buck-

ling and partly by crushing, so that in the above beam Figure 1 is used as a pillar, and that it is unstayed or free to bend in the direction of its least width, i. e., the 4-inch way, it would, as a pillar, fail partly by buckling and partly by crushing, as its length is to be its width as $72''$ to $4'' = 18$ to 1. If,

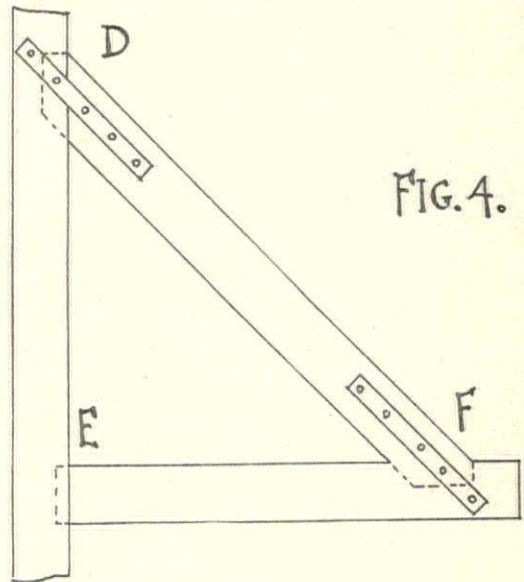


FIG. 4.

however, it is stayed or prevented from buckling on its 4-inch face, but free to do so on its 9-inch one, it would as a pillar fail entirely by crushing, as its length is to its width as $72''$ to $9'' = 8$ to 1.

There are one or two points worthy of notice in the construction of these framed or trussed cantilevers, and these are the need of proper joints at the junctions of the several members. For example, in Figure 3 the joint B is in tension, and it must, therefore, be so constructed as to prevent it being drawn out of the post A B under the load. It should be tenoned, pinned and dogged. The load at C will assist in keeping the member A B in position, but a bolt at B will be useful, and a splayed cleat is necessary at C, with bolts to keep it in position, unless it is stump tenoned in and screwed.

In Fig. 4 the joints at D and E are in tension, and means must be taken to prevent the member D E drawing out of the post D E by reason of the weight or load placed on the trussed cantilever. Iron plates or dogs can be used. To keep the joint E in position, it should be stump tenoned to the post.

Advertising—The Small Contractor

Ben F. Cobb

THERE should be a close relationship between the man who is doing a small contracting business and advertising. This is an assertion that will probably appear strange to some, but if given a little thought will appeal to any man who is trying to do business.

There is no exception to the rule that all men in business should advertise, as it is advertising that makes the small business grow into a larger one, and makes the larger business crowd forward to the head of the list. The man with a small contracting business in a small town is apt to think that there is a limit to the amount of business he can handle, and perhaps it should be stated that he does not realize that his business can be made to grow to be equal to the largest contracting business in the world. The same chance is open to every contractor to reach the head of the list if he so desires, and no man ever aimed too high yet. But let us come back a little and talk more of the small contractor, and explain how those men doing business in a small town may succeed.

Perhaps better to illustrate this point I might say that nearly every large business in existence today came from very small beginnings. We have contracting firms in Chicago who do business in New York, Cleveland, Cincinnati and many other cities. Those concerns did not start out building skyscrapers, nor did they start out even in a city. Some of them I know started in a small town in a small way, but they were not satisfied to work always in the small town and in the small way, and when they had grown as large as they could grow there, they reached out into other fields. Some one reading this may say, "but I have not the education to carry on a proposition of this kind—I must be content with where I am."

I might say, in answer to this, that quite a number of years ago I met a man in an eastern city who could neither read nor write. He could not even write his own name when he first started in business, but he afterwards learned to write his own name so that he could sign checks, still I doubt if he knew what any one of the letters in his name meant. That man, when I last saw him, was living in a beautiful home of his own and was

carrying on a contracting business in stone. He owned a quarry and had gotten very rich.

Education is a great thing. It is a great help along lines of business, but there is more in the man than even in education. I think I hear some one say, "but how shall I begin," and my answer is, "let the people know what you are doing, what you are trying to do and what you want." If you had a child that was old enough to talk that would allow himself to suffer all day for the want of a drink of water that he would not ask for, you would have your doubts as to that child being altogether right in the upper story. This idea holds good in the business man. If you want anything ask for it.

The next question is how to ask, what to say and how to present your claims or desires to the people. The answer to this is one simple word "advertise," and still this one word needs some explanation, for the reason that for every different size town one needs a different class of advertising. For instance, we have some advertising before us of Mr. M. E. Naylor, Cincinnati, Ohio, and it is good advertising, but it possibly would not do in a town of 500 or 1,000 people—that is to say, not all of it would do. You have got to govern your advertising a good deal according to your location. For instance, one of Mr. Naylor's ads is a blotter that he gets out, and unless the town that you are in is very small, this blotter is well worth taking up, for almost everyone uses blotters. On this blotter Mr. Naylor has these words, "Carpenter work, old houses remodeled, straightened up and new sills put in, and all kinds of carpenter work done, plans drawn and estimates given." Then he gives his telephone number and his location. He also gives the name of his town, Cincinnati, Ohio, and this is a point that is well worth an extra sentence.

In all advertising that anyone does they should have the name of their town. At first blush you may think this is unnecessary—you may say, "my town has only a few hundred people in it and everybody knows me." That is not a fact, for while it may be a fact that there is only a few hundred people in your town, it is not a fact that everybody knows you, unless you have done a good deal of advertising. It is a strange truth that



very few of us are known anywhere near as much as we think we are. Your next-door neighbor may know you are a carpenter, but they may not know whether you are a jack-leg or the finished article. Another thing, your town is small and there are other small towns about you. Between those towns there is always some one that needs carpenter work. There are new people coming and going in your county all the time. Keep yourself before them and put the name of your town on so that they won't mistake your advertising, or wonder where you are.

Mr. Naylor is probably a contractor of quite a little importance, judging from the advertising that he gets out, and any of you who read this article can be of just as much importance on paper as Mr. Naylor is if you are using the same kind of advertising. A rather unique piece of advertising (and it is advertising, although the intent is a little different), is his daily time sheet, to be filled out every day by each workman.

On the first line he has a place of registering what the weather is, "clear, cloudy or rain." The next line, "work done." The next line, "if corner, what corner." Then number of flat, name of flat or building, carpenter's name, work done for Mr., time of day work was started, time of day when work was completed, lumber used, kind and size and what used for. There are several blank lines for this to be filled out, and under this is space for hardware to be used. This is in addition to a time sheet that the men have to keep, and it is a fine thing for any contractor to use with his men, even if he is a very small contractor, and only has one man. Then he can use a sheet himself if he is a working contractor.

I said that this was an advertisement, and it is, for any man whom a contractor works for that notices a system that his contractor has must approve of a system like this, and it will give him more confidence in the contractor. Therefore, the system becomes an advertisement for the contractor.

I was particularly struck with Mr. Naylor's letter-head. It is not gotten upon expensive paper, but it is an advertisement. This letter-head states that he is Architect and General Contractor, estimates given, general jobbing and remodeling of all kinds, references given. Also states the location of his shop and gives his telephone number. Down at the side of the letter-head, taking up a couple of inches all the way down, he has

what he states is a part of the contract. I suppose by this that the contracts Mr. Naylor makes out are sometimes made on these letter-heads, and in that case this part of the printing on the letter-head becomes a part of the contract. Had I looked a little more carefully I would know this to be a fact, as he has at the bottom of the page a line before it which says "Sign here." The following is what he has at the side of the letter-head:

"Not responsible for
 damage by fires, rain or water,
 lockouts or strikes,
 plastering or water pipes,
 gas pipes or gas fixtures.
 All material taken out of building
 belongs to me, such as
 lumber, brick, stone,
 sash, doors, glass, etc.
 Money must be paid every Saturday
 noon, as work goes on, and when work
 is completed must be paid in full.
 No discount allowed for cash.
 Nothing done or furnished that is not
 specified in contract.
 All permits paid for by owner of
 building.
 Plans drawn free when work is done by me.
 Contracts must be signed before work is
 started."

This in itself is rather a unique idea, because these are things that should be in any contract, and it saves a lot of writing.

This makes three styles of advertising that Mr. Naylor uses, but advertising seemingly has no limit, or rather the ways that advertising can be done.

Today there is no town without the telephone, and it matters little how small a contracting business a man carries on he cannot very well do without a telephone, if he expects that his business shall grow. He may not even have an office, or rather he can have his office in his house, and some of the family can tend to the telephone while he is out.

One of the great helps to advertising today is the typewriter, for in my mind letter writing comes next to personal solicitation in the line of advertising. It is a well-known fact among thinking business men that the best advertising that can possibly be done is personal solicitation. You meet a man who wants something done and you can come to an understanding at once. Perhaps he does not want any work done at the present time, but you can put in a word for yourself anyway.

Next to this is the personal letter. If I was doing business in a small town I should see to it that about once in so often every man in the town whom I thought would possibly have any work to do should get a personal letter from me in regard to it. Next to the personal letter I would carry a small ad in my town paper. I would change the ad once in a while, the oftener the better, and I would not feel disappointed if that ad did not bring me in any inquiries, because advertising in your town paper is what we call "publicity advertising." It is not treated like a letter, and greatly helps in the development of your business. If your name is always

in the paper people who read the paper are going to know that you are there for business.

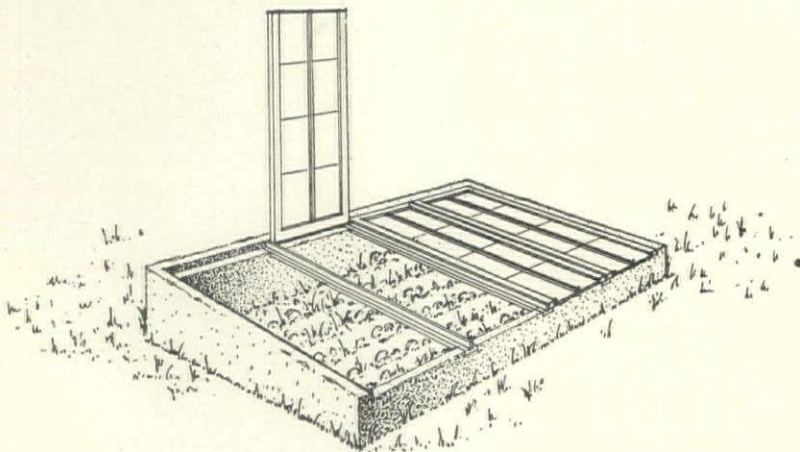
There is another point that can be worked out here. The editor of your town paper is always looking for news, and he is always willing to print the fact that you have just taken a job to build a house for some one, or if you have just finished a house, or something about yourself or your work. Those little ideas gotten into the reading notices are even more valuable than your display advertising, but your display advertising is good, and it is the key to the publisher's heart, making him willing to give you an occasional personal notice.

Concrete Hot-beds and Cold-frames

Means for Growing Winter Vegetables and Early Spring Plants

THERE is nothing which pleases the appetite so much as delicacies out of season. As for vegetables, such delicacies are not costly luxuries and are within the means of anyone who will take the time to build and run a hot-bed or a cold-frame. Such

on the sunny wind-protected side of a building. A four-sash bed is usually large enough except for commercial purposes. A standard hot-bed sash is 3 feet by 6 feet. Lay out the bed 6 feet 8 inches wide by 12 feet 10 inches long. The concrete



Cold-Frame Grooved for Sash.

a bed will make possible home-grown lettuce and radishes (and even violets) for the Thanksgiving and Christmas dinners. Moreover, by this means, one can depend on having good hardy plants for spring planting in the garden.

PROPER TIME TO BUILD HOT-BED.

September and October are the months to prepare the hot-bed. To avoid annual repairs, and to secure the best results build it of concrete. Locate the bed

walls are 6 inches thick. Dig the foundation trenches 2 feet 6 inches deep within the lines given above. Make forms of 1-inch lumber to carry the south (front) wall 6 inches and the north (back) wall 14 inches above ground. Forms are not required below ground level. The tops of the end walls slope to the others. Before filling the forms with concrete, test the dimensions of the bed by means of the sash. See that the sash lap the forms 2 inches on all sides.

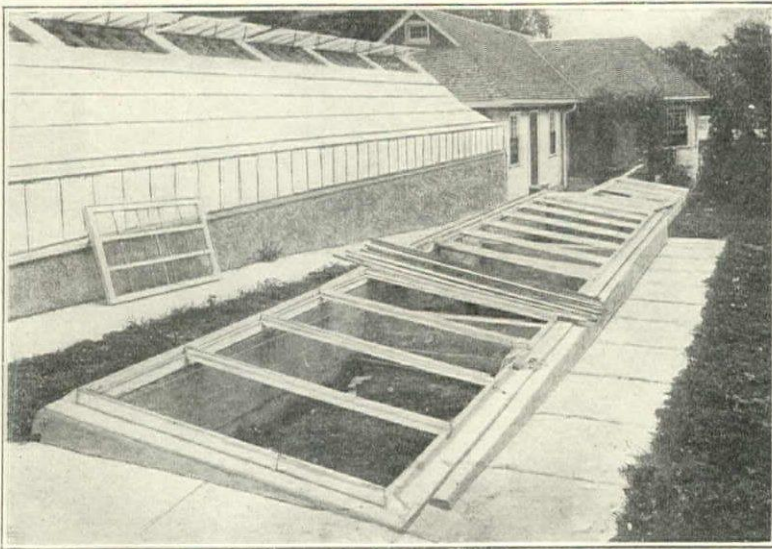
MIXING AND PLACING THE CONCRETE.

Mix the concrete mushy wet in the proportion of 1 bag of Portland cement to $2\frac{1}{2}$ cubic feet of sand to 5 cubic feet of crushed rock, or 1 bag of cement to 5 cubic feet of bank-run gravel. Fill the forms without stopping for anything. Tie the walls together at the corners by laying in them old iron rods bent to right angles. While placing the concrete set $\frac{1}{2}$ -inch bolts about 2 feet apart to hold the wooden top-framing of the bed to the concrete; or make grooves in the top of the concrete for counter-sinking the sash to the level of the walls with an allowance of one-quarter inch for clearance. This can be done by temporarily imbedding

of sand and $2\frac{1}{2}$ cubic yards of crushed rock; or 14 bags of cement and $2\frac{1}{2}$ yards of pit gravel at a cost of \$10.00.

PREPARATION AND CARE OF THE HOT-BED.

If the bed is to be used as a cold-frame, it is finished when covered with glass. For a hot-bed, dig out the dirt to the depth of 2 feet, tramp in 18 inches of fresh horse manure well mixed with leaves or bedding and cover it with 4 to 8 inches of rich soil. Bank the excavated earth around the outside of the bed. Put the sash in place, hang a thermometer on the inside and allow the bed to heat up. After a couple of days, when the temperature has dropped to 85 or 90 degrees, planting may be safely done. Seed catalogues



Well Located Concrete Hot-Bed.

in the concrete wooden strips of the necessary dimensions. During this operation, by means of blocks nailed to the strips, make provision for the center-bars described below. Remove the strips as soon as the concrete stiffens. Take down the forms after five days. The extra $2\frac{5}{8}$ inches in length of the bed is allowance for the three center-bars between the sash. These sash-supports are of dressed 1-inch stuff, shaped like a capital "T" turned upside down. The length of the stem of the "T" is equal to the thickness of the sash and the top is 3 inches wide. Sufficient materials for the concrete will be supplied by 14 bags of Portland cement, $1\frac{1}{4}$ cubic yards

contain valuable information as to the length of time necessary to produce the different kinds of plants.

During the midday, in bright weather, the bed will become too hot and must be ventilated for a short period by raising the sash on the side away from the wind. Water the plants in the morning only and ventilate later to remove the moisture from the foliage. On winter nights it will often be necessary to cover the bed with old carpets and boards.

It is a genuine pleasure to grow winter vegetables and flowers for home use. If the supply exceeds the needs, there is always a profitable market for such products.

Successful Contractors

A. A. Stafford

A CONTRACTOR to be successful must have a perfect system in his business, and everyone he employs must work according to that system. The successful contractor under all conditions has keen wits and is a deep thinker. He can see a perfect detail of his jobs, although he may be miles from them. This is why he can plan his work for tomorrow, for next week, and perhaps for his entire jobs. Now, I wish to confine this subject to the building line and work the system, which, like a ladder, may vary a little between steps, but still is all ladder just the same.

To start with, a contractor gets from some source a job to give an estimate on. If he knows his business, he starts to itemize and figure the cost of every article that it will take to complete that job—and from sad experience he has learned what the labor will cost to assemble those articles into their proper places. After all sums are totaled, he adds a percentage to cover incidentals, which no man can ever foresee until the job is complete. If the estimate cost is accepted by the owner and contract for all completions signed by both parties, then at the proper time, our contractor starts operations. Right here is where real system must begin, and it is up to the contractor to know whether the respective foremen on the jobs are using good system, which means a whole lot towards success to the contractors, i. e., saving labor, material and accident expenses.

Now, let us see where we can be successful. First, don't ever take a job for your health. Successful contractors don't. They are careful buyers and rarely sublet any part of their job, as they want the sub-man's profit. When we commence to excavate, "we'll put the dirt in a convenient place," he says, "because my common labor can get it back cheaper and my skilled mechanics can climb over it around the building, besides I have a place to put material close to the job and haulers must pile up their stuff when unloading in their respective piles, then it costs less for labor in getting certain sizes when used."

Many dollars are saved on jobs in waste material by having a good man to look after it and keep it around where men can use it instead of having it burned or carried away. There are always cuttings that can be called

money if they are taken care of and used. For instance, I start to rough in a flat, 9 ft. ceiling with 10 ft. stuff to do it. I have to cut off a lot of ends about a foot long. They make just what I want for corner blocking and save waste. Another saving in a man's time is never to clean out the cuttings, no matter how small they are, until he has finished, as he must have small pieces in roughing, and in finishing as well, and if he cannot pick them up at once, he must spend time to get them, perhaps from larger stuff, which cuts into Success. I have seen men frame joists where they would have to cut off six or eight inches, throw them away, and when they came to set up on walls, take a long 2x4 in. and cut it into 3 in. pieces for blocking, instead of using their joist cuttings. Success? No! There are any amount of such instances around a building, and a man does not have to save an awful lot of waste to make a day's wages—and the locality where wages are the least is where it amounts to the most, as material does not vary like labor. I say waste, because most all odd ends go to the scrap pile, and from there to the neighbors. There are many of these technical points from the time a job is started until it is completed, and the careful contractor is the one who has lost many a good sleep sizing them up in the columns of profit and loss. No man has ever acquired this knowledge in a few minutes; it takes years of deep study and experience. The unsuccessful contractor never lets one of these minor thoughts enter his mind—just go ahead and jam in, guess the rest.

A lot of success starts in the office in keeping a correct, itemized account of everything and keeping everything in the office ship shape so as not to be bothered.

Another great feature is to have plenty of tools and appliances so that men can handle difficult parts of the work successfully. These things herein mentioned are a few of the great many which must be remembered in the job to make it win. Some contractors have a compiled list that practically covers all jobs to figure from when giving estimates, so as not to depend on memory and leave out some vital points that would cost more than the profits on the job. Of course, all jobs have

ins and outs, which no contractor has thoroughly overcome, as there is absolutely no chance.

The secret of Success under fair conditions

is the contractor with a good system who is ever on the alert to improve it. He is the man who is able to turn over the keys at the specified time.

Creamery and Dairy Floors

Robt. Grimshaw

THE creamery and dairy interests in many portions of our country are so important that every detail concerning the construction of the buildings should be of interest to builders and architects, who should ever be on the alert to profit by the experience of others in the lines in question. In one particular there has always been difficulty and dissatisfaction—namely as regards the floors. In too many cases they are almost impossible to keep clean; further, they tend to induce sourness, etc., in the materials handled. Also for this very reason the floors themselves are not so durable as they should be, and as would be desired for them.

For this there are two reasons—improper choice of materials and improper use of those chosen. Creamery and dairy floors are subjected to mechanical wear and tear, as well as to insidious chemical disintegration. Mechanically they are in many instances damaged by wooden or wooden-soled shoes, of course not so much in America as in Europe; but if the employes in creameries, margarine factories, slaughter houses, dye works, etc., where there is cold water about, knew what was good for them, they would never let anything but wood come between them and the floor. Then there is the sliding about of machines, heavy cans, etc.; the latter usually with more regard for haste than for the good of either the floor or the cans themselves. So here we have the necessity for a floor that will be hard enough to withstand banging and scraping, yet not of a character to spall or split.

Then comes the necessity for absolute water-tightness, that is, not merely freedom from joints, knot holes and cracks, which would permit the passage of water and milk, but absolute lack of porosity, which would permit the absorption of either of these liquids, and especially of the latter.

There are plenty of materials which make a jointless floor, and one that is sufficiently resistant to mechanical use and even to abuse—but then comes in the question of the re-

sistance to the chemical action of the lactic acid developed by the decomposition of the milk, or of its compounds. This acid and its compounds will attack lime, whether alone or used in combination with other materials, as in cement. This comes pretty near to ruling out entirely, for many parts of the creamery, either plaster, concrete or terrazzo floors. The floor must be acid-proof. It must be remembered that there are many substances which from the chemist's point of view are acids, but which are not necessarily very sour to our sense of taste or very corrosive to touch—indeed some of them, as carbonic acid, are, as far as these senses are concerned, absolutely neutral. Ordinary cement may be made quite resistant to acids, especially when diluted or to the less vigorous ones by the addition of any one of a great number of substances which are in themselves neutral; as for instance, ceresite, asphalt, etc. Where terrazzo is used, care must be taken that the stone spalls used as aggregate contain no marble. Suitable aggregates for this purpose are glass, serpentine and ironstone; and a good proportion is about one to three. Asphalt alone, laid down an inch thick, makes a good surface for a creamery floor, if well supported so that it will remain level, else there will be everlasting puddles. But as regards appearance I have never found anyone who was willing to say a good word for it.

There have been used various compounds in the form of plates, or laid jointless, containing wood sawdust in combination with various binding materials. One of these bonds, however, is chloride of magnesium, which rules out the mixture for creameries and dairies, as it is attacked by lactic acid if the latter is present in great proportion; and if it is not, then the wood in the mixture is not sufficiently protected, and comparatively soon starts in to decay.

As far as I know, there is no good jointless material for creamery floors; so that one is compelled to take up with tiles and slabs. Tiles have the disadvantage of having cracks

between them. The smaller the tiles, the more joints; and on the other hand, the larger the tiles, the more readily they are broken. The first difficulty may be overcome by the use of asphalt cement or its equivalent to run the joints; and the second by a proper under-flooring, which indeed, is necessary for any tile floor, else spalling of the corners is almost sure to take place; not necessarily by reason of injury from dragging weights, etc., over the floor, but by settling of the building and jarring of the machinery in the building itself, or even in an adjoining one. For the under-floor I should choose

stone slabs—not, however, marble, but slate—which incidentally is about the most durable and satisfactory material of which I know, for steps subjected to much wear. For bedding the tiles a mixture recommended by German architects and builders, consists of one part by weight of ground asbestos, one of fine white sand and three of soda water-glass. A mix for jointless floors, which is recommended by one authority, consists of a 28 to 30 degree (Beaumé) solution of magnesium chloride, in which calcined magnesite is mixed to a stiff paste, to which is added three times as much sharp sand, which is free from clay.

Practical Problem in Stair-Building

Wm. C. A. Stevenson

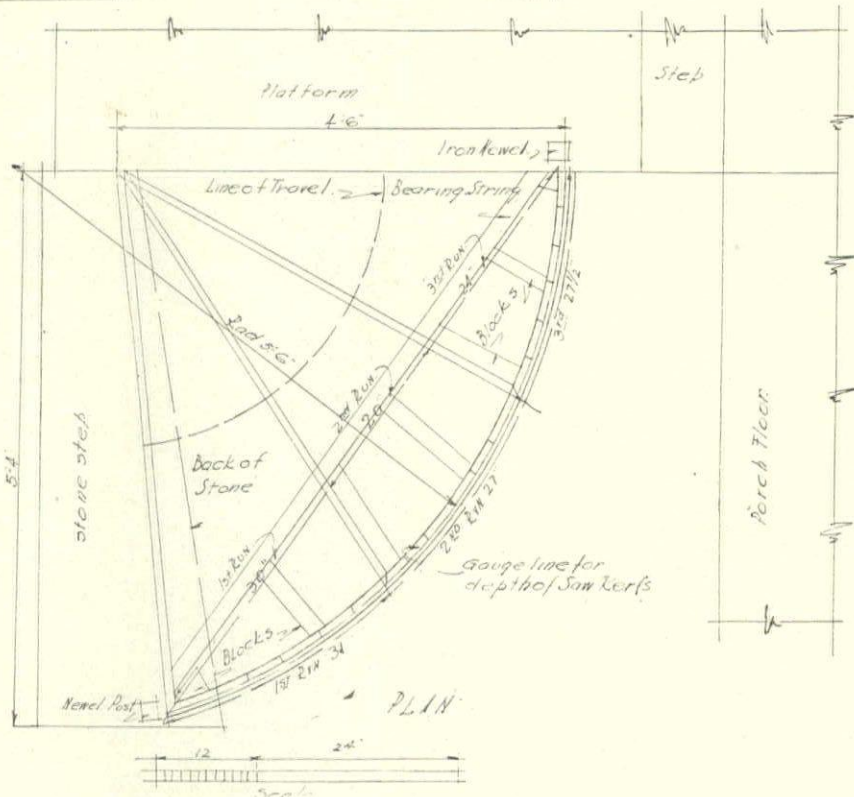
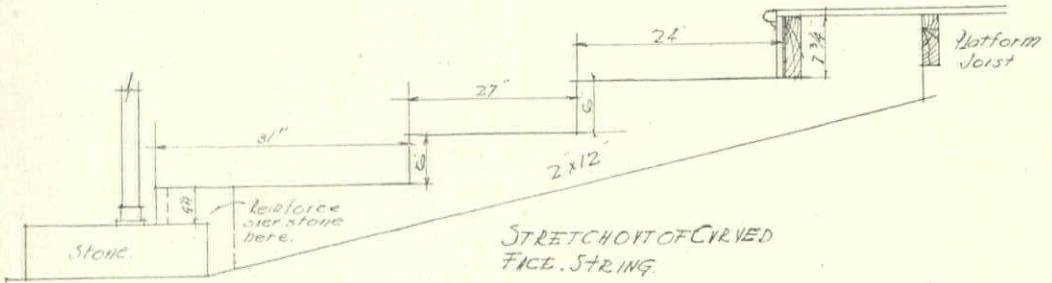
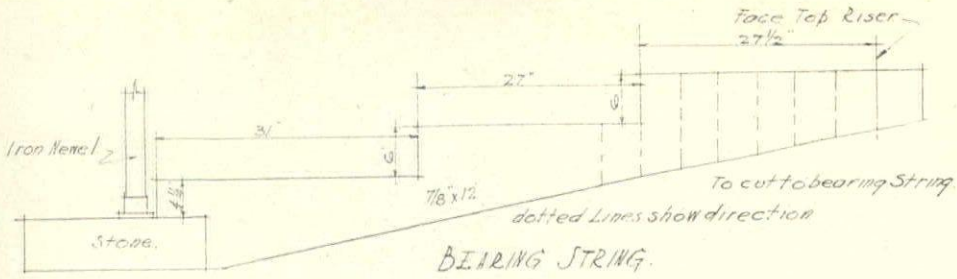
ALMOST every carpenter can lay out and put up straight steps, but a great many find themselves in trouble when it comes to something on the curve.

Recently a job of rebuilding front steps required that the new work had to conform to the old stone step and iron handrail, which was to remain. I found the old curved string built in a very unsatisfactory manner. It was built of two thicknesses of $\frac{7}{8}$ boards, the inside piece being kerfed and keyed to form the curve, while the outside piece was kerfed and bent to the inside. It certainly made a very weak string to support such large steps, as the reader will see by referring to the plan herewith.

I, therefore, worked out the plan shown, which can be readily seen to be much stronger, as the bearing string does all the work, while the face string is for looks only. Also this method is less work than the method described for the old string. The plan shows pretty clearly how this job was done, but for the benefit of those not well versed in stair work, I will make a few explanatory remarks as to the plan of procedure in work of this kind.

First: Care must be taken to have the steps of equal width on the line of travel, paying no attention to the width at wall or on outside string, as in this case. In order to do this, just draw the outline of your space either full size or to exact scale. Better full size on the floor. Then strike the line of travel, as shown, and divide it into as many equal parts as you have steps—in this case

three. Then draw your riser lines from meeting point through division points on line of travel, extending to outside string to measure the run of each step on the strings. Note the manner it is done on plan and compare it with the string developments shown. Note the bearing string cut to bear up under platform floor to joist. Also note the first riser cut on string is the thickness of the step less than rise. In this case the rise is 6 inches, the step $1\frac{3}{4}$ inches thick. Therefore, where string rests on stone it is $4\frac{1}{4}$ inches. This should be reinforced, as it will be liable to split. It will also be seen that the run of the bearing string and face of curved string are not the same, but they must be made to conform to each other. The most practical way to get the run of the curved string is to bend a thin strip of wood or cardboard around the curve, marking your points, then measure it when it stretches out straight. The next important step is to get your string to bend to shape required. In order to do this it must be saw kerfed. Note the gauge line showing depth to saw. This is usually about $\frac{1}{4}$ inch from face. In order to find the distance apart to saw the kerfs, saw a kerf in a piece of the same thickness as string to same depth and measure how much it will bend out of line at a point the distance of the radius from kerf when kerf is closed. The radius in this case 5 feet 6 inches, and I found my kerf required to be $5\frac{1}{4}$ inches apart. It must be borne in mind that the kerf must be cut on the plumb or parallel to the risers and the same saw used for



them all. A good tough piece of material must be selected and after it is cut out should be well soaked with water in order to make it a little more elastic until it is formed and fastened into place, when it will dry out and remain to shape.

In order to get shape of steps, take some

lath or similar strips and make templets to the shape of each step, making sure you allow for your projection over riser. As the plan only shows the face of the risers, the reader at all familiar with stair work ought to have no trouble following these instructions.

Individuality and the Small Plant

Warfield Webb

VIEWED from one aspect the observer is tempted to conclude that the day of the individual worker—the man who essays to keep before him his individuality in matters of certain lines of endeavor—is a thing of the past. There is quite likely to be an opinion formed that would betoken disaster to this industrial worker, and to see in his place the machine and its operator instead. The age is a rapid one; a revolving of the wheels that will grind out the commodities demanded by man in which there is a minimum of individuality and a maximum of machine power and finish.

We say that there is an inclination to so view the matter. To the thoughtful man; the man who views the subject with the keener insight that it demands, there is no special reason to feel that there is or has been sounded the doom of the individual worker, or of the smaller plant. There are several reasons why this is a fact. One cannot hope for any commodity manufactured by man-made machines, that can compare in actual value to the article evolved by the hand of the expert in any line of endeavor.

There is in the labor of human hands an individuality, a personality that becomes an inherent part of the commodity itself. We cannot, with the most humanizing effort in the construction of a machine make it do this character of work. There is still apparent to the observer that ever-present element that denotes it as the work of mechanism. This is one of the favorable signs noted within recent years in reference to the trend of education and the return, in at least a measure, to the days of the apprentice. While it is not possible to revert to the old days where the boy was trained under the guidance of the master in the little plant for years until he became the adept that merited just praise, it is at least promising to find the value of individual training, not alone on machine work, but also in the matter of hand achievement, given so much greater consideration by places of learning.

The genius is not born every day. He is not developed in the machine shop, strictly. His talents are awakened and enlarged with such training as will only be possible with that guidance that is nurtured under the

warmth of the master hand. No man can be at his best, in individuality, with a machine. The love that all of us possess for the best in every industry, overshadows the greatest effort of power equipment. We are not decrying this power. In this age of big things it is essential. We could not continue as in the old days and still hold our own. There is and must be progress as exemplified in power and rapidity.

In the face of this there is the love and the need and the demand for the individual and his labor. True, on the other hand, that the man who becomes the machine expert is the man who has genius. Shall we not still train this individual genius so that the individual will make possible greater individual achievement in his labors? There is the demand for the higher art that is made possible by handicraft. There is the element of art, even in the smaller undertakings, that is an asset of more than ordinary value to the man who looks into the theme with sincerity.

There are possibilities in the smaller plant that are not seemingly attained in the larger operations. The unified power of the small dynamo and the gasoline engine make possible the reduction in the cost of the operating figures. This is the element that reduces the cost of operation for the smaller man and is a factor that is worthy his consideration. He may not be able to turn out as much in volume as the man who operates the plant with manifold possibilities, but the quality of his commodity can be made a reason for his success, even in a small way.

There is the advantage too, of the finer labors made by direct supervision. If the operator is an adept and has in his employ men who are trained in his ways and in his special methods, there will emanate such products as should in themselves possess intricate virtue and a larger value. To make his ideals possible he must have a force of hands that are trained as individual expert workmen. Will it repay him to operate in this way? Are there not demands today for the things that have a special virtue in point of individuality? Recently we have come across a man who in this way is specializing on a folding table and other unique devices that are made in a small plant. These specials demand the

work and the thought and the equipment that are not to be found in the plant that makes volume and not quality.

In order to supply the particular trade needs there is the urgent call for the man who has this genius developed. It must be developed and worked out in the small plant. To operate a machine will not ordinarily require nearly so much time to do so creditably as to individualize in the finer work that has the human touch and the human finish.

The day of the special worker has arrived. It may not be that there will be a large field for his endeavors, but the number being few there will be sufficient to keep him busy. He is not a work of a limited time. He cannot achieve the success that is demanded of him in a limited time. Genius works slowly. The brain and the hand must work in a unison

that is not so keenly essential where the machine does at least a part, if not the thinking, at least is so constructed as to relieve a man of the detail and the labor that is the underlying secret of his accomplishment.

No, the day is at hand for making the ideal more so and the man who can labor with an end and with the accomplishment that develops the special art that this embodies will be sure to find his place unfilled. Too many of us are merely machines in our endeavors. The special requirements are not made to bristle with the majority; there is no need for this condition. There is the need for the man who can do things, and the place for the small plant with its force of workers who are trained to that perfection that is only another name for genius in all works of handicraft.

Building Contracts

W. J. Stanton

BUILDING contracts generally provide for the amount of compensation to be paid for the work to be performed and of course such a provision is binding upon the parties and fixes the amount of compensation recoverable. Where the contract states a specified amount of compensation to be paid for the work as an entirety the fact that it also shows that the amount so arrived at was based on estimates of quantities at fixed prices does not entitle the contractor to additional compensation where the estimate of quantities was less than the actual work required.

On the other hand, if the estimated quantities were more than the amount of work required the builder is not entitled to a deduction from the contract price of the work as an entirety. Where the contract fixes the compensation according to the amount of work, that is, at so much per cubic yard or other measure, the fact that the contract also states that the work will include about a certain amount of material does not entitle the contractor for compensation for such amount in case the work requires less.

Where the contract is ambiguous as to the rate of compensation it will be interpreted most strongly against the builder and in favor of the contractor. Where the contract fixes the rate of compensation, it is not permissible in an action thereon to show its cost

value on the extent of the benefit therefrom to the builder. The question whether the receipt by a contractor of less than the agreed compensation is binding upon him depends upon whether the acceptance of the less sum was by way of accord and satisfaction or not. When the work is not performed as agreed, an agreement to commute the contract rate is valid. So, where a contractor, finding the work more difficult than contemplated, threatens to abandon it on the ground that the builder misrepresented its character, an agreement for increased compensation in consideration of the continuance of the work is binding. If the contract does not specify the compensation to be paid the contractor is entitled to receive a reasonable compensation.

Working contracts providing for excavations, embankments, masonry, etc., frequently provide for a certain compensation per cubic yard of work done, and questions have frequently arisen as to the manner in which the work shall be measured. Where the contract provides for payment for masonry and similar work by the cubic yard or other measure denoting solidity, the work is to be measured after the stone or other material is in place, without deductions for the natural interstices between the material as laid in place. So, where an earth embankment is to be paid for at a certain rate per cubic yard, the em-

bankment is to be measured, and not the excavation from which the material therefor was taken; but the contractor must stand for the natural waste and shrinkage. A general usage or custom may control the manner in which the amount of work shall be measured, or the parties may, of course, specify by their contract the mode of measurement to be adopted. Thus, when a contract for brick work fixed the price at a certain sum per thousand, the number of brick laid to be estimated on the basis of twenty-four bricks per cubic foot, it was held that the contractor was entitled to pay estimating twenty-four bricks to the cubic foot, not to pay estimated by the actual amount laid.

Working contracts providing for excavations, embankments, masonry, etc., frequently, instead of stating a fixed compensation for the entire work, fix the compensation according to the amount of work done and according to a classification which develops as the work progresses. Thus, in excavation contracts the compensation is frequently fixed at a certain price per cubic yard or other measurement for the excavation of earth, another for the excavation of rock,

etc.; or in contracts for masonry at a certain price for first-class masonry, another price for second class masonry, etc., and in such cases the contracts frequently further provide that the measurement and classification of the work shall be determined by the architect or engineer in charge of the work. In such contracts, if there is no provision for measurement or classification of the work by the architect or engineer, this classification or measurement is not binding on the contractor, nor is the contractor required to secure a classification or measurement of the work by him, as a condition precedent to recover compensation.

On the other hand, if the contract provides for the payment of the compensation upon estimates of the architect or engineer by whom the amount of work performed is measured and classified, his estimate of the quantity and character of the work is, as a general rule, a condition precedent to the recovery of the compensation. In order to render the measurement and classification by the architect or engineer a prerequisite to a recovery of the compensation, and binding on the parties, there must be very conclusive language in the contract to that effect.

Carpentry Pertaining to Reinforced Concrete

D. C. Babcock

IN TAKING up this subject at the point when the introductory article stopped in the October issue. The writer will endeavor to make each branch as plain as possible for the reader, from the setting of the stakes and lines for the foundation, to the completion of the building.

On general construction it is usually the custom to employ an engineer to stake out the foundation and also to establish any points and lines necessary for the location of the footings for the walls and piers needed in the support of the building, but at times it is necessary for the foreman to attend to this in place of an engineer, consequently it is best for all foremen to familiarize themselves with the use of the instruments and the best systems of the duties belonging to the engineering department.

In the first place, you should establish

the property lines, and if it is bounded on one or two sides you should establish the street line, then work from these to locate the other two sides.

In case the foundation consists of columns supported on footings it is best to establish a center line of the outside columns on each side of the building, longitudinal of the building, then if the room will permit, set this line outside of building any certain number of feet and use this as an established reference line; then take the measurements for the center line of piers, cross section of the building along this line, beginning at the front building line of the corner column and mark distance given on plan to the center of the next and establish this point by driving an iron pin or piece of pipe into the ground and placing a mark on this point with a cold chisel. Repeat

this system the entire length of building, as shown in Fig. 1.

This method should be repeated on the opposite side of the building and be sure to drive pins down to the surface of the ground and you will find after excavating is complete that your reference points have not been molested and you will not need to spend any unnecessary time in checking up to find if any certain point is correct.

In excavating if the soil is such that it will not cave, excavate the size of the footings and let the sides act as the form for the footing as far up as the plan showing the proper height directs. Now you will

line of all the columns that may be shown in that row on the plans.

Cut No. 1 will fully explain this and to insure accuracy do not neglect to check up often.

In order to keep the reinforcing bars in the proper position I advise using a template fastened to the top of the cap form, as shown in Fig. 2.

The next step to be considered is the main column forms. It is well to have them made during the progress of the work described, then there will be no delay in not having them ready when they are needed.

In building the forms for the main col-

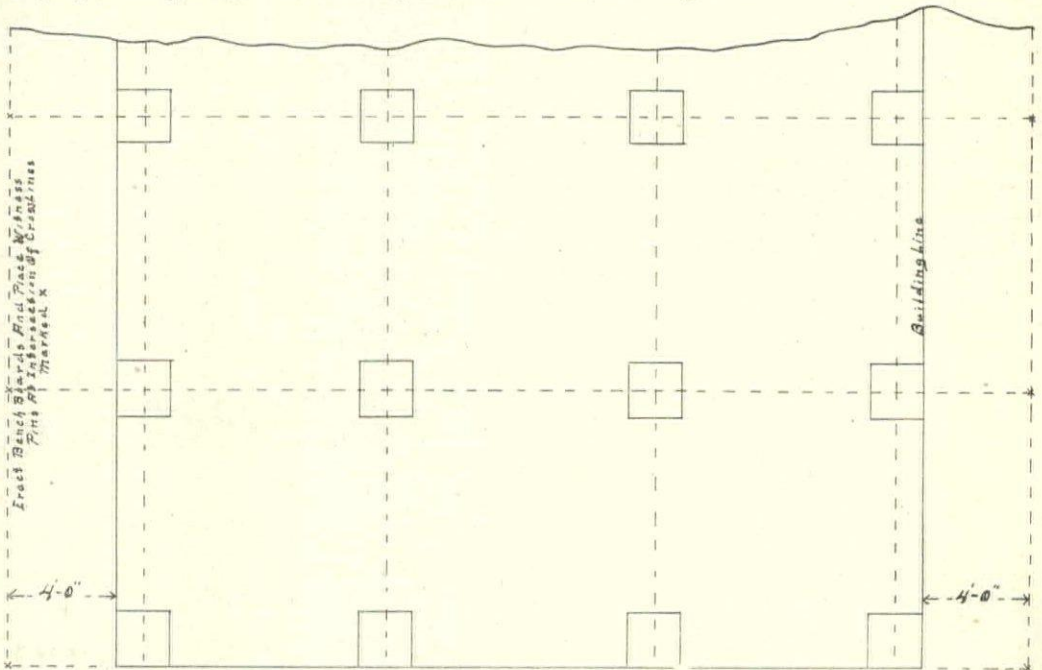


Fig. 1. System of Lines.

need the form for the cap column to complete the pier and to receive the reinforcing. It is best to make the forms for this cap 6 inches higher than grade and use nails inside to mark the height of cement.

In setting this form, care must be taken to have the outside cement line of cap exactly parallel to the building line previously explained.

In order to establish the center line of caps across the building you may erect bench boards over each iron pin and place a nail in top edge of board directly over the mark on pin on both sides of the building, then by stretching a line from nail to nail in bench boards you have the center

line of all the columns that may be shown in that row on the plans. It is best to have two sides the exact size required for the cement column and the other two sides as much wider as twice the thickness of the material used for same and nail the two wide ones onto the edges of the narrow ones, as shown in Fig. 3.

Bear in mind that the cleats on the forms should not be more than 2 feet apart and clamped tight while cleating to make them as tight as possible to prevent leakage when they are being poured.

It is best to let the panel forming the face side of the column extend 6 inches below the other sides, as shown in Fig. 3. Then you will find that when you raise the form this 6-inch projection will locate the

exact building line when clamped to the foundation cap below.

Care must be used in placing the column form and be sure that it is centered with the cap below; also that you check for the distance center to center, according to the witness pins.

You may drive stakes into the ground to fasten the braces to for the present as temporary plumbing, for there is no need of trying to make it permanent until after the shoring is in place, and the joists are ready. Then I will try and explain by cuts a method of holding a column in such a way that it may be adjusted in any direction desired

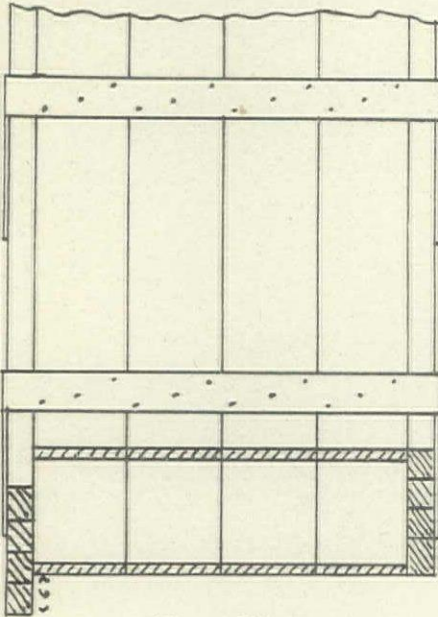


Fig. 3. Column.

at any time before being poured without any of the other work conflicting. For it is simply impossible to plumb a set of columns and have them remain in the same position during the progress of the other work connected with them.

I have heard superintendents say in giving orders to his men that he wanted them to plumb the columns and be sure they were right and that he did not want to have to plumb them twice and then proceed to complete the other work. Now, any man that expects to hold the columns plumb and then complete the other work that is required up to the time of pouring has requested something of his men that he cannot do himself or that has never been done.

This one reason is why the writer's method of setting up the columns, placing the bottoms accurate and clamping same to cap and not plumbing the column permanently until ready for pouring, then by using the adjustable method of holding the column, which I will explain later, a great deal of time and unnecessary trouble is avoided, for the necessity of having to do the work the second time is the reason of the excess cost.

In the next article we will take up the system of shoring, which is next in order, and if the reader will keep in touch with each article it will be much easier for him to understand, as each article has a bearing upon the previous article—also the follow-

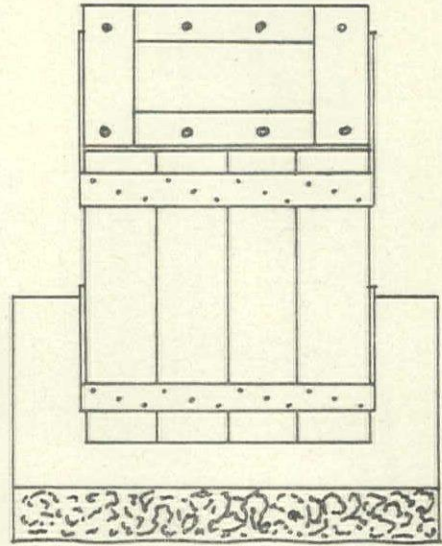


Fig. 2. Template.

ing one—and will help to explain the system.

There will be many minor points that the reader must study out in the progress of the work, for it is almost impossible for the writer to go into all of the small details that is sure to come up and obstacles that will arise in course of the construction. But at any time that the reader wishes to ask any question THE NATIONAL BUILDER will be only too glad to present such inquiries and answer such questions that may be requested, from time to time, through their question and answer columns each month.

Now, having our foundations complete and the outside columns up, bottoms placed and clamped securely to the footing caps and the temporary bracing on, we will let it remain until the next issue.

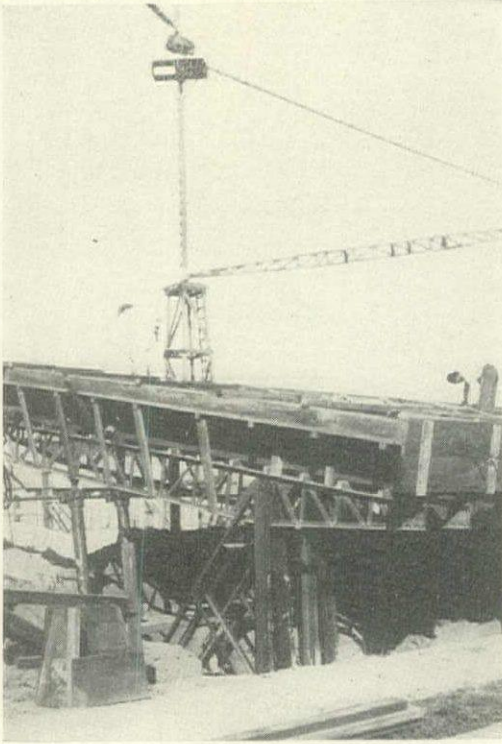
Raising Concrete Walls

C. L. Edholm

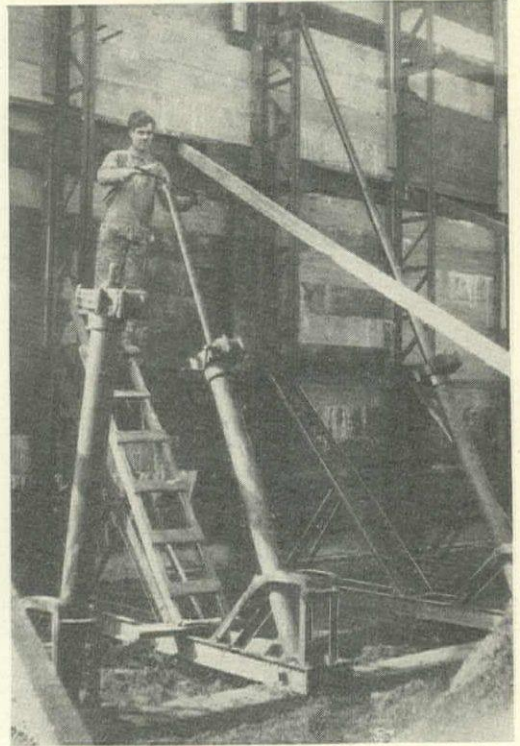
A SYSTEM of concrete construction especially adapted for one-story buildings, such as barns, barracks and factories, makes use of the novel idea of laying the walls on a nearly horizontal

and, it is claimed, better and more attractive walls.

The economy of material is seen first of all in the forms; instead of both sides of the wall being enclosed in boards that are nailed



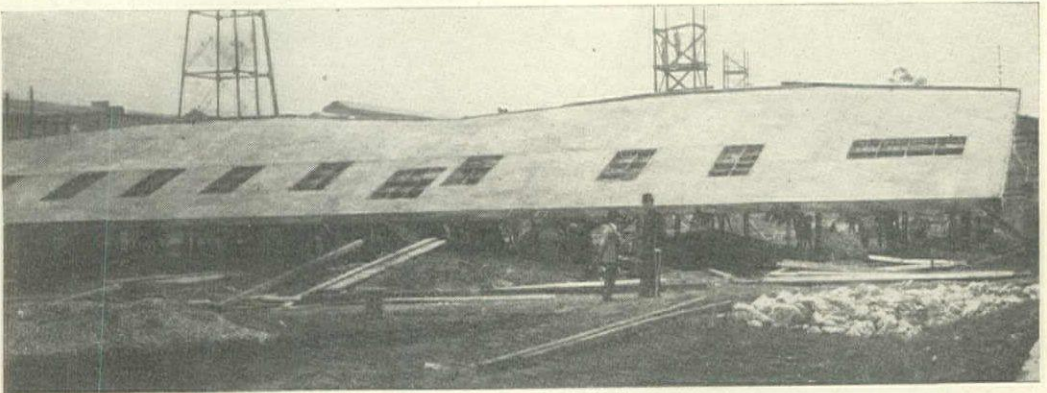
Laying and Bolting the Forms.



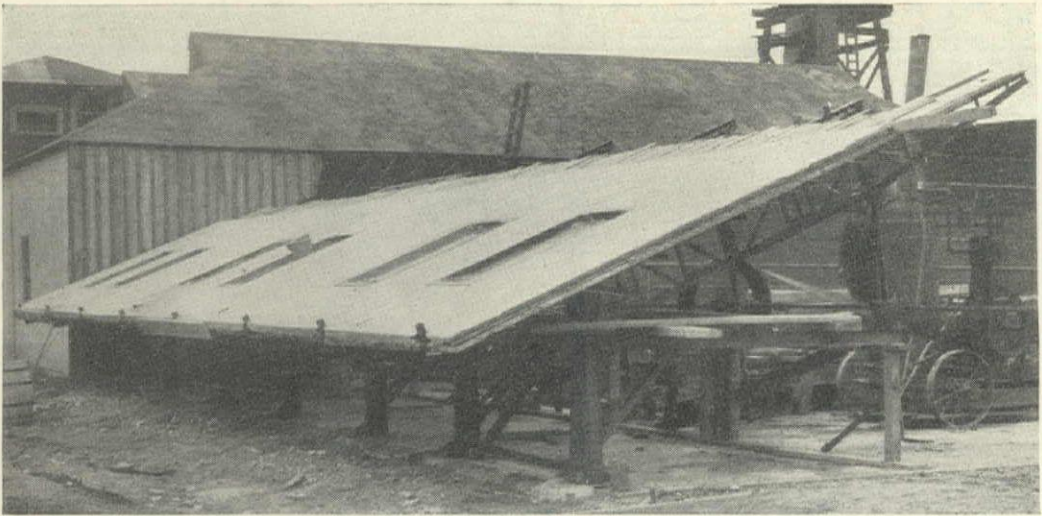
Behind the Wall.

position by means of jackscrews. There are framework and raising them to a vertical many advantages in this plan, economy of material and labor, rapidity in execution

in place by carpenters, only the lower side (the inner surface of the wall) rests on the boards, which are simply laid or bolted in place and can be used more than once. Less



Raising a 120-Foot Wall.



A Wall of a Farmhouse.

concrete is required when the walls are made hollow, which is readily done by this system. Less work is required, as it is easier to fill a flat, shallow form, leaving no voids, than to properly fill an upright form. There is a saving of time, both in pouring and in allowing the concrete to set, as the upper surface is exposed to the air and evaporation takes place more rapidly. The walls when finished present a more attractive appearance because all board marks are on the inner surface while the outside of the wall can be given a smooth finish while the concrete is wet, thus preventing the scaling which so often occurs with an applied surface finish.

The method employed is to set a row of beams, supported by telescope screws, along the foundation of the proposed edifice. The iron beams support the shallow form of boards and of course door and window openings are built into this flat, box-like trough, and the reinforcements are set in place. Pouring may be done by the gravity system, as shown in the photograph, or by men with

wheelbarrows. In about six days after pouring, the wall is ready to be set on edge, and this is done by a gasoline engine which operates the series of jackscrews simultaneously, raising the wall very slowly and steadily until it rests upon the foundation.

The corners are joined by separate pourings. The reinforcement projects a few inches beyond the end of each wall, so that when the walls are in position the iron rods meet at right angles and forms are set up at the junction and filled with concrete, thus binding the corners firmly, in fact, as will be seen, they are doubly reinforced.

This method has been in use in the east long enough to prove that it is no theory, and on the Pacific coast has been tried in Bakersfield and Los Angeles. The Federal Government has used it with success in building barracks, cavalry stables, quartermasters' warehouses, etc., at various military reservations; a wall forty feet in height being tilted into place as part of its construction in the Philippines, while lengths of 120 feet are handled with ease.



Concrete Ornament Applied to Facade.

OUR READERS PAGES



[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any questions or experiences will be given proper space.—Ed.]

Answers

DOUBLE MARGIN DOORS.

From "Old Carpenter," Springfield, Mass.:

With regard to double margin doors perhaps the following explanation will suffice to satisfy the requirements of your correspondent:

When doors are required exceptionally wide as compared with the height, and where they would otherwise appear unsightly, they

to the inner stiles, which have previously been prepared to the section shown in the figure and properly jointed. The two inner stiles are then glued and wedged together, the ends of the latter having been cut clear of the plough grooves, the panels are inserted and the process of wedging up is then proceeded with in the ordinary manner. The joint between the two halves is provided

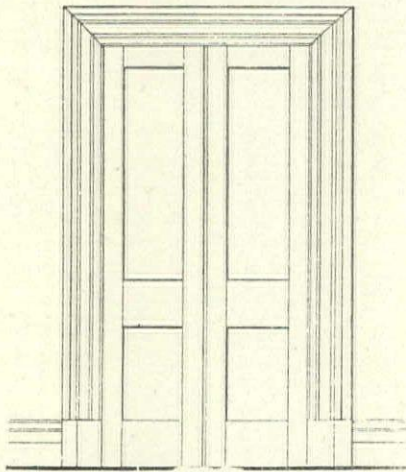


Fig. 1

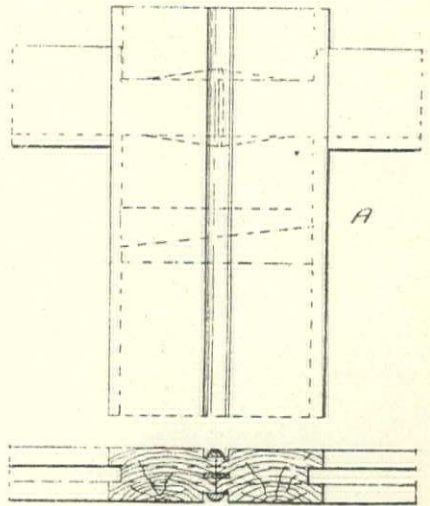


Fig. 2

are made to appear as in Fig. 1, but in reality they would open as one. These are termed "double-margin" doors and are constructed as follows: The two halves are framed separately, but, previous to wedging up the two inner stiles are fitted with three pairs of dry hardwood folding wedges. The top pair should pass through the stiles about 3 inches below the top rail, as shown at A (Fig. 2). The other two pairs pass through the stiles 3 inches above the bottom and middle rails, respectively. The rails of the two doors are first glued and wedged

with a double-quirked head, either worked upon the edges of the stiles or planted on separately, as shown in the section at Fig. 2. In fact, a "double-margin door" is simply two single narrow doors fastened together, the connection being made strong and secure.

These doors are now sometimes used for front or entrance doors and when hung they work like two doors and add much to the architectural beauty of a spacious entrance. In England they are quite common.

RUBBLE STONE WORK.

From "Old Scotch Mason," Detroit, Mich.:
I send you herewith for the benefit of "Farmer" a diagram or two of "Rubble Stone Work" from which he may select a design for building the walls of his intended cottage. The big stones must be broken in order to build the walls strongly and stones should be bonded as often as possible so

shown. Fig. 3 shows the end of the wall where connecting courses are intending to make "bond." This is not a very strong wall, as the "bonding" does not tie the stones together as they should be tied. Fig. 1 shows how the openings for doors and

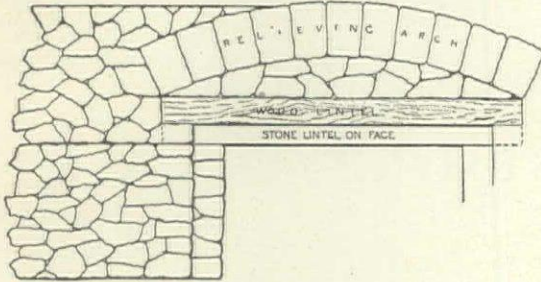


Fig. 1

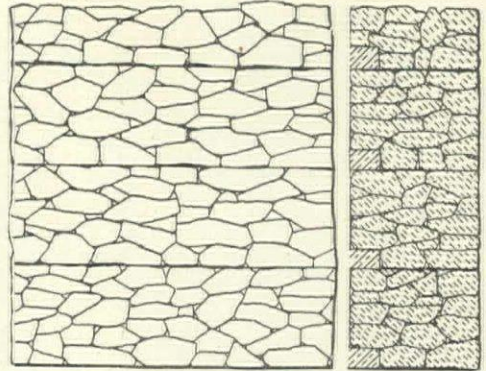


Fig. 2

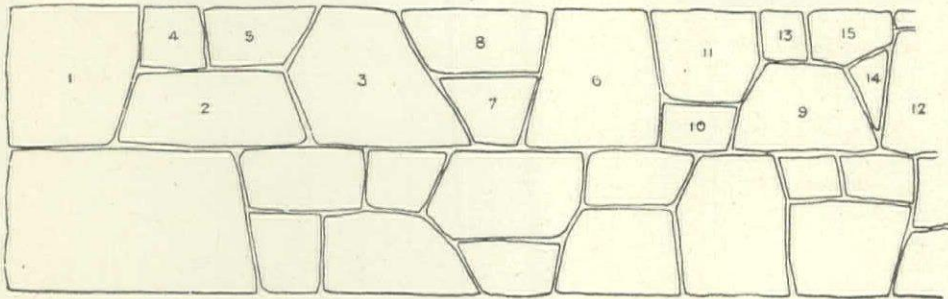


Fig. 3

that the stones (some of them) will reach wall to build. Figs. 2 and 3 show another irregular rubble, which is about the easiest across the wall. Fig. 1 shows a wall in wall built up with smaller stones and made up with horizontal joints every two feet, as

windows may be provided for. A "rubble" cottage when properly constructed makes one of the most lasting buildings possible. They are warm and cosy and finished with a thatched roof, are about as picturesque as anything I know of.

BICYCLE TOOL BOX.

From "A Fellow Cripple," Toledo, Ohio:
In answer to "Cripple," Philadelphia, I may say that I once made a tool box of light pine to hang below the top bar. It was about six inches wide (over all) and as long as the frame of the bicycle would allow. It was as deep as I could make it without interfering with the working of the machine. It was made in two compartments, lengthwise and opened to the inside by two doors hung at the bottom by good hinges and held fast at the top by good substantial locks.

Locks are necessary to keep children and others from meddling with the tools while

the owner is doing repairs in the building. Saws and long tools may be placed in the upper compartment and the smaller ones in the lower part. Each of the divisions should have bottom rails in front which form part of the box and which will prevent small tools from falling out. There may also be divisions made in the spaces formed by the front rails or little paper boxes may be fitted in and are very convenient for carrying nails, tacks, screws and small tools. I had trouble in carrying about a regular steel square, so I bought a "pony" square with a blade 12 inches long and a tongue 8 inches long. This did very well, but did not always fill the bill. Now, however, there should be

no trouble as, "knockdown" squares may be obtained without difficulty, and these can be folded so as not to take up much space. It is several years since I used my box, as I do not repair any more, being too old.

ELECTRICAL.

From "One of the First Electricians," Chicago, Ill.:

I would say to W. A. H., Middletown, Conn., that all the qualifications necessary to make a first class electrician is a thorough high school training and a fair knowl-

edge of mathematics, a willing mind and powers of application. With these, any boy will make a tiptop electrician.

SHOW CASE.

From "Joiner," Racine, Wis.:

If T. C. O. will make his hanging "show-case" of the dimension he states and of quartered oak, finished dark, he will have a very pretty case, but he must, of course, have a glass panel in his door and dark brass or bronze mountings for lock and hinges. Any plain design will look well.

Questions

SCALES.

A "Young Fellow," Marquette, Mich.:

I am following the lessons in drawing that are now being published in the NATIONAL BUILDER, and am much interested in them, and intend to study the "Art of Drawing" from them if I can possibly do so, and because of this intention and my long connection with the paper as a subscriber, I make bold to ask of you a clear explanation of scales, and how to get them, along with other things in connection therewith.

COLORING CONCRETE.

From "Jas. Durham," Chicago, Ill.:

I am trying to make a tile floor of concrete and would like to get some information regarding what coloring matter I should use in the cement that will not fade or discolor, also what proportion of sand and cement should be employed, and how the whole should be manipulated to insure good and permanent work? The tiles will be no thicker than three-quarters of an inch and less if I can. They will be laid on a bed of concrete in cement. Any information will be appreciated.

STAIR STEPS.

From "Training Student," Trenton, N. J.:

Will you kindly publish and illustrate the best way of making a step of wood for a stairs, how to attach the riser to the step so as to make it strong and durable? I have been taught several ways, by teachers at manual training schools, but each one of them seems to have a "pet method" of their own and I am at a loss to decide on which way is the best for a workman to use, and I

will be glad to get some help on the subject from readers who know, or from the Editor of these columns, whose opinions on these, or similar subjects are considered to be the best that can be obtained.

NUMBER OF NAILS REQUIRED.

From "A Constant Reader," Carlisle, Ky.:

Will someone tell me in figuring on a job how to figure nails of different sizes, for instance, flooring, ceiling, studding, weather boarding, shingles and lath. I always figure and never have enough. We are down here where we have all of the work to do. How do you figure brick for a chimney?

CUTTING TREES BY ELECTRICITY.

From H. E. D., Attleboro, Mass.:

I have read about cutting wood or trees by electricity with a wire I think it was. I would like an account of the whole process by which it is done, how large an engine is required, and other machinery, and if it can be obtained readily in the market, also about the cost of the outfit to work with, and the expense while using it.

MORTAR.

From "Plasterer," Edmonton, Canada:

How old should mortar be for plastering before it is fit to use?

RETAINING AND OTHER WALLS.

From "W. S. K.," Vancouver, B. C.:

Please give me some information regarding brick and stone walls in general, and retaining walls in particular, and you will greatly oblige an "old Eastern" subscriber of "away back."

Book Notices

Notice—All books noticed in these columns may be obtained from this office at publishers' prices. All postage or express prepaid. (Money and address must accompany all orders.)

ESTIMATING FRAME AND BRICK HOUSES, BARNs, STABLES, FACTORIES AND OUTBUILDINGS. Ninth Edition, Revised and Enlarged by Fred T. Hodgson. Published by the David Williams Co., 239 West 39th St., New York, N. Y. Cloth. Price prepaid, \$1.00.

This is an excellent work and has had a very large sale and has now passed into a ninth edition. It has always been a popular work with contractors and builders, because of the simple and plain manner in which the author has treated the subject of estimating in all its phases. This edition brings the work to date, as the author has revised and made some corrections that seemed necessary. It contains a detailed estimate of kitchen, dining-room, parlor, den, halls, bedrooms, conservatory, basement, bathroom, closets, etc., figured out and measured by the quickest and simplest methods. Also showing how to estimate by cubing, by the square of floors, or walls, and by the process of comparison; with hints and practical suggestions for taking measurements and making tenders for work.

The book is illustrated, well bound and printed on good paper, and most excellently well gotten up.

HODGSON'S LOW COST AMERICAN HOMES. New edition, enlarged. Prices adjusted to suit present date. Plans and elevations of one hundred and fifty low priced houses. By Fred T. Hodgson. Published by Frederick J. Drake & Co., Chicago. Price \$1.00.

Parties intending to build a house, a cottage, a bungalow or any similar building, should be sure and procure a copy of this work, as they will certainly find something in it to meet their requirements. It will be sent from this office prepaid, on receipt of one dollar.

HODGSON'S ESTIMATOR AND CONTRACTOR'S GUIDE.

For pricing builder's work. Describing reliable methods of pricing builder's quantities and labor, for competitive work, showing in brief and concise form the methods generally employed by the most successful contractors, giving full details for estimating cost by the cubic foot, by the square, in rough quantities, by unit of accommodation, or estimating by accurate quantities in detail, etc., with many tables, rules and useful memoranda. By Fred T. Hodgson. Price \$1.50.

This is a new and revised edition, and has been overhauled, adjusted and prices changed to meet present conditions. This work has had a very large sale, and has become very popular among builders, carpenters and contractors, but having been published in 1904, it naturally became a little out of date, so far as prices were concerned. The rise of prices of labor, and materials of all kinds, since 1904, rendered it absolutely necessary for revision. This is why this book may now be considered almost a new book,

and one that is up to date and as nearly reliable as such books can be made.

BUILDERS' QUANTITIES. By Wm. Edgar Ballard, lecturer on Building Construction and Quantities, City of Birmingham, Municipal Technical School. Published by Longmans, Green & Co., New York, London and Bombay. Price 90 cents.

This is a timely book, as just now there is a feeling abroad that some change in the methods of estimating and taking quantities is necessary. This little book of 125 pages shows how to measure up—for quantity taking—walls, gables, breaks and angles, that may be necessary to make a complete estimate of all brick, stone and other walls. Also to find the areas of painted and plastered work, glass, piping for plumbing, wiring for electric lighting, roofing, paving, excavating, and all other work necessary to complete the work in accordance with specifications along with many other items and memoranda. Indeed the little book is almost exhaustive of the subject on which it treats, and we are persuaded that no man, who is an estimator and who once reads over its pages, will feel satisfied until he owns a copy of it for his own use. The book is very nicely gotten up and the print is large and easily read, and the price is so low that it may be considered a negligible quality. Its size is handy either for desk, bench or pocket.

NEW PUBLICATIONS. (LIST 18.) Bulletins.

Bulletin 48. Selection of explosive used in engineering and mining operations, by Clarence Hall and S. P. Howell. 1913. 50 pp., 3 pls., 7 figs.

Bulletin 55. The commercial trend of the gas producer in the United States, by R. H. Fernald. 1913. 92 pp., 1 pl., 4 figs.

Bulletin 62. National Mine-Rescue and First-Aid Conference, Pittsburgh, Pa., September 23-26, 1912, by H. M. Wilson. 1913. 74 pp.

Technical Papers.

Technical Paper 38. Wastes in the production and utilization of natural gas, and means for their prevention, by Ralph Arnold and F. G. Clapp. 1913. 29 pp.

Technical Paper 48. Coal-mine accidents in the United States, 1896-1912, with monthly statistics for 1912, compiled by F. W. Horton. 1913. 72 pp., 10 figs.

The Bureau of Mines has copies of these publications for free distribution, but can not give more than one copy of the same bulletin to one person. Requests for all papers can not be granted without satisfactory reason. In asking for publications please order them by number and title. Applications should be addressed to the Director of the Bureau of Mines, Washington, D. C.



LEGAL DECISIONS

OF INTEREST TO BUILDERS

Prepared for the
NATIONAL BUILDER
by George H. Murdock

An owner of a building in process of erection, who is forced to occupy it before completion, does not thereby accept it.—*Japes v. Harmon*, 141 N. W. (Mich.) 595.

That it would be difficult to construct a building according to the specifications in the contract is no ground for pursuing another method.—*Volquardsen v. Davenport Hospital et al*, 141 N. W. (Iowa) 432.

Where the terms of a contract, the performance of which is guaranteed by a surety, are materially altered after its execution, the surety is released unless he consents to the change.—*General Bonding & Casualty Ins. Co. v. Beckville Independent School Dist. et al*, 156 S. W. (Tex.) 1161.

Where a building contractor with honest intent substantially performs his contract, failure in slight particulars will not prevent him from recovering fair compensation, with a proper deduction for any loss or damage suffered by the other contracting party.—*Smith v. Cunningham Piano Co.*, 86 A. (Pa.) 1067.

The provision of the specifications, made part of a building contract, "wainscoting, pilasters, etc., in all corridors, * * * all lavatories and all stairs where shown" to be of marble, can well be construed by the architect to require marble wainscoting in the basement.—*Buchanan & Gilder v. Gibbs*, 156 S. W. (Tex.) 914.

A building contract providing that the decision of the architect, on any disputed point, shall be final and conclusive as to matters relating to the construction, his action is binding on the parties, in the absence of fraud or gross mistake, necessarily implying bad faith or a failure to exercise an honest judgment.—*Buchanan & Gilder v. Gibbs*, 156 S. W. (Tex.) 914.

Where, in a building contract, there is nothing making it binding on the owner to employ a certain person, named by inference as the supervising architect, a verbal agreement that such person is not to be so employed, even if made without the consent of the surety on the contractor's bond, is not sufficient to release the surety.—*General Bonding & Casualty Ins. Co. v. Beckville Independent School Dist. et al*, 156 S. W. (Tex.) 1161.

As respects a surety on a building contractor's bond, a provision of a contract for the construc-

tion of a school house that a supervising architect be employed was not altered by a member of the school board, who was a practical contractor, though not a professional architect, agreeing with the other members to act as such supervisor.—*General Bonding & Casualty Ins. Co. v. Beckville Independent School Dist. et al*, 156 S. W. (Tex.) 1161.

The provision of a building contract, after one that wainscoting and certain other things shall be of marble, that "in fact wherever marked 'marble' in plans, details, elevations or sections" a certain kind of marble shall be used, does not mean that if wainscoting is not marked "marble" that material shall not be used, but is an addition to the enumerated parts that are to be of marble.—*Buchanan & Gilder v. Gibbs*, 156 S. W. (Texas) 914.

The provision of a building contract that, if the plans and specifications have omitted any of the details necessary to completion of the building, they shall be worked out and furnished by the architect, and the contractor shall complete the work accordingly, as if such details had been actually worked out, authorizes the architect to decide as to the material of a wainscoting, if that detail was omitted.—*Buchanan & Gilder v. Gibbs*, 156 S. W. (Tex.) 914.

Plaintiffs contracted to build certain buildings for defendant railroad company, the contract providing that on final payment they should execute "a valid discharge from all claims and demands growing out of, or connected with his contract." On completion of the work, the amount due therefor was not in dispute, and defendant tendered payment, provided plaintiffs would sign a receipt releasing it from all claims "of every kind and description * * * arising out of, or connected with, said contract or its obligations." At that time certain damage claims for injuries to employes and otherwise growing out of the collapse of one of the buildings while under construction were pending and unadjusted. Held, that plaintiffs were justified under the circumstances in refusing to execute a receipt so sweeping in its terms, and on recovery under the contract were entitled to interest from the date when the payment was due under its terms.—*Northern Pac. Ry. Co. v. Goss, et al.*, 203 F. (U. S.) 904.

Plaintiffs, who were experienced builders,

contracted to build two ice-houses for defendant in accordance with plans and specifications made by defendant's engineer. The structures were very simple, consisting of four hollow sides which were to be held together, above the bottom, only by the roof trusses. In constructing the walls plaintiffs secured them in position by braces fastened to stakes on the inside. When the first building was enclosed, they made the roof trusses inside of it, raising them from there into position, commencing at one end of the building. As this work progressed the braces holding the walls, which were in the way, were removed, and not replaced. When about two-thirds of the trusses had been raised, the building collapsed in a high wind, and plaintiffs were put to ex-

pense in paying damages to injured workmen and for reconstruction, to recover which they brought an action against defendant, alleging that the collapse was due to the insufficiency of the plans and specifications. There was a conflict of testimony as to whether the building would have been sufficiently stable when completed, but the evidence showed that it would have been much more so than when it collapsed, and tended to show that it would not have collapsed if the braces had been put in place. Held, that the question was not as to the stability of the building when completed, but whether it could have been safely completed in accordance with the contract by the use, by plaintiffs, of known and ordinary methods of construction.—Northern Pac. Ry. Co. v. Goss, et al., 203 F. (U. S.) 905.

Patents

The following list of recent patents and trademarks relating to building interests is especially reported for *The National Builder* by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

1,049,373. Weather-strip for metal-window constructions. Alfred M. Lane, Assor. Monarch Metal Weather Strip Co., St. Louis, Mo.

1,049,381. Seal-lock for sliding doors. William C. Martineau, Assor. Universal Car Seal & Appliance Co., Albany, N. Y.

1,049,750. Electric heating-stove. Albert E. Mastin, Sacramento, Cal.

1,049,505. Machine for making cement blocks. John D. Matthews, Wood River, Neb.

1,049,388. Water-heating apparatus. Welles M. Partridge, Marblehead, Mass.

1,049,524. Water-heating apparatus. Welles M. Partridge, Marblehead, Mass.

1,049,390. Automatic barn-door latch. George H. Peck, Fort Dodge, Iowa.

1,049,529. Door-check. Benjamin F. Perry, Grand Junction, Colo.

1,049,392. Weather-strip. John D. Pierce, Assor. Monarch Metal Weather Strip Co., St. Louis, Mo.

1,049,917. Bath-tub. John C. Reed, Assor. Standard Sanitary Manufacturing Co., Pittsburgh, Pa.

1,050,071. Bath-tub. John C. Reed, Assor. Standard Sanitary Manufacturing Co., Pittsburgh, Pa.

1,049,611. Outlet connection for sinks. Charles O. Schoonover, Los Angeles, Cal.

1,049,542. Corrugated metal casing for culverts, drainage-tiling, etc. Andrew Smith, Assor. Smith Metal Perforating Company, San Mateo, Cal.

1,049,543. Corrugated sheet-metal sectional casing for culverts, drainage-casings, etc. Andrew Smith, Assor. Smith Metal Perforating Company, San Mateo, Cal.

1,049,544. Sheet-metal casing for culverts, conduits and drainage-tiling. Andrew Smith, Assor. Smith Metal Perforating Company, San Mateo, Cal.

1,049,420. Reinforced-concrete building construction. Arthur C. Tozzer, Lynn, Mass.

1,049,630. Building material. Alexander P. White, Caldwell, N. J.

1,049,631. Building material. Alexander P. White, Caldwell, N. J.

1,049,632. Sheet-metal slitting and punching machine. Herbert E. White, Assor. The General Fireproofing Company, Youngstown, Ohio.

1,049,554. Shutter mechanism. Earl M. Wooden, Assor. of one-third to A. B. Cavanaugh, New York, N. Y.

1,049,792. Cut-off and drain for house-plumbing. Charles G. Woods, Assor. of one-fourth to F. Grutzner, one-fourth to G. Haynes, and one-fourth to J. H. Brogan, St. Louis, Mo.

1,049,436. Mold for plastic material. James W. Woolf, Tempe, Ariz.

1,050,099. Water-closet. Oliver C. G. Brettell, Assor. Anchor Sanitary Co., Pittsburgh, Pa.

1,050,428. Building construction. Hugh B. Copeland, Denver, Colo.

1,050,360. Door-securer. Henry E. Hall, Assor. The Thomas Mfg. Co., Dayton, Ohio.

1,050,130. Concrete structure. George C. Harvey, Geneva, Ohio.

1,050,656. Door-hanger. Charles H. Howard, Greenfield, Ill.

1,050,661. Valve for toilet-basins. Robert W. Kelley, Wellington, Tex.

1,050,144. Hot-water furance. Peter T. Kniss, Waterloo, Ind.

1,050,477. Reinforced-concrete floor construction. Alfred E. Lindau, Assor. Corrugated Bar Company, St. Louis, Mo.

1,055,247. Furnace. Jacob Weintz, Assor. to the Strong, Carlisle & Hammond Co., Cleveland, Ohio.

1,055,110. Window pivot. Benjamin F. White, Assor. to International Window Mfg. Co., Dover, Del.

Building Material Price List

Revised to Date.

*Price not given. yp—Yellow pine. wp—white pine. np—Norway pine. op—Oregon pine. rw—Redwood.
 s—Spruce. oc—Ontario Cedar. h—Hemlock. bc—British Columbia Cedar. rc—Red Cedar. F—Fir. Cdr—
 Common Cedar. Cyp—Cypress. BM—Board measure. S1S—Sized one side. D4S—Dressed four sides. KD—
 Kiln dried. RG—Rough. C—Clears.

Dimensions—	Seattle, Wash., Corrected by J. H. Bradley. M ft. BM	Chicago, Corrected by J. H. Touchstone. M ft. BM S2S	Omaha, Neb., Corrected by I. P. Hicks. M ft. BM S2S	Southern Ontario, Corrected by F.O. Frantz. M ft. BM S2S
2x4 in. to 8 in. up to 16 ft., No. 1.....	\$11.00	\$22.00	yp \$26.00	h \$26.00
2x4 in. to 8 in. up to 16 ft., No. 2.....		20.00	24.00	22.00
2x4 in. to 8 in., 18 and 20 ft., No. 1.....		24.00	27.00	26.00
2x10 in. up to 16 ft., No. 1.....	12.00	24.00	28.00	24.00
2x12 in. up to 16 ft., No. 1.....		26.00	30.00	25.00
2x14 in. up to 16 ft., No. 1.....	12.50	28.00	*	26.00
Each 2 ft. over 20 ft., add per M.....		1.00	1.00	2.00
Select stock as above, add per M.....	6.00	5.00	*	*
Exterior Finish, Etc.—				
1x3 in. to 1x8 in., No. 1.....	30.00	M ft. BM D4S	M ft. BM D4S	M ft. BM D4S
1x6 in., No. 1.....	39.00	yp \$30.00	yp \$45.00	wp \$35.00
1x12 in., No. 1.....	35.00	35.00	43.00	40.00
1¼x3 in. to 1¼x12 in., No. 1.....		33.00	46.00	42.00
1½ in. and 2 in., same as above.....		43.00	48.00	45.00
1-in. drop siding, No. 1.....	25.00	40.00	48.00	42.00
½-in. lap siding, No. 1 cedar.....	25.00	22.00	30.00	30.00
		26.00	rdw 30.00	30.00
Enclosing and Fence Boards—				
1x4 in. to 1x 8 in., No. 1.....		M ft. BM S1S	M ft. BM S1S	M ft. BM S1S
1x8 in. to 1x12 in., No. 1.....	11.00	yp \$24.00	yp \$25.00	wp \$30.00
1x16 in., No. 1.....		27.00	24.00	h 24.00
1x16 in., No. 2.....	15.00	*	24.00	24.00
		*	22.00	22.00
Interior Finish, Flooring, Ceiling, Etc.—				
½x¾-in. T. & G. Flooring, No. 1.....	30.00	M ft. BM DS	M ft. BM D4S	M ft. BM D4S
½-in. T. & G. Flooring, No. 2.....	27.00	yp \$28.00	yp \$38.00	wp \$40.00
Ceiling, per M.....	25.00	*	34.00	wp 30.00
Partition, per M.....	30.00	1.00	2.00	1.00
¾x4-in. Ceiling, No. 1.....	17.00	2.00	2.00	2.00
		25.00	30.00	np 30.00
4¼-in. Moulded Casing.....	.02	100 ft. run	100 ft. run	100 ft. run
4¾-in. Moulded Casing.....	.02½	yp \$1.75	yp \$2.00	wp \$2.00
7¼-in. Moulded Base.....	.03	2.00	2.50	2.50
¾x9¼-in. Moulded Base.....		3.00	3.50	4.50
1½x4¼-in. Moulded Window Stool.....	.02½	4.00	4.00	6.00
		2.50	3.00	4.00
Miscellaneous List—				
Shingles, No. 1.....		Per M	Per M	Per M
Shingles, No. 2.....		rc \$3.75	\$4.00	bc rc \$3.75
Shingles, Fancy.....		3.75	3.75	*
Lath, 4 ft., No. 1.....		W.C.	4.50	6.00
Lath, 4 ft., No. 2.....		yp 3.60	yp 5.50	wp 5.00
Pickets, 1x3-in. x 4 ft. 6 in., dressed.....		2.75	5.00	s 3.75
Pickets, 1x3 in. x 4 ft. 6 in., rough.....		35.00	30.00	*
		*	*	*
6 in. x 8 ft. Post, split.....		Piece	Piece	Piece
8 in. x 8 ft. Post, split.....		Cdr \$0.13	Cdr \$0.25	*
8 in. x 8 ft. Post, whole.....		.17	.30	*
8 in. x 8 ft. Post, whole.....		.66	.40	Cdr \$0.30
6 in. x 8 ft. Post, whole.....		.25	.35	.25
Hardware List—				
Nails, wire, common.....		Cwt.	Cwt.	Cwt.
Nails, cut, common.....		\$2.25	\$3.00	\$2.85
Nails, wire, fine finishing.....		2.10	*	3.00
Sash Weights, cast iron.....		2.65	3.50	4.00
Tarred Felt Paper, best 2-ply.....		1.60	1.50	2.25
Tarred Felt Paper, 3-ply.....		Roll \$1.00	Roll \$1.00	Roll \$1.25
Red Rosin, Atlas brand.....		1.25	1.25	1.50
Red Rosin, durable brand.....		.90	.75	.50
Black Neponset.....		*	*	.60
		*	*	2.50
Masons' Supplies—				
Brick, blue, at kilns.....		Per M	Per M	Per M
Brick, blue, at kilns, No. 1.....		*	*	*
Brick, blue, at kilns, No. 2.....		\$7.50	*	*
Brick, white, delivered, face.....		7.00	*	*
Brick, red, delivered, backing.....		7.00	7.50	*
Brick, delivered, dry pressed.....		18.00	18.00	\$17.00
Brick, vitrified, dry pressed.....		*	24.00	*
Lime, best gray.....		bbl. \$1.30	bbl. \$1.25	bbl. *
Lime, best white.....		1.40	1.25	*
Cement, Portland.....		.95	1.85	bbl. 1.80
Plaster, calcined.....		2.40	1.80	bbl. 2.50
Hair, 8 lb. per bush.....		.25	.25	*

NOTE—While these figures are approximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—Ed.

New York Prices for Lumber

	SPRUCE	L. L. Y. P.	S. L. Y. P.
2x2—2 x2½—2x3 } 2x4—2½x4 —3x4 } 2x6—2x7—2x8 } 3x6—3x7—3x8 } 4x6—4x8 } 2x0—2x10—2x12 } 3x9—3x10—3x12 }	Average price\$29.00 19 feet and under.... 32.00 Over 19 feet..... 34.00 19 feet and over..... 34.00 Over 19 feet..... 37.00	\$30.00 Up to 28 feet..... 30.00 Up to 28 feet..... 30.00 Up to 28 feet..... 33.00 Up to 28 feet..... 38.00 Up to 28 feet..... 42.00 Up to 28 feet..... 50.00 Up to 28 feet.....	\$25.00 Up to 28 feet..... 28.00 Up to 28 feet..... 30.00 Up to 28 feet..... 34.00 Up to 28 feet..... 40.00 Up to 28 feet..... 30.00
2x9—2x10 } 3x9—3x10 } 4x9—4x10 } 2x12—4x12 } 3x12—6x12 } 8x12—10x12—12x12 }			
14-inch 16-inch			
"Squares" { 6x6—6x8—8x8 8x10—10x10	31.00 34.00		30.00
¾-in. and 1¼-in. white pine cornice, sound knotted.....			55.00
¾-in. and 1¼-in. cypress cornice, clear.....			60.00
¾-in. and 1¼-in. cyprus cornice, select.....			50.00
6-in. red cedar or redwood bevel siding, clear, 8 to 16 feet.....			30.00
6-in. white pine, clear, 12 to 16 feet.....			45.00
6-in. white pine, No. 2, 12 to 16 feet.....			40.00

ROOFING, T. & G., SHIP-LAP OR SQUARE EDGE.

¾x5½-in. face, N. C. pine, 10 to 16 feet.....	23.50
¾x7½-in. face, N. C. pine, 10 to 16 feet.....	25.00
¾x9½-in. face, N. C. pine, 10 to 16 feet.....	27.00
1¼x5½-in. face, N. C. pine, 10 to 16 feet.....	25.00
¾x5½ to 7½-in. spruce.....	28.00
¾x5½ to 7½-in. hemlock.....	27.00

FLOORING.

¾x2½ to 4½-in. N. C. pine, or yellow pine, flat grain, No. 1, 10 to 16 feet.....	35.00
¾x2½ to 4½-in. N. C. pine, or yellow pine, flat grain, No. 2, 10 to 16 feet.....	30.00
¾x2½ to 4½-in. N. C. pine, or yellow pine, flat grain, No. 3, 10 to 16 feet.....	24.00
¾x2½-in. N. C. pine, comb grain, No. 1, 10 to 16 feet.....	47.00
¾x2½-in. N. C. pine, comb grain, No. 2, 10 to 16 feet.....	38.00
¾x2½-in. yellow pine, comb grain, "A Heart," 10 to 16 feet.....	65.00
¾x2½-in. yellow pine, comb grain, "A Sap," 10 to 16 feet.....	47.00
¾-in. maple flooring, 2 feet and up, clear.....	58.00
¾-in. maple flooring, 2 feet and up, No. 1.....	48.00
¾-in. plain oak flooring, 2 feet and up, clear.....	70.00
¾-in. plain oak flooring, 2 feet and up, selects.....	60.00
¾-in. quartered oak flooring, 2 feet and up, clear.....	105.00

SHINGLES.

18-in. red cedar, "Eureka".....	5.75
18-in. red cedar, "Perfection".....	6.25
18-in. white cedar, XXXX.....	7.00
18-in. white cedar, clear butt.....	6.00
16-in. white cedar, extra.....	5.50
16-in. white cedar, clear butt.....	5.00
6x18-in. cypress, No. 1, Heart (on 6-in. basis).....	11.00
6x18-in. cypress, No. 1, Sap or "A" (on 6-in. bases).....	9.00
6x20-in. cypress, No. 1, Heart (on 6-in. basis).....	14.00
6x20-in. silver gray cedar, No. 1 (on 6-in. basis).....	18.00
6x20-in. silver gray cedar, "A" (on 6-in. basis).....	15.00
6x20-in. silver gray cedar, Star (on 6-in. basis).....	12.00

CEILING.

½-in. N. C. pine ceiling, clear, one side, 10 to 16 feet.....	27.00
½-in. N. C. pine ceiling, No. 2, one side, 10 to 16 feet.....	24.00
¾-in. N. C. pine ceiling, clear, one side, 10 to 16 feet.....	24.00
¾-in. N. C. pine ceiling, clear, one side, 10 to 16 feet.....	35.00
¾-in. N. C. pine ceiling, clear, two sides, 10 to 16 feet.....	37.50
1¼-in. N. P. pine ceiling, clear, one side, 10 to 16 feet.....	37.50
1¼-in. N. C. pine ceiling, clear, two sides, 10 to 16 feet.....	40.00

4¾-in. moulded casing.....	CYP. \$2.75	Y. P. \$2.25	W. P. \$3.30
4¾-in. moulded base.....	3.00	2.50	3.75

NOTE.—These prices are for less than car lots delivered on the job, within reasonable limits in New York, Brooklyn and the adjoining districts.

Trade Review

The various trade mentions which have appeared from time to time in these columns have been written by the editorial staff of the NATIONAL BUILDER for the benefit of our subscribers. We have found that our readers are interested in the descriptions of new materials, machinery, tools and other apparatus used in building construction.

The changes taking place from time to time in the building field should be brought to the attention of our readers, to keep them posted on the general business advance, that they may take advantage of the thought and effort which others have brought into their work.

To do this to the best advantage it has frequently been found advisable to mention the

products of various manufacturers, many of whom are advertisers in the NATIONAL BUILDER. This does not mean, however, that these articles are paid for in any way, for they are not. In fact, no advertiser or other concern of any character could buy space in these columns at any price.

Under the new postal law, passed August 24th, 1912, any reference to an advertiser or firm or to any particular material which could be interpreted as a paid advertisement might be interpreted as advertising matter and as such must be clearly designated.

In order, therefore, to conform with the letter of the law, this section is designated "Advertisers' Section," and each page is so marked.

STEEL POLISHED PERFECTION HARDWOOD FLOORING.

No part of the house is subject to more use and abuse than the floor. The doors are swung on their hinges frequently, but they are otherwise practically untouched. The window sash are raised or lowered once in awhile, but the wood itself is not necessarily touched by the hand. The rest of the trim about the house is left severely alone except as it is dusted with a soft cloth as occasion demands.

The floors, however, are subject to constant use and very seldom do they feel the touch of rubber or felt soles. They are far more accustomed to hard leather and nails.

It stands to reason, therefore, that the architect, contractor, carpenter and home owner should pay particular attention to the quality of the floor which they use in their various buildings. It should be such that it will stand the various kinds of wear as well as the abuse which comes with its ordinary use as well as the exceptional cases where heavy furniture is moved about on it or where wet shoes, rubbers, etc., tramp over it.

There are several kinds of wood used for flooring, each having its particular characteristic, and some of them possessing unusual qualities which render it desirable for flooring purposes.

For the finer finishes, as in the parlors, libraries, drawing rooms, etc., it is probable that oak will, for many years, retain its supremacy. When it is desired to harmonize with various other trims, beech, birch, cherry and walnut may be used either alone or in combination. For the hard wear in the kitchen, pantries and similar rooms, maple is usually given the preference as its close grain and hard, impervious nature makes it ideal for this purpose.

But, the nature of the wood is not the only necessary qualification. Two logs of the same kind of wood will vary considerably, depending upon the conditions under which it grew. The log from a tree growing in swampy ground would probably be of a coarser grain than the same kind of a tree, grown on the hills with only the normal

moisture. So the lumberman must use care in the selection of the logs from which flooring is made.

As a tree is a living thing, the wood contains a certain percentage of sap and moisture. This must be entirely driven out before it can be considered first class material. There are two ways to do this, one requiring a long time exposure to the air in a closed shed at normal temperatures; the other consisting of exposing it to the hot air of a dry kiln for a comparatively short time. A combination of the two of these is the ideal method of seasoning and drying the best grades of lumber for flooring.

When the properly seasoned lumber is brought to the mill for the final process of manufacture, it must still be put through a careful process to bring it to finished material of exactly the right width and thickness. This requires special machinery to insure that the product is first class in every particular.

The John Schroeder Lumber Company, foot of Pleasant street, Milwaukee, Wis., have specialized in the manufacture of hardwood flooring for many years. They are able to control the quality of their finished product because all of the lumber is cut from their own forests, and being entirely under their supervision from start to finish. Their mills are equipped with special machinery, while their method of seasoning is exceptionally complete. This insures that the flooring will be perfect in every respect when it reaches the contractor, and if properly laid and finished, will give a permanent floor of lasting beauty.

The handsome catalogue and price list which the John Schroeder Lumber Company is sending out describes in detail the method of manufacturing, drying, shipping, etc., of the various floorings made by this company. It shows photographic reproductions of the logging camps, logging trains, docks, etc., where Schroeder Hardwood Flooring is handled, and gives a great deal of valuable general information on the flooring subject. The catalogue indicates why Steel Polished

Advertisers' Section.

Perfection Hardwood Flooring, made only by the John Schroeder Lumber Co., is superior to other grades now on the market.

There are also shown a number of floor designs indicating the effects which can be obtained by using different woods arranged in patterns. This catalogue will be of great interest to our readers.

SKYLIGHTS.

How many of our readers have their shop in the top story of a warehouse where the light from the windows is insufficient to work by? Those who put up with this condition have only themselves to blame as it is possible by the proper use of skylights to flood the room with daylight. The effect of plenty of light will show in the amount of work which the men will turn out as they will feel confident that they will not be injured while working around machinery in a poorly lighted room.

F. M. Bowers & Son, 926 W. Washington St., Indianapolis, Ind., manufacture a complete line of single and double pitch skylights with and without ventilators. Their circular gives prices, and lists the standard sizes which can be quickly shipped.

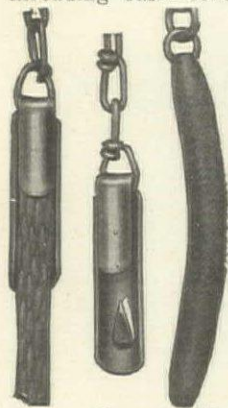
F. M. Bowers & Son is a comparatively new concern, although the individual members of it have been in the sheet metal business for many years. Besides the skylights mentioned, they are prepared to make finials, ventilators, cornices and special sheet metal work. Their catalogue will be of interest to those working in this line.

THE HAN-COT SASH MOUSE.

Every carpenter knows the difficulty of threading sash cord through the pulley and down to the counterweight. The device shown herewith, made by Hanley & Cotterman, 164 N. Wabash Ave., Chicago, Illinois, is designed to do this work for the carpenter. As will be seen, the device consists of a lead weight, which can be bent to go over the smallest pulley, this weight is fastened to a light chain, at the other end of which is a clasp to which the sash cord can be instantly fastened and as quickly removed.

The use of this device obviates the necessity for tying the chalk line to a nail and working it over the pulley, tying the other end to the sash cord and finally getting the cord down to the weight.

The Han-Cot Sash Mouse can be found in practically all hardware stores and should be in the tool box or pocket of every up-to-date carpenter. Those who are unable to find this device in their local store can obtain it from the manufacturers direct.



BISHOPRIC STUCCO OR PLASTER BOARD.

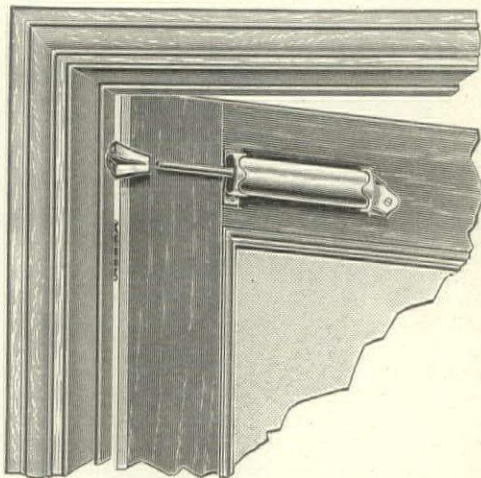
The popularity of stucco houses has led to the introduction of a great many systems of construction for this part of the work. We find the stucco applied to brick, stone, concrete and tile walls, plastered on wood or metal lath, with and without sheathing and paper underneath. One of the latest methods is by means of Bishopric Stucco or Plaster Board. This consists of a layer of fibre board, a layer of asphalt mastic in which are embedded keyed laths into which the stucco dovetails and is firmly held against cracking or falling off.

This board can be easily nailed in place by the ordinary carpenter and the large sheets in which it is made permits of great rapidity in the work, one man being able to keep ahead of a dozen plasterers.

The Mastic Wall Board & Roofing Co., 453 Este Ave., Cincinnati, Ohio, are the manufacturers of Bishopric Stucco or Plaster Board, and will furnish samples and other data regarding it to contractors, builders, carpenters, etc., who are looking for information along this line. They ask that six cents in stamps to cover postage be sent with the request for samples and other information, which includes a complete plan for building a model house.

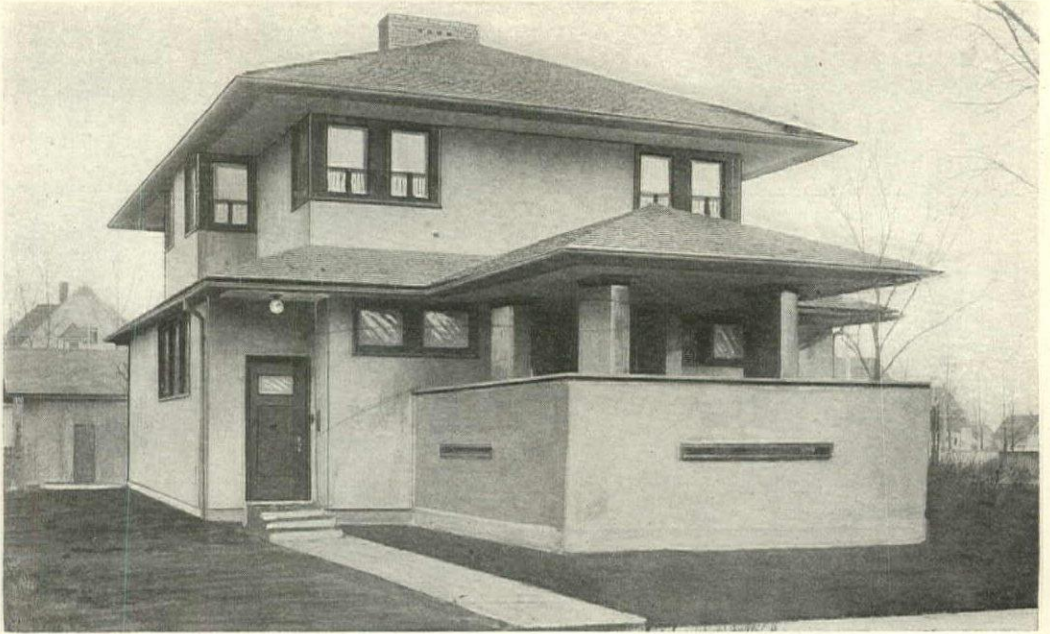
HARDWARE SPECIALTIES.

The catalogue of the Caldwell Manufacturing Co., 2 Jones street, Rochester, N. Y., describes a number of interesting specialties which the enterprising contractor should know about. Besides their well known window balances, which do away with the need of weights, etc., the catalogue shows a num-



Caldwell Screen Door Check

ber of styles of sash locks, casement fasteners, basement window catches, door holders and stops, window ventilators, screen door checks, etc. The contractor should be posted on these goods, as it will allow him to answer questions about little odd jobs which at present get past him. The catalogue will be sent to our readers on request.



A STUCCO HOUSE FROM "A BOOK OF PLANS."

A BOOK OF PLANS.

The contractor who is not a skilled draftsman is frequently asked by his prospective customers to either get up plans or make suggestions embodying certain conditions, arrangement of rooms, unique exteriors, etc. With nothing to guide him, the contractor would have to spend a good many hours in thought and study to get up something to meet the requirements.

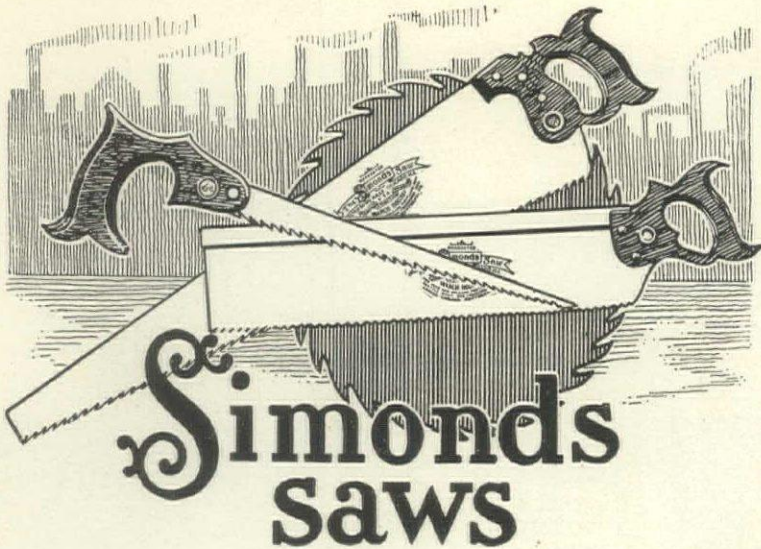
To a large extent this effort on his part is entirely unnecessary. The Harris Brothers Company, 35th and Iron Sts., Chicago, Ill., have anticipated this condition and have prepared the plans for a great variety of houses, bungalows, cottages, barns, warehouses, etc. These plans show a great variety in the arrangement of the rooms, as well as in the exterior, and show plans from the cheapest two room portable house to elaborate residences and apartment houses. These designs have been incorporated into a beautiful book in which each particular design is shown, as well as a photograph of the completed building. We show on this page the exterior of one of these beautiful designs in which a stucco finish has been used for the exterior. This style of construction has many points in its favor and has been used with great satisfaction in practically all sections of this country. As will be seen, the house presents unusual features which will at once attract the attention of the discriminating visitor, and when erected by a contractor, will find a ready sale, both on ac-

count of its pleasing appearance and on the excellent arrangement of the rooms. It will be noted that while a large porch is provided, this is entered only from the living room, the main entrance to the house being entirely separate. This feature makes the porch practically another room and gives it an added privacy not generally found in this part of the house.

On the first floor of this house there is found a large living room with windows opening both to the front and to the side. There is also a neat brick mantel. Opening from the living room is the dining room, while the kitchen, pantry and stairway take up the remainder of the floor. A feature of the stairs consists in a combination stairway, reached from both the kitchen and the front hall. This provides all the privacy of a rear stairway, without its additional expense and also saves the room. On the second floor are three well arranged bed rooms, a bath room, and closets for each bed room.

The Harris Brothers Company have listed the material required to erect this building, and by their method of assembling and shipping are able to make a very low price on it. They provide in their estimate for certain alternative arrangements to suit the individual owner.

A book of plans will be sent free to such of our readers as are interested in them by Department BR-63.



have done their part in making many buildings: Cross-Cut Saws in the forests; Simonds Circular and Band Saws in the mills; Simonds Hand, Rip, Panel and Compass Saws used by the carpenters.

No matter what kind of a Saw you use, we believe it is to your advantage to use a Manufacturer's Brand Saw — one that is backed by years of experience as is the Simonds — and is absolutely guaranteed against any defects whatever.

Simonds Saws are made of Simonds Steel. Ask your Hardware Dealer to send you a Simonds Saw, or write any of our offices for full particulars.

Do you need a Hand Saw or a Circular Saw now?

Simonds Manufacturing Company

Fitchburg, Mass.
New York City
Portland, Ore.
Vancouver, B. C.

Chicago, Ill.
New Orleans, La.
San Francisco, Cal.
Lockport, N. Y.

Montreal, Que.
Seattle, Wash.
London, Eng.
St. John, N. B.

PASTE THIS DOME
WRITE TO ADVER-

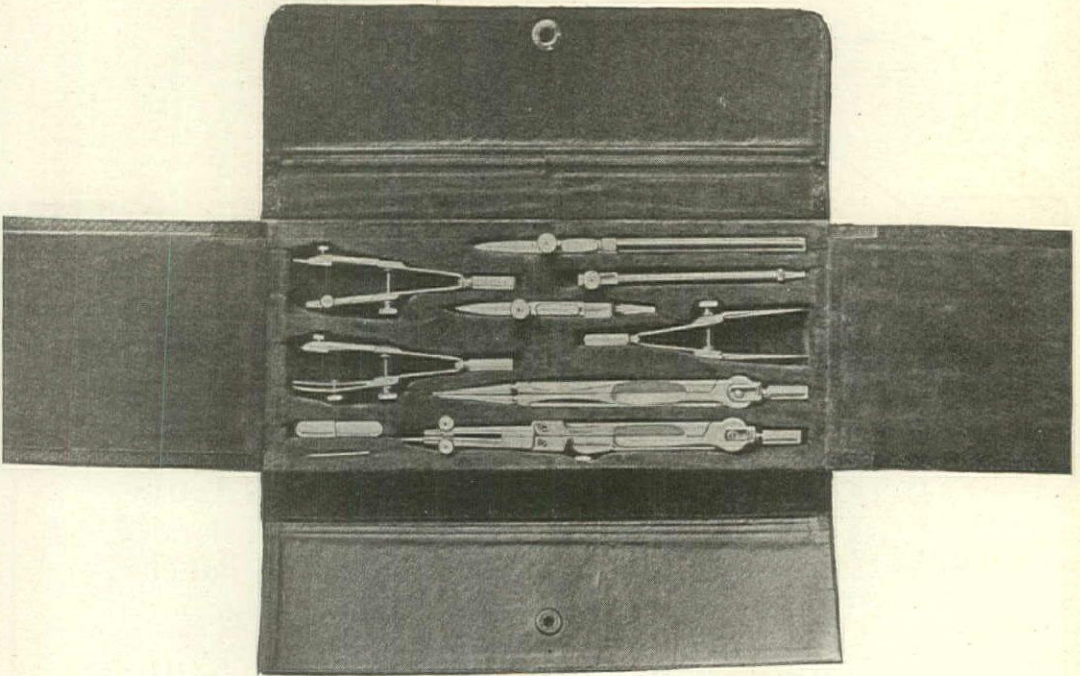


ON LETTERS YOU
TISERS. IT HELPS.

THE KEYSTONE SYSTEM

The course of study of the Keystone Architectural Institute, 204 Mansion building, Rochester, N. Y., embraces practically everything which a carpenter or contractor would need to prepare the plans for practically any building in which he might be concerned. The

Every contractor, carpenter and builder appreciates the fact that the one who can make even a simple drawing accurately and neatly will be given the preference over one who can only describe vaguely what he proposes to do. This, unquestionably, leads to many fine con-



Drawing Instruments Furnished with Keystone Scholarship

elements of drawing are carefully taken up and the student is instructed in the methods of preparing floor plans, elevations, details, specifications, estimates, etc., for frame, as well as brick, houses, and for the engineering subjects, such as heating, lighting, plumbing, etc.

That the student may be prepared to do his work neatly, the Keystone Architectural Institute furnish each student with a set of drawing instruments free.

tracts, which would otherwise go to contractors who were better prepared in this respect. It is, therefore, up to every carpenter who wishes to advance to pay particular attention to drawings, as well as to the more advanced work in specifications, writing and estimating.

The Keystone Architectural Institute will give our readers such other and further information as they may desire regarding their course and methods of instruction.

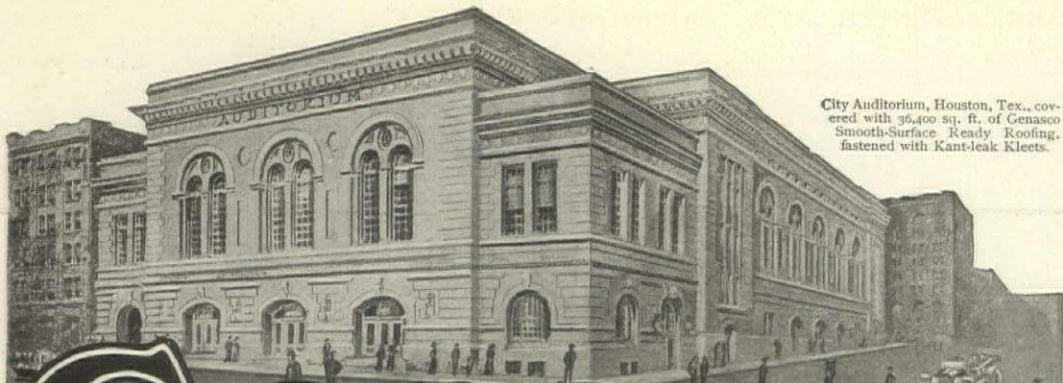
BUILDING MATERIAL CATALOGUE.

The homebuilder will find in the new catalogue of the Chicago Millwork Supply Co. the easiest and quickest way to save money on his new house. This immense catalogue describes practically everything used in the construction, repair or alteration of buildings. There are listed a great variety of windows, doors, millwork, grilles, colonnades, mantels, fireplaces and grates, as well as the various materials, such as lumber, shingles, lath, roofing, parquetry floors, art glass, lighting and plumbing fixtures, screens, sideboards, mirrors, metal ceilings, hardware, paint, etc.

The Chicago Millwork Supply Co. is most favorably located for prompt shipment of ma-

terials and other goods, and are prepared to take care of any order from a single piece of molding to the complete materials for the most elaborate residence. They show in their catalogue a great variety of the various lines mentioned, so that the individual tastes of the contractor's customers can be closely followed. The quantities in which they buy and the large stock which they carry insure the contractor or homeowner that the very best materials will be furnished.

The Chicago Millwork Supply Co., 1423 W. 37th St., Chicago, Ill., will be glad to send the above mentioned catalogue, No. 308, to our readers who wish to save money



City Auditorium, Houston, Tex., covered with 35,400 sq. ft. of Genasco Smooth-Surface Ready Roofing, fastened with Kant-leak Kleets.

Genasco

THE TRINIDAD-LAKE-ASPHALT Ready Roofing

If you want to be sure of an evertight roof be sure its waterproofing is Trinidad Lake asphalt.

Trinidad Lake asphalt is "Nature's everlasting waterproofer"—noted for its uniform and lasting quality. And only with roofing that is lastingly waterproof can you expect to get lasting protection.

Genasco Roofing is Trinidad Lake asphalt in the right form to give resisting and enduring power to roofs. Our experience (beginning as pioneers over thirty years ago) in the use of asphalt goes in Genasco. And this combination makes roofing that withstands the rain, sun, wind, hail, snow, heat, cold, and fire.

Go deeper than the looks when you buy your roofing. Get Genasco and you get roofing with real, permanent waterproofing.

Ask your dealer for Genasco—the roofing with the hemisphere trademark. Guaranteed. Mineral or smooth surface—several weights. The **Kant-leak Kleet** is in every roll of Genasco smooth surface roofing. Beats cement and large-headed nails for waterproofing the seams. Write us for the Good Roof Guide Book and samples, free.

The Barber Asphalt Paving Company Philadelphia
Largest producers in the world of asphalt and ready roofing
New York San Francisco Chicago

Trinidad Asphalt Lake



Trinidad Lake Asphalt

Asphalt-saturated wool felt

Trinidad Lake Asphalt

PASTE THIS DOME
WRITE TO ADVER-



ON LETTERS YOU
TISERS. IT HELPS.

THE CARPENTER LAYING OAK FLOORING.

Generally, at this time of the year, outside carpentry work is nearing completion and the average carpenter usually turns his thoughts to indoor work for the winter season.

Oak Flooring, $\frac{3}{8}$ inch thickness, for covering old pine floors, offers profitable and agreeable work for any carpenter. All that is necessary is to go to a lumber dealer who carries $\frac{3}{8}$ inch Oak Flooring, get a few pieces for samples, and the booklet that is published by the Oak Flooring Bureau, 897 Hammond Bldg., Detroit, Michigan. This booklet tells all that is worth knowing about measuring room space, laying, nailing, scraping and finishing. A little study on this Oak Flooring Booklet will soon put one in a position, with the aid of prices from the dealer, to go out and solicit jobs.

The average carpenter can lay Oak Flooring successfully from the very start. It needs some care, just like any kind of work of its class. A full knowledge of all the Oak Flooring Grades, the different thicknesses and widths both in the plain and quartered Oak Flooring is very necessary. Any dealer who carries Oak Flooring stock will give any carpenter or contractor co-operation along this line. The laying of thin Oak Flooring over old pine floors has proven very lucrative to many of the regular floor layers during the winter season.

Many dealers usually offer special prices, or some satisfactory arrangement, with carpenters or contractors, who have a desire to do this work during the slack season.

Oak Flooring, due to its excellent color and figure, is recognized as the king of all flooring. It will harmonize with any kind of interior trim or any kind of decoration. Real estate dealers when advertising homes for rent or for sale always emphasize Oak Flooring, if it is used. They know that it will bring a better class of tenants besides assuring better rents. The owner recognizes the value of Oak Flooring as it will increase any building anywhere from 10 to 20 per cent when selling.

As a rule carpenters do not make a practice of finishing Oak floors. Their work usually ceases after the scraping process, but there is no reason why they cannot finish up the floor and make a complete job themselves. Any paint and varnish house will send books free for the asking on the subject of finish. There are a number of different kinds of finish but a wax finish seems to be preferred. This is a finish which, should it wear out in spots, can be very easily renewed by the house-keeper. However, the finishing is a matter of taste. Some prefer the varnish finish while others would rather have the wax.

In nearly every city there are now a number of flooring specialists who make a specialty of doing nothing but laying and finishing Oak Floors both in parquetry and plain strips. These experts were all at one time carpenters but saw the opportunity of bettering themselves by making a specialty of laying Oak

Flooring. Any carpenter, with a fair amount of intelligence, by getting a knowledge of the different grades and prices at any lumber yard, can go out and secure jobs.

The best season of the year for laying $\frac{3}{8}$ inch Oak Flooring over old soft pine floors in old homes is during the winter time. The logic of this is that the old floors are dry and usually in the best condition to receive an upper floor. All $\frac{3}{8}$ inch Oak Flooring is tongued, grooved and end matched and when laid it has all the appearance of 13-16 inch stock and an expert could not tell the difference.

One of the most laborious items is the scraping of the floor, but with the advent of floor surfacing machines this irksome task is done away with. It is a common practice for several or more carpenters to co-operate and buy a floor surfacing machine. In this way the machine will very soon pay for itself and the arrangement is usually satisfactory.

In laying $\frac{3}{8}$ inch Oak Flooring over old soft pine floors it is very necessary to hammer down all nails and plane off the high spots, otherwise it would make a very poor foundation for a thin flooring.

Nature has given a peculiar favor to this very excellent and most substantial of all American hardwoods. Its very name stands for durability and when made into flooring its natural beauty stands unexcelled. Quality, Distinctiveness and Durability are prime requisites. Oak Flooring combines all three in the highest degree and places it in a class by itself.

WINTHROP TAPERED ASPHALT SHINGLES.

The necessity for a tight and permanent roof for all kinds of buildings has led to a great many preparations and materials for the purpose. Among those which have found especial favor in the eyes of architects, manufacturers and owners is the Winthrop Tapered Asphalt Shingles, made by the Winthrop Asphalt Shingle Co., 10 Sixty-first street, Argo, Illinois. This shingle is made tapering with the thick edge at the butt, where the hardest wear comes, thus giving to the shingle an extraordinarily long life as well as decreasing the dead weight of the roof. They are laid with ordinary shingle nails, their regular size permitting them to be laid with great rapidity.

The booklet which the Winthrop Asphalt Shingle Company is sending out describes in detail the manufacture of this shingle and its many good qualities. It tells how to test these shingles as well as other reasons why it will outlast the rest of the house. Numerous photographs of completed buildings on which these shingles were used indicate the fine appearance which can be obtained with their use.

Those of our readers who wish to see for themselves just what the Winthrop Asphalt Shingle is can obtain a free sample from the manufacturers.



QUIET DOORS

are a necessity in the homes of business, and the Corbin door check is recognized as the best means for eliminating noise. There are a number of buildings in which more than 2000 are used, all working quietly and efficiently and giving satisfaction.



Send for the "DOOR CHECK BOOK," a guide to quiet doors.

P. & F. CORBIN

The American Hardware Corporation Successor
NEW BRITAIN, CONNECTICUT

Chicago

New York

Philadelphia

PASTE THIS DOME
WRITE TO ADVER-



ON LETTERS YOU
TISERS. IT HELPS.

CONCRETE CULVERTS.

The Northwestern Expanded Metal Company, 905 Old Colony Building, Chicago, Ill., have found that their "Econo" Expanded Metal has been particularly popular for builders of culverts, bridges, etc. They have, therefore, prepared a neat booklet showing some of the various styles of culverts which have been erected with this metal as a reinforcement. The book shows designs which have met with approval in various sections of the country, many of them being installed to take the place of wooden culverts, bridges, etc., which had passed the age of usefulness, and which were unable to stand the strain of increasing and heavier traffic.

This booklet will give one some excellent ideas on the culvert question and will be sent free on request.

QUALITY DOOR CHECKS.

The Worcester Mfg. Co., Worcester, Mass., are placing on the market a new style of door check, which possesses advantages over the styles now in use. While the door check retains the fundamental principles of the original Blount door check, the Worcester Blount Improved Door Check is an improvement on the original. The Worcester Manufacturing Co. have a more detailed description of this door check, showing its advantages and describing its manufacture and use. A circular will be sent to our readers on request.

HYDRO-BAR WATERPROOFING PRODUCTS.

The necessity for keeping buildings dry as well as warm led first to a tight roof covering. As we go below the ground, however, we are confronted with another problem, that of keeping the ground moisture from working through to the inside of the wall. This problem is entirely different from that of preventing condensation on the inside walls, and requires entirely different treatment. Condensation can only occur when the walls are colder than the dew point of the air near the wall, while the ground moisture is entirely independent of this and will soak through unless means are taken to prevent it.

The Hydro-Bar Waterproofing Company, 515 W. 19th street, New York, manufactures a number of preparations for waterproofing exterior walls, floors, roofs, etc. These preparations are described in a neat booklet which the manufacturers are sending to our readers on request, and which will give the contractor and builder many excellent ideas on the subject.

HOW TO SELECT DRAWING INSTRUMENTS.

A booklet issued by the Keuffel & Esser Co., 111 E. Madison street, Chicago, Ill., describes in detail the construction and manufacture of their Paragon Drawing Instruments. It will give the carpenter and contractor an idea of what the successful draftsman looks to in these instruments, and will

enable him to make a good selection for his work.

Keuffel & Esser Co. have a very large factory of their own, in which they make practically all of the goods shown in their catalogue, which include every conceivable instrument for the use of the architect, engineers and draftsman.

One of the interesting instruments which they make is an architects and builders level, which is readily convertible into a transit, suitable for laying out any ordinary building. The contractor who does not have the services of an expert engineer or surveyor at his command can, with this instrument, lay out all of his buildings and check up his grades, levels, lines, etc., as the work progresses.

DIAMOND HARD MAPLE FLOORING.

Northern Michigan is the natural home of the hard maple, from which the best grade of flooring is made. The location of the J. W. Wells Lumber Company at Menominee, Michigan, on several railroads as well as on the water, enables them to receive all of their supplies and make their shipments at the lowest rates and in the quickest time.

This company makes a specialty of "Diamond Hard" Maple Flooring, which is thoroughly kiln dried, side and end matched, hollow backed, bundled, bored for blind nailing and face polished. It is carefully graded in accordance with the Maple Flooring Manufacturers Association, which insures that the purchaser will get exactly the grade which he pays for.

The J. W. Wells Lumber Co. are prepared to quote delivered prices on this flooring, as well as on beech, birch, and oak. The beautiful catalogue which they are sending out to our readers on request contains much valuable information and shows the contractor and carpenter how he can produce an exceptionally fine floor at the lowest possible price.

UNITED STEEL SASH.

The Trussed Concrete Steel Co., 384 Trussed Concrete Bldg., Detroit, Mich., has recently issued a complete handbook on steel sash. This is probably the most complete publication of its kind which has ever been issued and contains complete technical information regarding this kind of sash as well as numerous illustrations showing the work in place, and showing the methods of installation. Practically every condition for lighting and ventilating every sort of a building is fully shown and described. In one section is shown the Standard Pivoted United Steel Sash, and in another is shown a continuous sash, both center pivoted and top hung. For vertical sliding sash, there is shown counterbalanced, spring counterbalanced, lead counterweighted and cast iron counterweighted. There are also sections showing horizontal sliding sash, special casements, standard casements, and special pivoted sash. Steel partitions and steel doors are also illustrated.

About fifty full-sized sections, which are used in building up this sash as well as eight

Roofing Bargains —Great Fall Sale!

Huge Stock—'Way Below Market Prices

We are among the largest buyers and sellers of Roofing in the World. Our tremendous purchases have put us in a position to offer Contractors and Carpenters the best grades of guaranteed Roofing at a big reduction from market prices.

We list here some of our famous brands, offered during this great Fall Sale at bargain prices which no builder who uses Roofing can afford to overlook.

Orders will be filled direct from this advertisement under our usual guarantee of Quality, Safe Delivery, Goods as Represented and Absolute Satisfaction or every penny refunded.



"Quality" Rubber Guaranteed Roofing

\$1.25 Per Roll. The remarkable wearing qualities of this splendid Roofing are universally conceded. It is elastic, pliable and tough.

Guaranteed not to contain an ounce of tar. Made of heavy, strong, long-fibre felt, thoroughly saturated with asphalt.

1-Ply Weight 35 lbs. Price per roll of 108 sq. feet	2-Ply Weight 45 lbs. Price per roll of 108 sq. feet	3-Ply Weight 55 lbs. Price per roll of 108 sq. feet
\$1.25	\$1.50	\$1.80



"Jap-a-Top" Slate Surfaced Roofing

\$2.25 Per Square. Furnished in two colors—Red or Grayish Green. This extra fine Roofing combines beauty, durability and economy.

Makes artistic roofs for fine residences, bungalows, garages, etc.

The weather side is surfaced with *Chip Slate*. Gives a rich pebbled effect. *Strong, rich colors—*

NEEDS NO PAINTING. Will outwear wood shingles.

Price per square of 108 square feet, \$2.25. Rolls weigh 80 lbs.

Composition Roofing (Not Guaranteed)

80c Per roll. If you want something "dirt cheap," for use on temporary buildings—*here it is!* Local dealers ask \$1.50 to \$2.00 per roll for the same roofing.

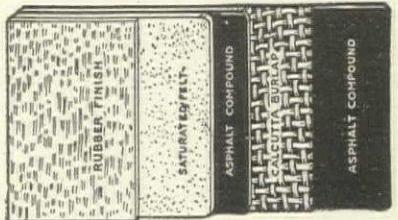
Roofing Nails and Cement for Seams FREE in Every Roll of Our Roofing

"JAP-A-TOP" Slate Surfaced Shingles

Furnished in *Red* or *Grayish Green*. Never need painting. "Jap-a-Top" Shingles are made 8x12 $\frac{3}{4}$ inches, packed in crates. Each crate contains shingles to cover 100 sq. feet.

Weight, 220 pounds.
Use ordinary roofing nails.
Price per square, 424 shingles (crated), choice of Red or Grayish Green **\$4.50**

Burlap Reinforced Rubber Roofing



Combines the strength of felt roofing with a reinforced piece of heavy burlap. Saturated with mineral rubber compound. Will last from 15 to 20 years. Price per sq. of 108 sq. feet, **\$2.85**

We are making a big cut on high-grade, guaranteed Storm Sash and Doors. *Worth looking into.*

Order Direct From This Adv. or Write for Big Free Catalog

If you are in the market for Roofing, *better get your order in at once*, while we are prepared to ship from stock. And don't forget that our proposition on Storm Goods means money in your pocket.

GORDON-VAN TINE CO., 670 Federal St., Davenport, Iowa

(260)

PASTE THIS DOME ON LETTERS YOU WRITE TO ADVERTISERS. IT HELPS.



styles of mullions are shown. Standard hardware, tables of sizes, numerous details of installation, etc., are given.

This handbook has been prepared with great care and will prove a valuable addition to the library of anyone interested in steel sash construction. It will be sent free to practicing architects, engineers and builders, who will find it an authoritative treatise aside from its advertising value.

MODERN GRILLES.

A recent catalogue issued by the Chicago Grille Works, 828-38 Wells St., Chicago, Ill., shows a number of new and attractive designs in grilles, parlor columns, colonnade openings, consoles, sideboards, etc. These designs represent the selection of over twenty years in this line of work and indicate to a degree the success which the Chicago Grille Works have met with during this time.

The grilles, etc., shown in the catalogue are to a certain extent carried in stock so that the purchaser can be assured that there will be no delay in shipment. As a rule the customer has a choice of a variety of woods, including plain Oak, unselected Birch, Yellow Pine and Cypress. Other woods, of course, can be furnished if desired. The Chicago Grille Works are quoting unusually low prices to our readers, and these prices can be obtained when asking for the complete catalogue.

SANITARY AUTOMATIC DUMB-WAITERS.

The local carpenter has no difficulty in installing the sanitary automatic dumb waiter made by the York Automatic Dumb-Waiter Works, 369 W. Market St., York, Pa., as this device is made so complete that there is nothing which can become misplaced or put in the wrong place. This dumb-waiter consists of practically a refrigerator space, which can be instantly moved from the kitchen or pantry to the basement or cellar, and vice versa. By this means there is a great saving in the ice bill, as well as the corresponding saving in the food.

The Sanitary Automatic Dumb-Waiter is made in several styles and sizes, which are described and priced in the circulars which the York Automatic Dumb-Waiter Works are sending on request.

REX-TILE SHINGLES.

Among the improvements in roofing materials which have recently been placed on the market, the Rex-Tile Shingle made by the Flintkote Manufacturing Co., Boston, Mass., possesses unusual features.

The shingle instead of being merely a piece of prepared roofing with an added mineral surface to give it appearance and durability is made by a process which makes the entire shingle of one homogeneous composition. The color and appearance, therefore, of Rex-Tile Shingles will always remain the same and never require painting, staining or surfacing.

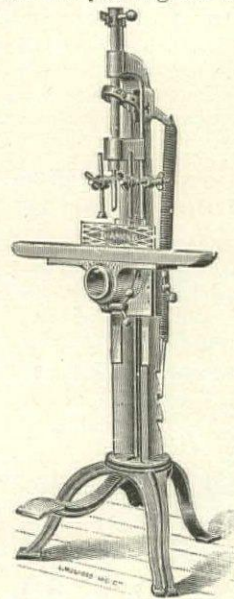
Another excellent feature of Rex-Tile Shingles consists of it being so made that the shingle

is nailed at the butt and the nails being entirely covered. This prevents any possibility of the shingle lifting up during a severe wind and at the same time presents a much neater finish.

The circular which the Flintkote Manufacturing Company sends to our readers describes in detail the numerous other good features of Rex-Tile Shingles. This circular, as well as samples, prices, etc., will be sent to our readers on request.

THE DIAMOND MORTISER.

The contractor is often called upon to make on the job a great variety of cuts, joints, etc.,



which call for something more than a hammer and chisel. For instance, he has a lot of special sash to make up and it would take time to get them all out by hand. The Diamond Mortiser made by the Seneca Falls Manufacturing Co., 629 Water St., Seneca Falls, N. Y., is designed to take care of this kind of work. As will be seen by the cut, this mortiser is operated by foot power and is readily adjustable to do a large variety of work, not only for mortising, but for dovetailing, tenoning, and for making sash, screen doors, frames, and similar work.

The Diamond Mortiser is made entirely of metal, except for the hardwood table. This renders it unusually strong, rigid, and free from risk of breakage. The table can be set at any angle for special work, thus greatly increasing the scope of its usefulness.

A more detailed description of the Diamond Mortiser is given in the catalogue No. 21-A of the Seneca Falls Mfg. Co., which also describes in great detail their various foot, hand and light power woodworking machinery.

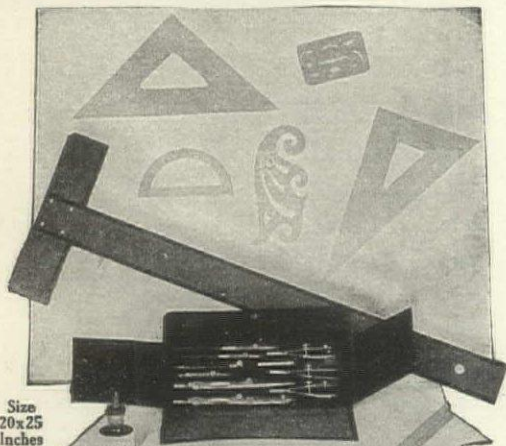
AUGER BITS.

The many styles of Auger Bits made by the Russell Jennings Mfg. Co., Chester, Conn., are fully described in their catalogue No. 30. This catalogue lists a great variety of styles and sizes of bits for every purpose and it is interesting to see the numerous styles and sizes which are used in the various trades. Russell Jennings' goods are to be found in practically every first class hardware store and the dealer, if not carrying a complete stock, is always ready to order any special bit for which the carpenter or contractor may have use. This includes the various styles for use in boring machines and for special work such as used by ship carpenters, boat builders, electricians, millwrights, machinists, etc.

DRAFTSMEN GET BIG PAY

Learn at home by our new, easy method

The American School is making a **Special Offer** to those who never had a chance to get a technical education. This is a wonderful opportunity for you to get the training you need—in your spare time and in your own home. Learn drafting. It will bring you big returns—you can earn from \$75 to \$200 per month. Your success depends only upon your ability and the kind of instruction you have had. There is a constant demand for draftsmen. It is one of the few professions where the demand exceeds the supply. Send for our big **Special Offer** today. Fill in and mail the coupon now. We will send you our general bulletin and complete information about your course. Remember, this is the greatest offer ever made—by the largest correspondence educational institution in the world—with a capital of over half a million to back it up.



Size 20x25 inches

FREE This \$20 Draftsman's Outfit

exactly as illustrated, consisting of imported german silver drawing instruments in morocco case, drawing board, ebony lined mahogany T-square, two transparent triangles, german silver protractor, French curve, triangular boxwood scale, waterproof ink, pencil, ink and pencil erasers, erasing shield, pencil pointer, handmade drawing paper and thumbtacks. The instruments are manufactured by one of the largest makers of mathematical instruments in the world, and are guaranteed absolutely accurate.

FREE

This complete Cyclopedia of Drawing, value \$20, included absolutely free if you enroll at once. This great work, consisting of four big volumes as illustrated below, covers completely the entire work of the architectural and mechanical draftsman. Its value as an adjunct to the course we now offer cannot be estimated. Not only will you receive personal instruction from our expert draftsmen, but you will have these books at your elbow to settle immediately any question that may arise. The four volumes are bound in half red morocco, gold stamped, and contain 1,720 pages, 7x10 inches; 1,037 illustrations, full page plates, diagrams, designs, etc.

Remember, these books do not cost you one penny—they are included without charge with the course.

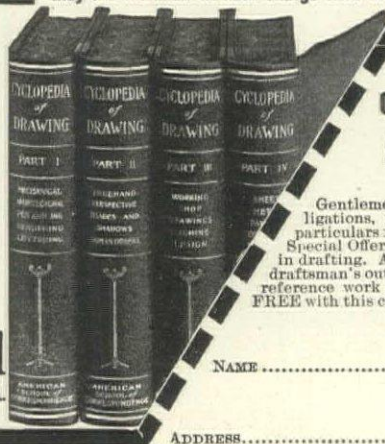
SALARY GUARANTEE

THE AMERICAN SCHOOL OF CORRESPONDENCE GUARANTEES that you will receive an increase of fifty per cent over your present salary within three years from the date of your enrollment; or, failing in this, the School guarantees to refund to you the full amount paid for your course. Back of this guarantee stands the School—for more than fifteen years the foremost educational institution of its kind in the world. This school has succeeded because it has been true to its principles of giving its students the instruction for which they enrolled.

MAIL THE COUPON — NOW

Don't fail to take advantage of this great offer—an offer that has never before been equalled. Keep in mind that the \$20 draftsman's outfit and an up-to-date four volume reference work of the same value are sent absolutely without charge when you enroll in this course. Don't pass up this opportunity. At any rate, mail the coupon and get complete information regarding this great offer. It will cost you nothing to investigate—it may be the turning point of your fortunes. Send the coupon now!

American School
of Correspondence. Chicago, U.S.A.



SPECIAL OFFER COUPON

AMERICAN SCHOOL OF CORRESPONDENCE
Chicago, U. S. A.

Gentlemen.—Without any obligations, please send me full particulars regarding your great Special Offer on a complete course in drafting. Also tell me about the draftsman's outfit and four volume reference work which are included FREE with this course. N.B.11-13

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ADDRESS

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ON LETTERS YOU
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ARCHITECTURAL SHEET METAL WORK.

The recent catalogue of the Willis Mfg. Co. shows the contractor possibilities of sheet metal work in connection with his buildings. The catalogue shows a great variety of metal cornices, bay windows, store fronts, skylights, cresting and finials, gable ornaments, conductor pipe, roof and hanging gutters, metal roofing and ceilings, metal shingles and tile, etc. The metal windows designed by the Willis Manufacturing Co., Galesburg, Ill., are constructed so as to be installed with the least possible labor and expense. A carpenter can set them as readily as any wood frame and they offer no difficulties to the mason. Equipped with wire glass, these windows offer an absolute protection against fire, not only to the contents when the fire is on the outside but to adjoining buildings when the fire originates from within.

Catalogue No. 6 will be found to be of interest to our readers who have work of this character to do.

THE WHITE IMPROVED CONVERTIBLE ARCHITECTS' LEVEL.

The contractor engaged in miscellaneous work has frequent use for a convertible level, such as that made by the David White Company, 419 E. Water street, Milwaukee, Wis., and more particularly described in their circular X. This instrument can be used either as a level or by means of a simple attachment, it can be used as a transit to locate points above or below the level line. This makes it especially valuable for such work as laying out the building, as the line of sight can be brought down to a point on the ground, or even in a deep excavation.

Extreme accuracy is required of the contractor today, and he must be prepared not only to know that his work is absolutely correct, but to prove to the owner or to the architect that it is so. The contractor equipped with a White Level, as above described, is in a position to assure the architect or his client that the work is being properly done. It will also assure him of a reputation for doing first-class work, and the owner and architect will have greater confidence in him.

The contractor who secures the catalogue of the David White Company will find that the instruments and other apparatus described therein is of the highest grade, and he will also find that the prices quoted are extremely reasonable.

PAY ME AS IT PAYS YOU.

"Pay me as it pays you," says John F. Weber, president of the Weber Mfg. Co., makers of the well-known Weber Double Acting Floor Scraper, "my scraper will earn more than enough extra profits to take care of the small monthly payments I ask."

That is the pith of a proposition Mr. Weber is sending out to contractors and carpenters to meet the requests of a number who wish to buy a good scraper on payments. He says,

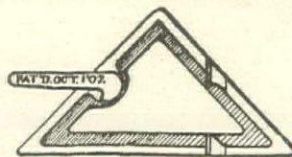
having the largest floor scraper factory in the country, and employing the best mechanics to be had on this class of work, he is able to sell, at a standard price, a machine that would ordinarily cost about a third more money. And that, on this account, he can, for a limited time only, accommodate contractors and carpenters by granting term payments that exceed but very little the amounts generally asked as rental on inferior machines—payments based on his cash price.

As to the economy of using his double-acting floor scraper, Mr. Weber says there is no comparison between its work and hand work—either in speed, ease, or quality. His records show conclusively that putting the daily saving over hand work at \$8.00 is conservative, indeed. In fact, the gain made on the floors of two buildings pays for his scraper.

Mr. Weber has some interesting literature for every one who will drop a card to John F. Weber, president Weber Mfg. Co., 661 71st Ave., West Allis, Wisconsin. He also wants one responsible carpenter or contractor to represent him as agent in each town. This looks like a good opportunity for a great many to fill in spare time during the coming cold weather.

THE RULE TOOL.

Every carpenter has felt the need at times of a simple device which he could carry in his pocket and by which he could mark a square cut for sawing, scribe to a line, or mark an accurate miter. The Rule Tool, made by the Rule Tool



Co., Herman and Vesey Sts., Newark, N. J., allows him to do this. As will be seen by the illustration, the Rule Tool consists of a triangle on which are two lugs and a cam for holding an ordinary two foot rule closely against the lugs. This simple device will be found useful in a great many places and will take the place of a detached tri-square or bevel, while its pocketability insures its always being on the job.

METAL CEILINGS.

There is a growing demand for metal ceilings, cornices, side walls, etc., and the up-to-date contractor is taking advantage of this demand to keep busy during the winter months. The advantages of metal ceilings over other forms of decoration are well shown in a catalogue issued by the Indianapolis Corrugating Company, Indianapolis, Indiana, which shows some of the many styles of ceiling and wall plates, cornices, beam covers and mouldings which are made and carried in stock by this company. The catalogue also contains excellent suggestions and directions for measuring, estimating, ordering and applying these materials. The catalogue is free to our readers and in their hands will undoubtedly be the means of adding several well paying jobs to their winter's work.



Dealers' Estimate \$419 - Ours \$269

For over a year we have been telling you how we can save you 40% to 60% on lumber and millwork. Here's an instance of how this saving works out in dollars and cents.

Last April, Mr. L. H. Willrodt, of Chamberlain, S. D., sent us a bill of materials for prices, getting figures also from his local dealer. Our bid of \$269 against Mr. Dealer's \$419 secured us the business. After the lumber arrived, Mr. Willrodt wrote us as follows:

"I am highly pleased with the quality of your lumber. I find it better than I have been able to get at our yards here, besides the great saving in cost."

A great many of our customers write and tell us of the big saving we make them. Among those who have written since the first of June are:

J. D. Johnson, Fallon, Mont., \$327 saved; Christ. Smith, Flaxton, N. Dak., \$103 saved; S. B. Dillenburg, Pierz, Minn., over \$200 saved; Fred. J. Brown, Grandview, Wash., \$260 saved; H. G. Stocking, Lakin, Kans., \$75 saved.

This gives you a good line on the saving we can make you.

From forest to mill—direct to you

Our officers own thousands of acres of the finest forest lands in the Pacific Coast states. All cutting, logging, manufacturing is done under one overhead expense. You pay one profit—save 40% to 60% and get lumber of the finest quality—clean, straight-grained and free from sap and large knots.

Send your bills for quick estimate

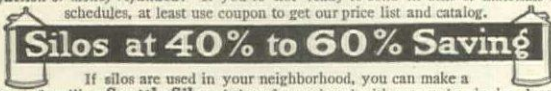
Distance is no draw-back to our saving you money. No one is so well equipped as we are to give quick,

accurate estimates. Every estimator on our large staff is an experienced lumberman.

Our orders go out within 24 to 48 hours of receiving. Seven railroads (keenly competitive) rush shipments. Average delivery two weeks. With the time gained by our prompt shipping service, we can supply you as fast as needed.

Better lumber at 40% to 60% saving will make you our steady customer if you order once

Why not give us a chance to figure on your next bill? You can't lose. You must win. We quote you delivered prices. We guarantee satisfaction or money refunded. If you're not ready to send in bills of materials or schedules, at least use coupon to get our price list and catalog.



If silos are used in your neighborhood, you can make a big profit selling **Seattle Silos** of clear fir, equipped with patented swinging doors.

Hewitt-Lea-Funck Co.

409 Crary Bldg., SEATTLE, WASH.

Hewitt-Lea-Funck Co.

409 Crary Building, SEATTLE, WASH.

Kindly send following, with price list:

- Catalog of lumber and millwork.
- Special Silo Folder.

Name _____

Address _____

Business _____

PASTE THIS DOME
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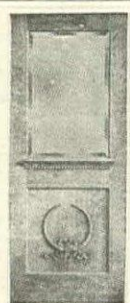
ON LETTERS YOU
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Floors That Last

We use choice *White Oak* quarter sawed. They are properly kiln dried. Our workmen are all thoroughly skilled. We have been building hardwood floors for twenty years and know how to do it. We are bound to serve you faithfully.

Ask for our Book of Designs

THE INTERIOR HARDWOOD CO.
Manufacturers Indianapolis, Indiana



DOORS-DOORS FANCY FRONT DOORS

Complete stock of Panel Doors in Fir, White Pine, Oak and Birch.

We Pay All the Freight
Write for catalogue—it is free

Stork Millwork Co.
20 W. Jackson St., CHICAGO, ILL.

We Manufacture Everything in Millwork in Large Quantities

You will like our high class materials and workmanship. We carry a large stock of kiln dried lumber in both soft and hard woods, and can get orders out promptly.

Send Us Your Lists or Plans for Estimate

Let's get together now—We know we can please you.

Harty Bros. & Harty Company
21st Place & Loomis St. Chicago, Ill.



THIS COLONNADE

Only \$13.75

In Yellow Pine

Oak or Birch \$14.50

Any size up to 8 x 8. Columns 6-inch diameter tapering to receive 5-inch compo. cap. Casings and cap trim not included.

THIS is positively the best Colonnade for the price in the market today. Take advantage of this special offer. Quality, satisfaction and safe delivery guaranteed. Order today. Give exact width and height of opening. State what kind of wood.

Our catalog No. 35 shows many new designs. Write for it.

Bertelsen Adjustable Grille Co.
615-617 So. Clinton St., Chicago

JAHANT DOWN DRAFT FURNACES.

The Jahant Specification Handbook, issued by the Jahant Heating Co., 165 Mill street, Akron, Ohio, tells the contractor in plain language about all that he ought to know about heating and ventilating. It tells how to estimate on the cost of a suitable heating system for any job, and particularly describes the principles of the Jahant Down Draft Furnace.

The selection of a suitable heating plant embodies difficulty to the uninitiated. Unless one is thoroughly posted, the furnace is apt to be unsatisfactory for any one or more of a dozen reasons. It may be too large or too small, have the wrong method of combustion, be fitted for a different fuel, readily obtainable, or, as sometimes happens, it may be too high to even go in the cellar at all.

The system of selling furnaces and heating equipments followed by the Jahant Heating Company precludes any mistakes of this character. Their estimate is given after the contractor or owner sends them floor plans and complete information from which they can calculate the equipment required. In the installation the purchaser is likewise protected, as complete plans and instructions are sent with the equipment.

In order to assure the purchaser that the furnace will do the work, the Jahant Heating Company give with each purchase a 360 day guarantee bond. The terms of this bond are given in the book of the Jahant Furnace, which is sent to our readers on request.

A prominent feature of the Jahant Furnace consists in the method by which the air for combustion enters the furnace. It is so designed that a down draft is created, thus consuming practically all of the smoke and securing far more heat than is customary with other furnaces. This action is fully explained in the booklet mentioned above.

THE AWAKENING OF "OLD MAN" AYRES.

"Nothin' in it," growled "Old Man" Ayres, white haired farmer, to his young and enthusiastic son. "Nothin' in all this truck they call 'progressiveness' and bein' modern and 'up-to-date' and a lot of other such tarnel foolishness. These young fellers that's growin' up with a lot of new-fangled ideas about farmin' and chicken raisin' and grainin' lands and stickin' pebbles on the roof and runnin' telyphone wires around your place are a pack of durn fools. They hain't had no experyence, that's their complaint. It takes a practical farmer like me with forty years o' grubbin' to size up what's what on a farm. And I ain't a-go'in' to have none of these fool new play-things around my place, you bet your bottom dollar. Nothin' in 'em!"

The "old man's" son knew better than to argue with his father. Experience had taught him that no amount of reasoning would appeal to his father, who was a typical "old-school" farmer, set in his ways and stone-deaf to all the pleadings of the wide-awake, progressive and educated son to improve the

Advertisers' Section.

PASTE THIS DOME
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ON LETTERS YOU
TISERS. IT HELPS.

farm and get in line with sensible, modern farming methods.

"Why, just this mornin'," went on the old man peevishly, "I was drivin' by Scott's place on the way to the store and I couldn't believe my own eyes when I saw Jed Scott and his three sons up on their barn roof laying down rolls of some fool stuff they called roofin'. There they was, puttin' down the stuff and nailin' it to the shingle roof with things they called Kleets. They said they was goin' to have a tight roof this winter, all right, for they'd found the real stuff this time. Well, sir, I just laid back in that wagon and laughed fit to kill myself. The durn fools, do they think they can get a tight roof with that kind o' wall-paperin' truck? Why, the first rain that comes along will go through that stuff like water through a sieve! That's what comes of bein' modern, as they all say. No, sir, the old shingle roof's good enough for me. It's kept my hay dry for forty year!"

"But that's just the trouble. It hasn't kept your hay dry without a lot of repairing and fixing, which the modern roofing avoids," spoke up young Ayres, unable to resist any longer. "That roofing the Scotts are using is the best water proofing ever invented, and it is proving its worth on hundreds of barns all through this section. No up-to-date farmer with his weather-eye open will use shingle or tin on his roofs any more."

"There you go again! You've got it worse than the rest. Picked it all up at school and from readin' books and these fool farm papers. Well, you can't work any of your crazy notions on this farm till your father's dead and buried. Then I can't prevent it, I reckon."

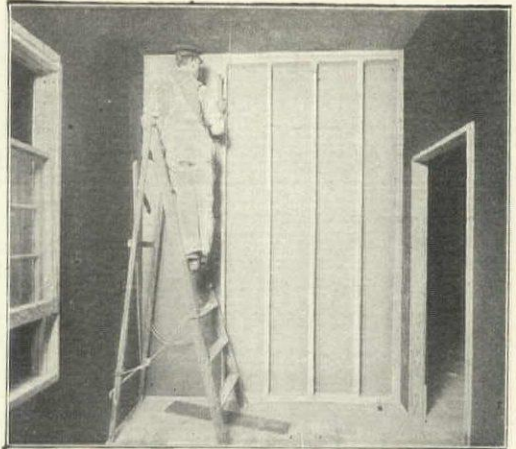
And the old man tottered off to bed, still shaking his head and muttering his anger. During the night it blew up hard and a regular northeaster descended on that section, bringing with it a deluge of driving, steady rain. Old man Ayres was greeted at sunrise with the cheerful announcement that the barn roof had sprung a lot of leaks, which were dripping water into his choicest mow of hay. All hands turned in and the entire morning was spent shunting hay out of the mow onto the dry barn floor. Neighbor Scott dropped in with his boys and they lent a helping hand.

It was a long, tedious, hot, sultry job, and all the time the men were at work in the dusty mow the water kept dripping steadily into the hay. "Old" Ayres worked with feverish haste, with the sweat rolling down his face and his temper getting more bitter with each drop from the badly leaking roof.

"There ain't no reason why this roof should be leakin'," he finally burst out, "it ain't old, and it cost enough to put on to get a roof that would hold out the rain. Jim Black put on the shingles and he's a first-rate carpenter."

"But it's a shingle roof. They're out of date. No matter how well they're put on they're bound to give trouble," said young Ayres.

"Oh, you shut up!" snapped the old man. "I just thought you'd work in a lot of 'I told you so's' today. Guess there ain't no roof but what'll leak in a rain like this. Your roof



Jones Used Utility Wall Board

Jones is a carpenter out in Iowa. He's a mighty good carpenter, too. But work fell off as work will at this time of the year. And Jones had a family to support so he couldn't afford to go south and take life easy.

Now Jones saw that wall board was becoming a most popular interior building material. He saw, too, that there was a big opportunity to make money on remodeling jobs.

Jones was conscientious. He got samples of all the better known wall boards and made strict tests. And he found that Utility was the best.

Utility proved itself non-porous and moisture-proof. It was easy to cut and quickly and conveniently put on. The owners liked Utility because there was none of the dust and muss of a lath and plaster job. Then, too, Utility never chips or checks and takes alabastine or flat tone paints or tints beautifully.

Jones is making more money now than he did in the summer time. He's taken on one helper and is planning to hire another. What Jones is doing you can do. Don't let the Jones's make all the money—get in and get some yourself.

*Don't delay a minute. Sit down
and write us now for a sample*

THE HEPPE'S CO.

*Also manufacturers of Flex-A-Tile
Asphalt Shingles, Asphalt Paint and
Asphalt Roofing in any Finish*

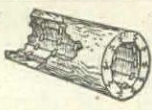
4502 FILLMORE ST., CHICAGO, ILL.

Advertisers' Section.

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WRITE TO ADVER-



ON LETTERS YOU
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LOOK INSIDE! 

SEE THOSE STAPLES.

STAY-LOCKED COLUMNS
DO STAY LOCKED

They're different—made to last and cost no more than inferior columns. Insist on having them—you'll not regret it.

Write for Catalog F—A beautiful free design book worth owning.

AMERICAN COLUMN COMPANY
BATTLE CREEK, MICH.

KOLL'S PATENT
Lock Joint Columns
Hot Off the Press

Our trade bulletin No. 1 containing valuable information for the Architect, Woodworker and Builder. All the information you need regarding wood columns. This is free for the asking.



Hartman-Sanders Company
Main Office & Factory 2155 ELSTON AVE. CHICAGO
Eastern Office 1123 BROADWAY NEW YORK CITY

Quickly Shipped To All Markets

We have a shipping outlet over C. & N. W., C. M. & St. P., Ann Arbor, and the M. St. P. & S. Ste. Marie in connection with the Wisconsin & Mich. Ry. which gives us access to all markets at reasonable rates for

WELLS DIAMOND HARD MAPLE FLOORING

This flooring is made from the famous Michigan hard maple by the latest improved machinery and methods. It is carefully selected, thoroughly kiln dried, side and end matched, hollow backed, bored for blind nailing, smoothly polished and the price is right. It will help you in specifying and buying an exceptionally fine flooring and at the right prices. Write for our Free beautifully illustrated Book on maple flooring.

J. W. Wells Lumber Co.
Menominee, Michigan

\$20
in Yellow Pine, Oak or Birch, in the white, any size up to 8x8

Freight paid to your station

Chicago Grille Works, 828-38 Wells St., Chicago

THIS Colonnade consists of Beam Brackets, Compo Caps, Columns and Pedestals, everything strictly first class. We offer you this Colonnade for \$20 F.O.B. your station. Give width and height of opening, and wood.

21 years in our present location.

leakin', Jed?" he asked, turning to his neighbor Scott.

"Not a dewdrop on the inside," replied Scott. "All tight and so dry you could strike a match anywhere. First heavy rainstorm I recollect when I didn't have to stretch canvas over my mows."

"Old Man" Ayres grunted and went on working in silence. Finally the work was finished and the neighbors had gone home.

"What'd you say the name of that roofin' was the Scotts used?" the old man suddenly jerked out.

"Genasco Roofing."

"And we can put it on ourselves over the shingles, without having any roofers?"

"Sure. It's the easiest thing in the world to put on. They furnish what they call Kant-leak Kleets for the seams so's you don't have to use cement."

"Where can we get it? Do we have to send 'way off to town for it while other rainstorms come along and drown out the whole barn?"

"Not a bit of it. We can get it right away at Irwin's store in the village. The makers have their dealers all over the country."

"Well, you hitch up right away and go over and get enough Genasco to cover up this barn! I'm sick of this rainin' in on a man's crops after he's worked like a horse all year to grow 'em and harvest 'em."

"You're waking up at last," laughed the son. "You're getting progressive."

"Progressive rot!" snapped the old man. "That's only showin' horse sense!"

"Oh," exclaimed the son as he turned away, "I thought they were the same thing."

That evening when his son wasn't looking "Old Man" Ayres stole a look at one of the farm papers. There he eagerly read about the Genasco Roofing, how it is made of natural asphalt, taken right out of Trinidad Lake and filled with valuable natural oils which give it resisting life, and how Kant-leak Kleets insure the perfect application of the perfect ready roofing.

Then he tiptoed to his sitting-room table and wrote a postal card to the Barber Asphalt Paving Company in Philadelphia, Pa., asking them for their "Good Roof Guide Book" and samples of Genasco Roofing.

"I guess I'll show 'em that you don't have to be a progressive fool to have plain horse-sense," he chuckled as he blew out the light and went off to bed.

THE MILLER LOCK MORTISER.

On a good many jobs, we still see carpenters laboriously cutting out by hand the mortises for locks. The up-to-date contractor does the same work with a Miller Mortiser in a small fraction of the time. It is possible with this device to cut a complete mortise in any kind of a door in three minutes and do it better than can be done with bits, chisels, mallets, etc., to say nothing of the risk of injuring the door while doing so.

The Miller Mortiser is simple in construction and operation, and is adjustable for dif-

Advertisers' Section.

PASTE THIS DOME ON LETTERS YOU WRITE TO ADVER-  TISERS. IT HELPS.

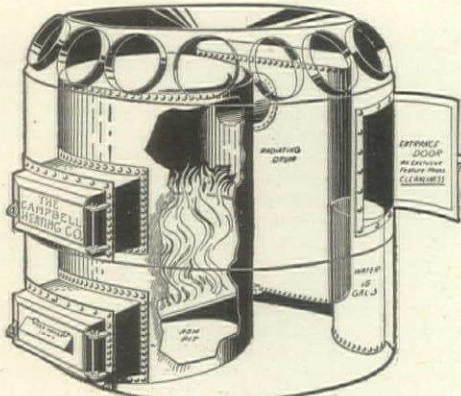
ferent sizes and styles of locks, thickness of doors, etc.

The A. W. Miller Manufacturing Co., Riverside, California, have an interesting trial proposition for this mortiser which will convince the contractor of its practical merits. Those who wish to learn the plan in detail are requested to write to the manufacturers direct.

A WARM STORY.

Catalogue No. 10 issued by the Campbell Heating Co., 1220 Walnut street, Des Moines, Iowa, describes at considerable length the advantages and construction of the Campbell Heater. Numerous illustrations are given of buildings heated by these furnaces and giving the owners' expressions of satisfaction with their operation.

A feature of the Campbell Heater lies in the large water space, by which the heated air is properly moistened. It is only by so doing that the air can be made healthful for breathing as well as making it ideal for conserving the construction of the building. It is to be noted that in heating air from zero to seventy degrees the capacity of the air for holding



The Campbell Furnace

moisture is increased about ten times, and unless the air is supplied with this additional moisture, it will take it up out of the surrounding woodwork, furniture, etc.

Statistics, which as a rule are dry facts, show that with the proper amount of moisture in the air a person is far more comfortable at a lower temperature than when the moisture is not present. This means a considerable saving in fuel as well as the added comfort. It is a further fact that air supplied with moisture at the furnace circulates much more freely than air which is not so treated.

The Campbell Heating System also provides excellent ventilation, it being possible to take the air either from the outside or to re-circulate the air already within the building.

This catalogue, containing much other valuable information regarding furnace heating, will be sent by the Campbell Heating Company to our readers on request.

Advertisers' Section.

\$13.95 PER DOZ.

(If You Send Cash With Order)

Absolutely Safe,

for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.

Steel Scaffold Bracket

The Taylor

Write for Catalog of Builders' Specialties

James L. Taylor Mfg. Co.
Poughkeepsie, N. Y.

The Architects' and Builders' Pocketbook (Kiddie).—The Fifteenth Edition. Revised and enlarged. 1,700 pages, 1,000 engravings, morocco binding. Price.....\$5.00

In the author's own words, it is "a general index to the many lines of work, methods, materials and manufactured products entering into the planning, construction and equipment of buildings."

The new edition contains extended chapters on fireproofing and reinforced concrete.

A modern construction handbook, indispensable to the professional man and the student of today.

Postpaid on Receipt of Price

Hodgson Book Company

537 S. Dearborn St.

Chicago

Scaffold Brackets

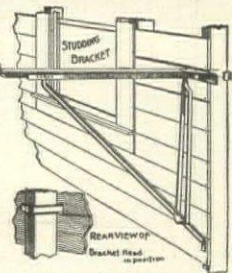
It has been proven that one set of Scaffold Brackets will save contractors from \$50 to \$100 on every house they build.

Each bracket will carry a ton, so they are absolutely safe.

In a few more years there will be no such thing as old style staging and scaffolding.

We are making a special trial offer of 1 doz. brackets for \$15, cash to accompany order. Send for catalogue, prices and full particulars.

THE FOLDING SCAFFOLD BRACKET CO.
57 Fort Street, West,



Detroit, Michigan

THE EXPERT WOOD FINISHER

By A. ASHMUN KELLY

A complete manual of the art and practice of finishing woods by staining, filling, varnishing, polishing, etc.

The woods and the fillers used are described at length and directions are given for ordinary finishing, for finishing and fuming oak, for veneer work, and for French polishing. Stains and staining constitute an important division of the manual, and a wealth of practical formulae is presented. Varnishes, their make-up, tests, and uses, is another capably-handled branch of the subject. Instruction for renovating old furniture and on the treatment of stains and spots brings to a conclusion a very useful exposition of an important art.

Bound in silk cloth and boards, 340 pages. Price, postpaid, \$3.00.

HODGSON BOOK CO., 537 S. Dearborn St., Chicago

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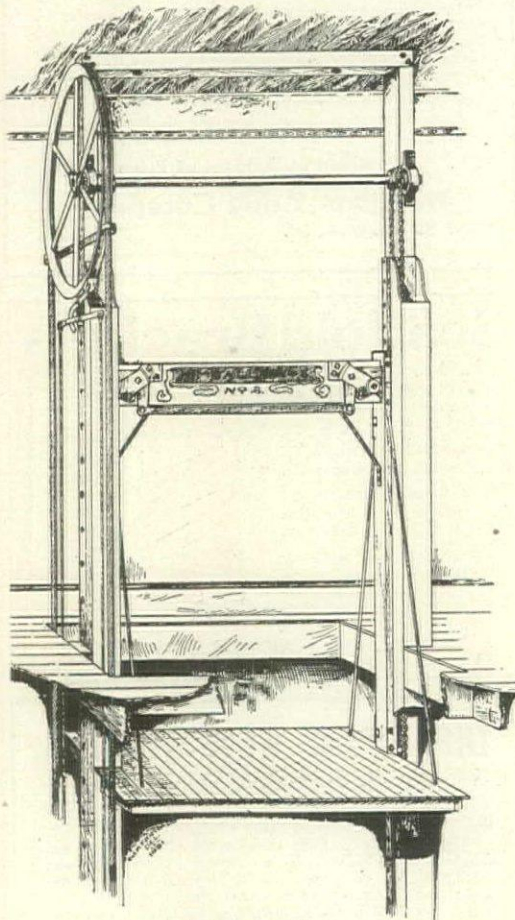
ON LETTERS YOU
WRITE TO ADVER-
TISERS. IT HELPS.

A NEW GAGE PLANE.

The genius of Mr. John P. Gage, president of the Gage Tool Co., Vineland, N. J., has been working for some time on a new self-setting block plane in which the cutting iron can be set at a lower or more acute angle than is found in other planes. This feature makes it especially valuable for end-wood planing or for working across the grain, etc. A circular of this plane is about ready, and will be sent to those who have their names on file with the Gage Tool Company. Our readers will be interested in this tool as it will enable them to do smooth and neat work with much less effort than by the old style, all-around planes.

PASSENGER AND FREIGHT ELEVATORS.

The modern buildings which are going up all over the country are mostly designed to save time both in the manufacture of goods and in their transportation from floor to floor



No. 2—Front View

or from the shop to the shipping room. To do this requires special machinery and apparatus not the least of which comes under the head of passenger and freight elevators.

The Kimball Brothers Company, Council Bluffs, Iowa, make a number of elevators suit-

able for various purposes, such as for freight in warehouses and manufacturing buildings, carriage elevators and passenger elevators. Their catalogue shows the various styles and details, as well as gives instructions for measuring, ordering, installing, etc.

Where the elevator has only a limited use a hand elevator will frequently serve the purpose and provide the building with means of conveying materials and goods from floor to floor.

Kimball Brothers Company have made a specialty of this style of elevator and have designed them so that they work rapidly with little effort and the safety devices which they apply render them perfectly safe for use by the ordinary laborer or mechanic.

MILCOR METAL BUILDING CORNERS.

The Milwaukee Corrugating Co., Milwaukee, Wis., are sending out on request samples of their Milcor Metal Building Corners. These take the place of corner boards for finishing the corner of the building when weather board for lath siding is used, and they save in both time and labor, as it is not necessary to make as neat a joint as when the entire mitre is exposed. The fact that the mitre is entirely covered also prevents any moisture from getting at the end wood and thus opening it up and causing the woodwork to decay.

This metal corner is made in sizes to meet the needs of various sections of the country and are also made both for outside and inside corners. Contractors who have never used these corners will be interested in them, as it will mean a considerable saving when they are used, as well as a great improvement in the appearance of the corner.

METAL STORE FRONT CONSTRUCTION.

When one considers that only the first story windows of a building are available for show purposes, it will be understood why every effort must be made to so design the front as to take advantage of the possibilities in this line. The Detroit Show Case Co., 481 West Fourth street, Detroit, Mich., have endeavored to show in their booklet, "Metal Store Front Construction," some of the many designs in store fronts as well as their line of metal store front material. This booklet will serve as a guide to the contractor when going after business in this line, and will also enable him to measure up a front when ordering the material.

The contractor in the smaller towns will no doubt know of several stores in his vicinity in which full advantage is not taken of the possibilities of exhibiting the goods which are on sale in the store. Small windows, with possibly small lights of glass, large mullions and other obstructions, prevents the prospective customer from getting a good view of the interior of the store and also prevents the merchant from properly exhibiting his goods or even of lighting his premises. We have an idea that many of our readers can pick up some very nice work in this line by co-operating with the Detroit Show Case Company.



Yes,
you can
use this
transit

Don't confuse this simple instrument with the complicated transits used by civil engineers. There are no bewildering attachments on the

Starrett Transit

It's made for carpenters and builders, and with our little instruction book to start you right, you will soon wonder how you ever did without it. Lots of builders and contractors have found it so. You can use it for locating batter boards, laying out lots for buildings, leveling foundation walls, running levels for drains, and for lots of other work which confronts the practical builder.

Let us send you catalog 20M showing styles and prices. Ask for instruction book, too

The L. S. Starrett Co.

42-218

World's Greatest Toolmakers

ATHOL, MASS.



The Only Wall Board That Can Be Successfully Papered

BECAUSE it is the only wall board that is strong enough and stiff enough to stand the "pull" that wall paper exerts when adhered to another surface.

Compo-Board is also the only wall board that doesn't have to be paneled. You can panel it if you wish, but you can also have walls and ceilings smoother than plaster that lend themselves to artistic decoration by any method.

The hundreds of contractors and builders who use **Compo-Board** are able to deliver a more satisfactory job in a shorter time and get a higher price.

Write for a sample and interesting booklet on **Compo-Board**. Learn about its unique construction, its strength, durability, insulating, fire-resisting and moisture proof qualities.

Compo-Board is sold in strips four feet wide and one to eighteen feet long, by dealers in most every town.

Northwestern Compo-Board Co.

5776 Lyndale Ave. North, Minneapolis, Minn.



Your customer will be delighted with

Roberds Ideal Wall Board

It makes such a beautiful interior finish at such a reasonable cost. It can be painted, papered or tinted and lasts forever. It never gets shabby, never cracks, peels, chips or warps and is proof against vermin, heat, cold, fire and moisture.

Roberds Ideal Wall Board comes in 7-ply sheets all ready to be nailed to the studding. Your cheapest man can apply it without previous experience. No muss, no confusion, no delay and no disappointment.

Our special proposition to carpenters and builders is unusually attractive. Write for it today and we will send you full particulars, samples, prices, catalog and testimonials from other contractors.

THE ROBERDS MANUFACTURING CO.
104 RAILROAD STREET, MARION, INDIANA

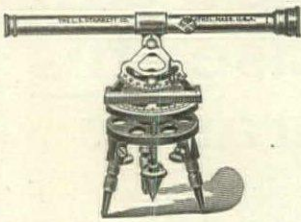
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WRITE TO ADVER-



ON LETTERS YOU
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THE USE OF THE STARRETT TRANSIT.

The L. S. Starrett Co. of Athol, Mass., has just published an instruction book on the use of their transit. This book describes in great detail the methods of graining, leveling, and simplest way of getting materials up is by the



simple engineering work such as the ordinary contractor should be able to do about the building. It tells how to find the difference in levels between the various stations on the ground; how

to measure vertical angles; lay out building lots and foundations; finding the area of irregular plots; measuring across water, etc.

All of these subjects and many others are dealt with in a simple, thorough manner so that the average carpenter or contractor can readily do the work. The various operations mentioned above can all be performed by the Starrett Transit or Level, a full description of which is given in the book. The use of this instrument, when the directions in this book are followed, enables the contractor to do accurately a great deal of the work which he has to employ a high-priced surveyor or engineer to do, and also saves the time spent in waiting for the work to be done.

Possibly the greatest advantage in using an instrument of this character lies in the fact that the owner or his representatives, possibly the architect, is present and wants simple information regarding levels, grades, etc. The contractor who is prepared to do this work will find that he is looked upon as possessing a higher order of intelligence than the man who must employ an engineer or surveyor for the purpose.

While the above book is a manual of instruction for the Starrett Transit, a copy will be sent to those of our readers who request it, as the Starrett Company believe that practically all of our readers will appreciate the information contained in it.

LOCK JOINT COLUMNS.

The catalogue issued by the Hartmann-Sanders Co., 2155 Elston avenue, Chicago, Ill., contains photographic reproductions of a number of buildings in which their Lock Joint Columns have been used. The catalogue also shows a number of the standard sizes and designs of plain, fluted and decorated columns which they are prepared to furnish. Prices are also given for the stock or standard sizes.

This company has built for its own use one of the largest factory buildings in the world devoted to this class of work, over an acre of floor space being equipped with the most modern machinery, dry kilns and other apparatus for making columns, pilasters, and similar work which are both architecturally and mechanically correct. The various departments of the factory have had many years of experience, which, with their perfect organiza-

tion, enables them to turn out the highest grade of work in the shortest possible time.

All of the material used in the Hartmann-Sanders Columns is carefully selected and a large stock is kept on hand so that they are able to build any size work without waiting for special stock.

The shipping facilities of the Hartmann-Sanders Company insure prompt deliveries to their customers.

Besides the manufacture of the wood columns, the Hartmann-Sanders Company have a complete plant for the manufacture of composition caps and other ornamentation. This insures that all of their designs will be in perfect harmony.

THE WINDOW CHUTE.

For three hundred and sixty-four days in the year there is no use for a window chute. On the other day of the year the coal and fuel is put in for the winter. It stands to reason, therefore, that while a window chute is a necessity, it should be so arranged that it gives practically as much light as a window during the time it is not in use as a chute.

The Holland Furnace Company, Holland, Mich., have so designed their window chute that it gives perfect light when not in use as a chute, and is burglar proof as well as airtight. The design of the window is correct architecturally, and being made of metal, it cannot be injured by the coal or other supplies taken in through it.

Department N. B. of the Holland Furnace Company is placing the Holland Window Chute on the market, and will be glad to send our readers a booklet giving the full description of the various styles and sizes which they make.

HOW TO BUILD WITH VAN GUILDER HOLLOW WALL MACHINES.

The Van Guilder Hollow Wall Co., 724 Chamber of Commerce Building, Rochester, N. Y., have issued a book giving complete instructions for building with their machines. A great deal of valuable information is contained in this book and the contractor will find many suggestions in it. There are given rules for estimating the quantity of material required, the average day's work, suggestions for mixing, methods of building in window and door frames, building chimney and ventilation flues. Explicit directions are given for mixing and applying stucco finish to Van Guilder concrete walls. The contractor is shown how to erect stagings so that workmen can proceed with the stucco work rapidly.

The use of the silo has become so general throughout the country that no farm is complete without it. The Van Guilder machine is equipped to build silo walls, and this book gives explicit instructions regarding them, the size and number of rods required for reinforcement, as well as the amount of cement, sand and gravel needed. A wall built by the Van Guilder method is much stronger than brick of the same thickness, and from the nature of its materials, is practically indestruct-



Bungalow Roofed with Edwards Metal Spanish Tile. W. C. Burrell, Atlantic Highlands, N. J., Owner
Conover E. White, Sheet Metal Contractor

Don't Miss This Opportunity

WE want one carpenter or builder in every community to demonstrate, take orders for and apply our Edwards Metal Spanish Tile on a liberal commission.

Here is a chance to build up an independent, profitable business for yourself right at home. Many carpenters are devoting their entire time to selling our metal roofing. Others have made big profits devoting part of their time to selling and laying our Metal Spanish Tile.

Edwards Metal Spanish Tile

Is being advertised in the leading magazines and is now known to thousands of home builders and owners everywhere. Wherever it has been used it has made a decided "hit" because it shows off to good advantage on the roof and has numerous points of superiority over any other style of roofing.

Architects are specifying Edwards Metal Spanish Tile, for they know it will do away with roofing "troubles." Builders like it because

of the finished appearance it gives any house on which it is used.

WRITE US TODAY ABOUT YOUR TERRITORY. Our business is growing so rapidly that it is necessary to have an agent in every community. The territory is going fast. One day's delay may mean that someone else will be given your territory. **DON'T DELAY. WRITE TODAY FOR OUR SPECIAL AGENTS' PROPOSITION.**

The Edwards Mfg. Co.

"The Sheet Metal Folks"

430-450 Eggleston Avenue, Cincinnati, Ohio

The World's Largest Metal Roofing, Metal Shingles and Metal Ceiling Manufacturers

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WRITE TO ADVER-



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ible and everlasting. The wall being hollow, the house is warmer in winter and cooler in summer than it would be with a solid wall, and as no dampness can pass the air space, the house will be absolutely dry all the time. On account of its incombustible nature, there is a saving in fire insurance premiums, as well as the satisfaction of knowing that the building cannot be burned through any ordinary conditions.

The above mentioned book is sent to those of our readers who are doing concrete work and have not investigated the merits of the Van Guilder Hollow Wall machine.

COMPLETE PLUMBING AND HEATING PLANTS.

The John Hardin Company, 4541-49 Cottage Grove avenue, Chicago, Illinois, have about ready for distribution a new catalogue showing the many designs and combinations in plumbing, heating and lighting plants. This catalogue, on account of the expense in getting it up, will be sent only to those who request it, and we would suggest that our readers get their names on file so that they will receive copies of the first edition.

All over the country the owners of buildings are finding that it is possible for them to have all of the advantages and conveniences of the city. Modern gas making machines enable them to light their house and cook with gas as readily and possibly at less expense than their city friends. A knowledge of the principles of plumbing allows them to equip their houses with every convenience at comparatively little expense.

HIGH GRADE BUILDING MATERIAL.

The Huber Builders' Material Co., 39-43 Vine St., Cincinnati, O., have a complete catalogue of high grade building materials of lumber, millwork, roofing, wall board, porch columns, doors, sash, art glass, hardware, mantels, grilles, etc. Practically everything needed to complete the modern house is shown and described in detail with very low prices for the highest quality of goods. The great variety of materials made and handled by the Huber Builders' Material Co. enables them to ship in one lot all of the materials needed for practically any style of house, while their shipping facilities enable them to secure the lowest rates to any part of the country on either large or small lots. This catalogue will be of interest to our readers, as it will show them where they can buy the best grade of goods of the most modern design for the lowest prices.

ASBESTOS ROOF STOPS CONFLAGRATION.

The ability of asbestos roofing to resist fire and check the progress of a blaze was again demonstrated by a fire which broke out in one of the sheds of the Export Lumber Company, Charlestown, Mass. The blaze quickly gathered headway and in a very short time reached such gigantic proportions that the fire companies, with all their modern fire-fighting devices, were temporarily powerless to check it.

Due to the high wind blowing at the time, sparks and burning embers fell on the highly inflammable roofs of buildings for a radius of a quarter of a mile around. The result was a score of small fires that gradually grew until several acres were ablaze at one time.

The fire burned its way from the sheds of the Export Lumber Company to a large warehouse owned by the same concern. This storehouse, which is the white-roofed building shown in the illustration, is the one covered with asbestos roofing. Owing to the fact that falling embers and sparks had no effect on this roofing the fire department was enabled to concentrate its energies on the advancing wall of flame, with the result that the fire was gradually gotten under control.

Had the blaze gone beyond this building the loss would no doubt have quickly mounted into the millions, for many large warehouses were situated just a short distance beyond. As it was, the fire is said to have caused damage to the extent of more than \$250,000 to the buildings and lumber owned by the Export Lumber Company, about \$5,000 to storehouses and stables across the Mystic river, and several thousand dollars to houses on an adjacent street in Charlestown.

The roofing that so effectively put a stop to this conflagration is known to the trade as J-M Asbestos Roofing. It is manufactured by the H. W. Johns-Manville Co., of New York.

The construction of this roofing is unique, as it is composed of felt made from asbestos rock reduced to fibres. Layers of this stone felt are cemented together with Trinidad Lake Asphalt, the whole forming a roofing that is literally a sheet of flexible stone.

DUMB-WAITERS AND HAND ELEVATORS.

The catalogue issued by the Storm Mfg. Co., 52 Vesey street, Newark, N. J., is more than a mere catalogue showing the numerous styles of dumb-waiters, hand elevators, invalid lifts, carriage and automobile elevators, basement and sidewalk elevators, ash hoists and similar equipments which this enterprising company makes. It is a guide to the contractor for ordering and estimating, as it gives explicit directions for selecting the style of elevator best suited to each particular case, as well as instructs the contractor how to measure up the building so as to give the necessary information to the manufacturer.

The catalogue shows in great detail the safety devices shown in the Storm Dumb-Waiters, by which the load is held automatically at any given point. It describes the various styles and gives their different good points as well as prices for the various sizes in which they are regularly made.

Every contractor has at some time or another wanted just the information contained in this catalogue, and they will be glad to know that they can obtain it free. It will enable them to talk intelligently to their clients and very likely pick up a number of jobs where the installation of proper dumb-waiters or elevators was omitted when the building was erected.

Here's **YOUR** Chance

A Remarkable offer to men in the building trades.



Go After the Big Jobs!



"Be the Man Who GIVES Orders."

If you have never had the advantage of a technical training, this is YOUR opportunity.

The Chicago Technical College

is making this great offer to practical men in the building trades because it knows that there are thousands of these men who cannot enter the day and evening classes in the college.

We have hundreds of Builders, Contractors, etc., in regular attendance at the college in Chicago. You can study at home the same practical blue print plans and instructions that our Chicago students study. The same experts—Chicago's leading Architects, Engineers, Estimators and Contractors will be **your** instructors. As a "Chicago Tech." student you can consult them at any time, free.

STUDY AT HOME—OUR SHORT, COMPLETE HOME-STUDY

BUILDERS' COURSE FOR PRACTICAL MEN

Your spare time is enough. The "Chicago Tech." method—our new, easy, quick plan will qualify you in a short time.

Plan Reading, Estimating, etc.

Architectural Drawing, Specifications, Contracting

The "Chicago Tech." method is to train for immediate work in the Architectural and Contracting fields—NOT to sell books. "Chicago Tech." students do not study from old-time plates in books, but from live, up-to-date blue print plans of buildings now being built or recently completed. These blue print drawings are furnished free with the course. No other correspondence course in America offers this advantage, and it is the only course that has an actual educational institution back of it. Write today. Never mind the cost; that is a small matter, anyway.

Take the forward step. Better things are in sight. Mark and mail this Coupon NOW!

WE FURNISH FREE A COMPLETE \$15.00 DRAWING OUTFIT

Mark "X" opposite work in which you are interested. Without obligation on you we will send full information free.

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| <input type="checkbox"/> Builders' Course | <input type="checkbox"/> Structural Steel Drafting |
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| <input type="checkbox"/> Plan Reading | <input type="checkbox"/> Reinforced Concrete |
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Town..... State.....

Resident or Home Study Course.....

Chicago Technical College

1018 LAKE VIEW BUILDING, CHICAGO, ILL.

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ON LETTERS YOU TISERS. IT HELPS.

LEVEL WORK?



**Architects
Builders
Contractors**

Insure against mistakes in leveling by using our Architects and Builders Level. We make a specialty of this instrument. It will give positive, accurate service. Saves its cost in a short time. We manufacture a complete line of surveying instruments in various sizes and at a wide range of prices.

Our circular No. 28 will explain our instruments to you in detail. It will pay you to get it before deciding upon any surveying instruments.

KOLESCH & CO., Surveying Instrument Makers
Established 1885 138 Fulton St., NEW YORK



Hess ^{MEDICINE} SANITARY ^{CABINET} Locker

The Only Modern, Sanitary STEEL Medicine Cabinet

or locker finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimmings. Steel or glass shelves.

Costs Less Than Wood

Never warps, shrinks, nor swells. Dust and vermin proof, easily cleaned.

Should Be In Every Bath Room

Four styles—four sizes. To recess in wall or to hang outside. Send for illustrated circular.


HESS, 907 L Tacoma Bldg., Chicago
Makers of Steel Furnaces. Free Booklet.

The Recessed Steel Medicine Cabinet

THE MOST ACCURATE LOW PRICED INSTRUMENT

Carpenters and Builders who use a level need

The Yankee



The YANKEE is a compound level, running both horizontal and vertical angles. It is the lightest instrument made embodying such advantages. It is the simplest for the same uses—the most accurate and best for its cost, and employs all modern high grade features. Where speed and ease is wanted in simple leveling and laying off horizontal and vertical angles, it is of great benefit. Drop us a line for our printed matter on the YANKEE. You will be surprised at its superiorities and the cost.

FROST & ADAMS COMPANY
35 CORNHILL BOSTON, MASS.



FULL LINE of PLUMBING and HEATING SUPPLIES

Sold Direct at
Wholesale Prices

**20% to 40%
Saving**

Complete bathroom outfits, tubs, closets, lavatories, kitchen sinks, etc. Prompt shipment from a complete stock. The only house selling up-to-date, guaranteed goods at wholesale direct. Write for illustrated catalogue and prices.

B. Y. Karol, 768-72 West Harrison St., Chicago, Ill.

DIAMOND SPECIALTIES.

The use for expansion bolts such as are made by the Diamond Expansion Bolt Co., 90 West street, New York City, means that the contractor must have proper facilities for putting these bolts in place. While it is only necessary to drill a hole for these bolts, this drilling is not the easiest thing to do, especially if the material drilled is granite or other hard stone.

The Diamond Rapid Fire Drill was designed to do this kind of work in brick, stone and concrete. This drill is operated by hand and will drill much faster and with less effort than with a hand hammer and chisel.

A complete description of the Diamond Rapid Fire Drill is given in a circular which the Diamond Expansion Bolt Company is sending to our readers. The same circular shows a number of the other building specialties which this company makes.

THE ANDREWS HIRED MAN.

The man who has to get up in what seems the middle of the night to start the fire in order to have the house warm by breakfast time, fails to appreciate the joke. It's very comfortable after the fire gets started, of course, but in the middle of the night, or even at five or six o'clock in the morning, one looks at it in a somewhat different light.

The Andrews Heating Co., 1369 Heating building, Minneapolis, Minn., recognizing this difficulty with modern heating plants, devised a neat arrangement whereby the fire can be automatically started up at any designated time. The same apparatus shuts off the draught as soon as the temperature reaches an indicated point. This ingenious device, known as the Andrews Hired Man Thermostat, can be installed on any heating system in a very short time, and at a very moderate cost. This will be appreciated by those whose present equipment is inadequate, as well as those who are just installing a new plant and want it complete in every particular.

A booklet which the Andrews Heating Co. is sending to our readers on request, describes this thermostat in detail, its operation, cost, etc. It will show the enterprising contractor where he can make the heating plant more satisfactory and boost his own reputation at the same time.

ART IN METAL TILE ROOFING.

The catalogue issued by the W. H. Mullins Company, 210 Franklin street, Salem, Ohio, shows the pleasing effect which can be obtained by the use of sheet metal shingles and tile. A great variety of patterns are shown, as well as photographic reproductions of many of the beautiful buildings on which they have been used.

The Mullins Tile are made by special machinery, which makes a great saving in the time required to lay the tile. As they are very much lighter than terra cotta or slate it is possible to use a much lighter roof framing and in fact, this beautiful and ornamental

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roof may be used anywhere where wood shingles, iron or tin could be used.

On account of its durability as well as the beautiful colors resulting from exposure to the weather, copper is preferable for these tiles. They are, however, made in some of the patterns in zinc and galvanized steel.

The W. H. Mullins Co. would be glad to correspond with contractors and builders and will quote prices on any of their regular or special patterns, together with the additional ridge roll cresting, finials, hips and valleys required for a complete job.

WOOD WORKING MACHINERY.

It would be interesting to know exactly what proportion of the carpenters and contractors in this country have shops equipped with wood working machinery. Very few probably, but what have some of the simpler machines, such as scroll saws, hand and foot power saws and borers, mortising and tenoning machines, etc. The fourth edition of catalogue No. 67, issued by the W. F. & John Barnes Company, 436 Ruby street, Rockford, Illinois, contains descriptions of practically all the wood working machinery which the carpenter or contractor will need to equip a small shop. There are shown several sizes and styles of saw tables to which numerous attachments can be added, also scroll saws, formers, mortising machines, hand tenoning machines, lathes, grinding and polishing machines, besides a complete line of tools to be used with them.

The W. F. & John Barnes Company have a most interesting trial proposition to contractors, carpenters, etc., by which any of their machines may be obtained on trial, and if not found perfectly satisfactory, the machine may be returned. This enables the mechanic at very slight cost to determine whether any particular machine is just the one suited for his work. More complete details of this remarkable trial offer to our readers can be obtained from the manufacturers direct.

SMALL HOUSES.

Within certain limits, the smaller the house, the better appearance it must make in order to pass muster with the rest of the street. The neat, modest home, nicely painted and finished, will present a much better appearance than a larger one in need of repairs.

Not only must the exterior be presentable, but the interior of the small house must keep up appearances. The walls must be nicely finished and the trim and doors must be spotlessly clean. With all these items taken care of, the floor remains as the one feature which must be perfect. For the small house, it is practically imperative that hardwood be used over practically the entire floor of the house. The fact that they are easier to keep clean than soft woods, which are either painted or carpeted, is a point very much in their favor, but after all, it is the appearance of the hardwood floor which really justifies its use.

The Interior Hardwood Company, Indian-

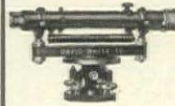
Advertisers' Section.

CARPENTERS, you may not need a **STEEL TAPE** often, but when you do need one you need it badly, and you need an **ACCURATE** one, a

LUFKIN STEEL TAPE

CATALOG ON REQUEST

THE LUFKIN RULE CO. Saginaw, Mich.
New York



WHITE'S IMPROVED LEVEL

This is an accurate and inexpensive instrument, especially designed for work where a general-purpose level is required. Telescope is 12" long, with magnifying power 25 diameters and will detect an error of 1-16 inch in 300 feet. For full particulars and prices ask for circular X.

David White Co., 419 E. Water St., Dept. D, Milwaukee, Wis.

Books for Painters

By A. ASHMUN KELLY

Second Edition of the Expert Painter's Estimator and Business Book contains all that can be told about reading plans, measuring both from plans and from actual work, and estimating correctly. Painters need this book. *Price, postpaid, \$1.50.*

The Expert Calciminer, a text book and manual for decorators. All that the interior decorator or student needs to know about water colors for wall and ceiling decorations. *Price, postpaid, \$1.00.* Send all orders to

Hodgson Book Co., 537 So. Dearborn St., Chicago

ARCHITECTS' AND BUILDERS' LEVELS



We manufacture every requisite of the engineer for field and office work and build a special type of surveying instruments for the architect and builder. Our catalogue lists a complete stock of drawing, mathematical and surveying instruments and measuring tapes. Send for copy.

Kouffel & Esser Co., 127 Fulton St., New York. General offices and Factories, Hoboken, N. J.—Chicago—St. Louis—San Francisco—Montreal, Can.

"Sterling" Convertible Level



An up-to-date instrument for use on building operations.

Strong, compact, durable, reliable!

Write today for description and reasons

why you should select a "Sterling" Level.

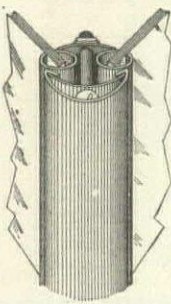
WARREN-KNIGHT CO.
136 N. 12th St., Philadelphia, U. S. A.
Successors to Izard-Warren Co.

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Voltz F. W. Bar No. 14



The Universal Sash Bars Automatically Adjust themselves to all angles and conditions without cutting or fitting; strong enough to carry the load of a high wind pressure; a flexible setting with no strain on the glass.

Send for Printed Matter

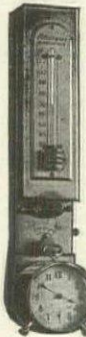
VOLTZ MANUFACTURING CO.

911 & 13 Penn St.

ST. JOSEPH, MO.

Andrews Hired Man THERMOSTAT

Gives You Good Profit and Pleases Your Clients



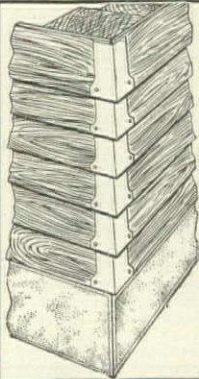
This famous heat regulator is the ideal one for contractors to handle, as it is so easily installed and so durably made. Your helper can easily put it in on any job in old or new house. Write for special low price to contractors.



Andrews Heating Co.

1369 Heating Bldg., MINNEAPOLIS, MINN.

SAVE TIME and MONEY



and make a neat, attractive corner job, with mitre effect, by using **Kees Metal Building Corners**. No cutting of bevels. Hold paint like wood. Use with lap siding.

Write today for free samples and particulars.

ED. KEES MFG. CO. BEATRICE, NEB.

Box 811

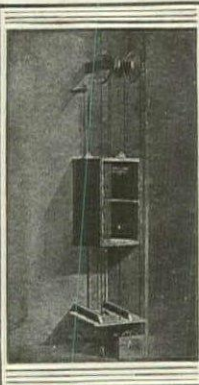
If you have never used Gossett Storm Sash Hangers ask for samples

HAVE YOU EVER TRIED TRACTION DUMBWAITERS?

A Little More Satisfactory Than the Others

OUR BOOKLET is FREE

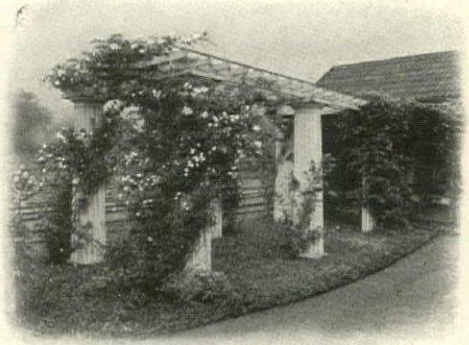
Chelsea Elevator Co.
332 West 26th St., New York



apolis, Indiana, have recently sent us a small booklet showing the plans, details, perspectives, etc., of a model five-room bungalow, showing the possibilities of hardwood floors for buildings of this character. The Interior Hardwood Company laid all of the floors in this building and they show on the plans a number of the possibilities in the selection of patterns and woods for this purpose. The Interior Hardwood Company have a special method of making parquetry and inlaid floors, and those of our readers who have work of this kind in contemplation should get their beautiful catalogue as well as their prices for this class of work.

STAY-LOCKED COLUMNS.

The great variety of styles in architecture found in this country calls for a great variety of constructive material. In every section of the country, however, we find porches, pergolas, colonnades, etc., for both exterior and interior work. For the exterior work these columns must be carefully made of selected materials to withstand the severe action of the weather. They must also be correctly de-



Pergola of Stay-Locked Columns

signed architecturally in order to present the best appearance.

The American Column Co., Battle Creek, Mich., in their Catalogue F show many of the beautiful designs which they have turned out, as well as showing photographic reproductions of the work in place in and about the buildings. This catalogue, which will permit the contractor to show his prospective clients exactly how the finished work will look, will be sent to contractors and builders free on request.

AUTOMOBILE TURNTABLES.

The owner of a garage who must back his car for even a short distance to get it in or out does not get the fullest use of his garage. The risk of damaging his car and of the garage while backing is obvious to everyone, but the means for avoiding it may not be apparent at first thought.

The turntables made by the Canton Foundry & Machine Co., Canton, Ohio, overcome the difficulties met in the ordinary garage. By

Advertisers' Section.

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means of this turntable it is possible to avoid all of the troubles incident to backing and turning in close quarters, while the saving in time is worth the cost alone.

The Universal Auto Turntable is made of steel, giving it the greatest possible strength. It is ballbearing, with the ball races so arranged as to turn with the least possible effort and with proper provision for lubrication and wear.

Catalogue C-5 gives complete information regarding this turntable as well as instructions for installing. It also describes a number of other automobile devices of use both in the private garage and in the repair shop.

SAFETY DEVICES FOR CIRCULAR SAWS.

The Phillips Mfg. Co., Orlando, Florida, are specialists in the manufacture of window frame machinery. They are also well known for the safety devices which they attach not only to their own, but to other woodworking machines. The use of these devices interferes in no way with the regular working of the machine, but it provides protection to the operator at all times. In these days of employers' liability, it is certainly well to be on the safe side and have the saw tables properly protected.

Full information regarding the Phillips No-Kick Saw Guard can be obtained from the manufacturers, who will also send our readers their complete catalogue showing the numerous styles of labor-saving machinery which they make.

RED DEVIL TOOLS.

The Smith & Hemmenway Company, 150 Chambers St., New York, have just issued a new illustrated booklet giving net prices of three thousand tools of their manufacture. A great many of our readers are interested in the Smith & Hemmenway line of goods, which include chain drills, glass cutters, pliers, miter boxes, and a great variety of other tools for carpenters and mechanics. The above mentioned booklet will be sent to our readers on request and will enable them to make comparative prices on these goods.

DOOR AND WINDOW SCREENS.

The contractor who will look into the future will be getting busy about this time with his customers in an attempt to have them have their buildings fitted for screens for the coming year. At this time, the contractor and carpenter can afford to give a little more time to this line of work than he could in the spring when everyone is in a rush getting ready for summer. For this reason, the catalogue of the Standard Screen Co., 1848-50 W. 14th St., Chicago, Illinois, will be of interest to our readers. It shows in detail the method of manufacture of these screens as well as lists the standard sizes for both windows and doors. The catalogue contains also a list of suitable hardware for this line of work together with prices and instructions for ordering special

Advertisers' Section.



Training Makes Men Equal

Gaining success is largely a matter of training those talents that every normal man possesses—but so few know how to use.

The successful men of today trained their brains—they developed their natural ability. The unsuccessful men probably never dreamed that they had talents that might have enabled them to succeed.

You have natural ability for some line of work. Find out where your natural ability lies—and then train yourself along that line.

For twenty-two years the International Correspondence Schools have been training men for better jobs and bigger pay. They can do the same for you.

Just mark and mail the attached coupon—it won't obligate you in the least—and the I.C.S. will show you how they can train you for a successful career in the line of work you like best.

Mark the Coupon NOW

International Correspondence Schools

Box 1332, SCRANTON, PA.

Please explain, without further obligation, how I can qualify for the position before which I have marked X.

- Architecture
- Architectural Draftsman
- Contracting and Building
- Structural Engineer
- Structural Draftsman
- Concrete Construction
- Electrical Engineer
- Electric Lighting
- Plumbing & Steam Fitting
- Heating and Ventilation
- Plumbing Inspector
- Estimating Clerk

- Mechanical Engineer
- Patternmaking
- Civil Engineer
- Surveying and Mapping
- Commercial Illustrating
- Mining Engineer
- Gas Engineer
- Automobile Running
- Bookkeeper
- Stenographer
- Civil Service Exams.
- Advertising Man

Name _____

St. and No. _____

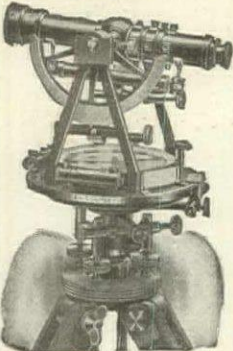
City _____ State _____

Present Occupation _____

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W. & L. E. Gurley
Troy, N. Y., U. S. A.

Manufacturers of

Engineers and Surveyors
Instruments

Physical and Scientific
Instruments

Standard Weights and
Measures

Accurate Thermometers

Hicks' Builders' Guide

A complete, practical work on building and estimating. Revised to date. Entire art of roof framing covered in the most practical manner. Price \$1.

I. P. Hicks, Ames Ave. Station, Omaha, Nebr.

Build For An Income



Buy a Plan Book of Flat Buildings and plan an income in your old age. Our book gives you ideas from two-family flats to twelve families, and our prices are reasonable.

First edition (right off the press) . . . 50c
Also a book for residences . . . 25c
Both . . . 65c

H. COOK & COMPANY
720 Ashton Bldg., Grand Rapids, Mich.



THE WORCESTER BLOUNT DOOR CHECK STANDS FOR QUALITY WORCESTER MFG. Co. Worcester, Mass.

Queen-Gray Co.
PHILADELPHIA

Queen Surveyors' Transit
Queen Architects' Level

Unequaled for Accuracy and Durability
Send for Catalogue
Sixty Years in Instruments

work. The contractor can, therefore, take orders for this class of work and have them all fitted ready to hang the first warm day of spring.

BUILDING CONSTRUCTION MORE ACTIVE

Building construction in 90 cities for September shows an increase of 5 per cent over the corresponding month a year ago. Permits were taken out in 90 cities during the month just closed, according to official reports to Construction News, for the erection of 21,316 buildings, involving an estimated cost of \$64,926,713, against 20,204 buildings at an estimated cost of \$61,901,245 for the same month a year ago, an increase of 1,112 buildings and \$3,225,468, or 5 per cent. This is a very satisfactory showing, as each of the past few months for a considerable period has shown a loss. The figures in detail are as follows:

Cities.	1913		1912	
	No. of Bldgs.	Estimated Cost	No. of Bldgs.	Estimated Cost
Chicago	930	\$ 7,858,920	969	\$ 7,201,900
New York (Bronx, Man. and Bronx)	443	6,320,496	285	9,024,890
Boston and vicinity	456	5,237,000	356	4,476,000
Philadelphia	1,302	4,363,955	1,010	2,798,700
Brooklyn, N. Y.	935	2,405,750	918	3,290,823
San Francisco	386	2,273,723	544	1,783,145
Detroit	856	2,056,855	882	1,884,800
Cleveland	1,065	1,949,545	763	1,379,315
Los Angeles	1,387	1,748,665	1,393	2,310,517
Portland, Ore.	667	1,621,005	1,185	909,595
Gd. Rapids, Mich.	150	1,573,350	118	264,130
Minneapolis	608	1,449,650	530	1,211,075
Syracuse	292	1,441,613	124	390,820
Pittsburgh	238	1,434,790	308	1,343,749
Utica, N. Y.	343	1,359,253	77	287,074
St. Paul	297	910,908	301	497,646
Troy	89	926,000	45	63,280
Milwaukee	333	874,509	379	803,889
Cincinnati	995	869,376	928	699,340
Rochester	279	834,226	312	969,936
Buffalo	326	821,000	307	838,000
Baltimore	377	808,237	206	669,700
Washington, D. C.	359	740,886	453	841,127
Seattle	939	692,885	958	607,870
Spokane, Wash.	79	678,715	87	214,515
Indianapolis	551	675,504	447	1,000,540
Toledo	222	672,489	183	336,605
Newark	208	561,526	219	708,625
New Bedford, Mass.	115	501,000	65	137,000
Duluth	150	473,897	88	85,408
Columbus, O.	237	473,195	236	513,225
Dallas	165	469,925	142	351,255
Oakland, Cal.	354	456,425	369	839,440
Omaha	97	414,580	115	476,050
Worcester, Mass.	142	404,619	143	666,902
Akron	225	393,645	223	335,650
Atlanta	309	384,723	356	568,587
Hartford	103	369,421	101	437,530
San Diego	253	352,560	248	1,596,859
Sacramento	116	330,797	96	289,365
Louisville, Ky.	243	297,170	204	330,970
Charlotte, N. C.	24	292,937	26	78,510
Memphis	273	288,355	314	644,515
Fort Wayne	89	278,355	93	352,640
Youngstown	83	261,465	88	341,120
Cedar Rapids, Ia.	43	258,000	33	330,000
New Haven	94	243,880	84	325,765
Birmingham	403	242,099	263	470,262
Springfield, Mass.	112	232,025	138	1,017,090
Evansville	98	211,632	115	181,271
Savannah	68	194,740	25	30,560
New Orleans	..	186,769	..	211,170
Elizabeth, N. J.	52	182,000	32	192,890
San Antonio	258	176,128	280	151,592
Portland, Me.	32	179,000	..	51,590
Jacksonville	117	164,825	76	169,415
Tacoma	194	157,842	163	282,840
Norfolk, Va.	51	157,200	50	97,740
Berkeley	77	147,050	87	144,000
Trenton	79	144,917	73	360,885
Salt Lake City	76	142,937	69	226,375

Advertisers' Section.

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Peoria	47	142,245	34	244,680
Pasadena	170	140,803	148	140,432
Wilkes-Barre	53	133,053	53	175,298
Des Moines	60	127,750	83	139,150
East St. Louis, Ill.	52	124,673	54	38,028
Topeka	37	113,655	69	96,110
Lincoln, Neb.	44	101,650	43	104,050
Sioux City, Ia.	59	100,085	54	126,970
Richmond, Va.	34	85,883	57	303,333
Harrisburg	37	83,800	35	101,050
Holyoke, Mass.	23	79,825	14	45,990
Davenport	33	79,250	34	99,150
St. Joseph, Mo.	56	77,120	66	37,711
Altoona	74	74,551	49	39,129
Pueblo	15	74,070	19	42,878
Scranton, Pa.	53	71,420	72	152,110
Covington, Ky.	32	69,685	30	80,719
Reading, Pa.	27	69,025	55	122,825
Kansas City	80	67,140	52	56,280
South Bend	41	60,028	23	60,725
Paterson, N. J.	49	54,215	66	126,119
Springfield, Ill.	28	52,385	35	181,435
Passaic, N. J.	38	51,970	27	85,890
Chattanooga	161	50,120	187	53,480
Nashville, Tenn.	39	49,390	46	84,144
Stockton	40	44,935	35	136,525
Colorado Springs	38	38,405	34	26,800
San Jose	36	37,373	28	33,548
Hoboken	16	25,665	18	15,154

Total21,316 \$64,926,713 20,204 \$61,701,245

There were gains in 44 cities and losses in 46. There was much improvement in building in the larger cities and New York, while notwithstanding it had a loss of 29 per cent for the month just closed shows a better condition of affairs and gives evidence leading one to believe that things are on the mend, the large areas of vacancy apparently being taken up.

It is almost superfluous to marvel at the growth of cities, but the increase in construction is only short of marvelous. Chicago shows a gain of 9 per cent, Boston 17, Philadelphia 17, Brooklyn 56, San Francisco 28, Detroit 9, Cleveland 41, Portland, Oregon, 78, Minneapolis 19, Pittsburgh 6, St. Paul 89, Milwaukee 9, Cincinnati 24, Baltimore 20, Seattle 14, Spokane 245, Toledo 99, Duluth 455, Dallas 34, Akron 17, Sacramento 14, Evansville 16, San Antonio 16, Portland, Me., 247, Norfolk, Va., 60, and a number of smaller cities likewise contribute their portion toward making it one of the most satisfactory months in the history of the building trades in this country. The cities in which there were losses are widely scattered, to such an extent that it can not be said from any viewpoint that there is any general depression in the building trades.

There are a number of small cities, some of which have not heretofore been included in the list, in which phenomenal gains are shown, but it is hardly fair to compare a very small city where a permit for one building to cost \$100,000 has the effect of running the percentage of increase up to an exceedingly high figure, with other cities having an established record as a basis of comparison.

THE CYPRESS SILO.

There are several excellent reasons why the silo has come to stay as a feature of American farming. The increasing value of farm property required that the farmer must raise a certain crop which would give a concentrated food, which could be stored in large quantities. It was found that several times as much food value could be raised on an acre given to silage as when hay was raised, while the bene-

Advertisers' Section.

With These Two
"Yankee" Tools



Quick Return No. 130 and Screw Holding Bit

You can drive or draw a screw 3 feet over head, in tight corners or most any other place out of reach. Besides this, you get the same service as with the famous No. 30, which you doubtless now have in use. The No. 130 "Quick Return" shown here has a spring in the handle which quickly drives the spindle back for the next stroke. Add the Screw Holder shown here and you see at once what a tremendous advantage you have in this tool, especially in over head work.



You can hold the work in one hand while you start and drive the screw in some place out of reach with the other. For all convenient and close range work this tool with the spring in handle is the quickest "Yankee" we have yet put on the market.

If your dealer cannot supply you, we will mail you the **\$2.25** two for....

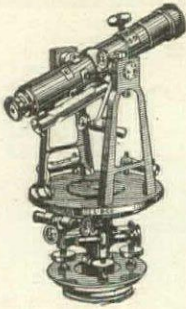
Write us for the "Yankee" Tool Book. It tells about every tool we make. A postal brings it.

North Bros. Mfg. Co.
 Dept. N Philadelphia, Pa.

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 WRITE TO ADVER-



ON LETTERS YOU
 TISERS. IT HELPS.



Your Money Back

if an instrument is inaccurate or otherwise inefficient, won't cover the trouble you are put to. Therefore select

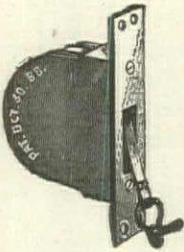


and be sure of satisfaction. Also—your money refunded if you say so, without question. That is our Satisfaction Policy.

Send for Circular W ::: Est. 1874

The L. Beckmann Co., 100 Adams St., Toledo, Ohio

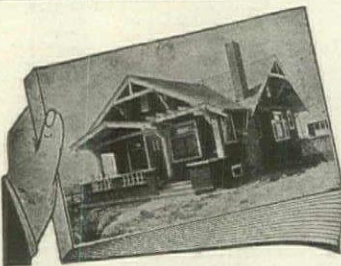
Caldwell Sash Balance



Does away with weight and cords and **vastly** more durable. Makes sashes work perfectly. Permits greater window space in new work, as box frames are not necessary. May be applied to old windows without altering sashes or frames.

Write for Circular to

Caldwell Mfg. Company
2 Jones St., Rochester, N. Y.



My 1913 Home Builder's Plan Book

Revised, En-
larged and
up to date

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ART of PRACTICAL WOOD CARVING

By Fred T. Hodgson.

PRICE: 12MO, CLOTH \$1.50; HALF LEATHER \$2.00

THE lessons given in this new book lead the young workman by easy steps until he is able to turn out work of a creditable character. The use and care of carvers' tools are given and explained and the tools described and shown by illustrations, with methods of sharpening and honing the tools. All kinds of appliances are shown, described and illustrated, for holding the work, and for preparing the tools and finishing up the carvings. The various styles of carving are fully described, such as Flat Carving, Chip Carving, Incised Carving, Scratch Carving, Figure Carving, Carving in Relief, Round Carving and Jewelry Carving. Sent postpaid on receipt of price, by

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fits were superior to any other food for the farm animals. The farmer was obliged to find a food which he could turn into milk and dairy products, and properly kept silage answered this requirement perfectly.

While the raising of silage was well understood, it was another matter to prepare it and preserve it through the winter. The ordinary methods used for keeping hay and grain were found to be valueless, and so the modern silo came into general use.

The first form of silo consisted of a pit dug in well drained soil and the silage was stored in these pits and covered with earth until needed. It took some time to get the silo out of the ground, but the general practice today is to build it entirely above the ground, providing on the surface a tight floor.

The Southern Cypress Manufacturers Association, 1212 Hibernian Bank building, New Orleans, La., recognizing the value of cypress for silo construction, has prepared a most excellent booklet on the subject. The various styles of barn buildings, as well as the various forms in which silos are built, are shown in detail. Specifications are given as well as bills of material, so that the contractor or carpenter is able to make a close estimate on the cost. A large detail sheet shows the plans, sections, details, elevations, etc., of square, round and stave silos. Other tables give the size and capacity of silos to feed certain numbers of cattle. These tables allow the contractor to figure out for the farmer the proper size silo to take care of his herd.

The Southern Cypress Manufacturers Association advise us that they have a number of these booklets on hand which they will be glad to send to our readers on request.

BALL-BEARING HINGES.

The Ball-Bearing Hinges made by the Stanley Works, New Britain, Conn., and described in their booklet N possess many advantages over the hinges commonly in use.

As there is practically no friction their action is entirely noiseless and they require no oiling. The consequent wear is practically nothing and they will outlast the building. The fact that many of the largest buildings in the United States are equipped with Ball-Bearing Hinges would lead one to investigate their merits.

BUILDERS' HOISTS.

A great many times the labor of laying brick and other materials is considerably less than getting the materials to the workmen. On buildings over two stories high, a mechanical hoist is an absolute necessity. Possibly the simplest way of getting materials up is by the use of a wheelbarrow platform elevator. This entire apparatus can be set up in a few hours and is a means of saving a great deal of labor in getting materials to the upper stories.

Not only must the platform be well made to carry the materials, but the guides must be so constructed that they will keep in place, and the engine must be suitable to hoist the ma-

Advertisers' Section.

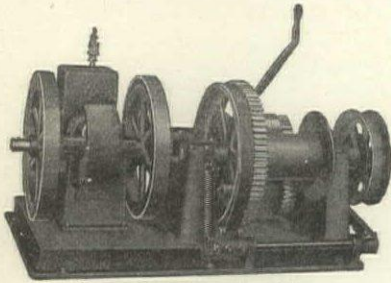
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terial rapidly and not be subject to delays or breakdowns.

The apparatus designed by the Bates & Edmonds Motor Co., Lansing, Mich., provides all the facilities which the ordinary job requires in the hoisting line. This company manufactures contractors' elevators equipped with either gas engine or electric motor. The hoist is provided with a drum for hoisting either a single or double line of platforms operating with a simple friction clutch drive. A power-



Bates & Edmonds Hoist

ful brake is provided, operated by the foot, thus making it a one-man machine.

This hoist is designed not only for contractors' use, but it will be found valuable wherever any kind of hoisting is to be done. Some have used it with great success for hoisting ice and coal, while others operate hay carriers, pile drivers, derricks, etc.

Bulletin No. 21 issued by the Bates & Edmonds Motor Co. describes all of the above apparatus in great detail. The contractor or owner having use for this class of machinery will have no difficulty in selecting the particular machine best suited to his needs.

EDGE TOOLS.

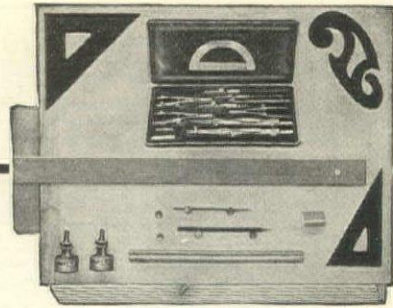
A recent number of the American Machinist contains a most interesting description of the ingenious processes used in the manufacture of hand forged edged tools, such as broad axes, hatchets, carving tools, plane irons, gouges, knives, chisels, etc. This article described in details the plant of Mack & Co., Brown's Race, Rochester, N. Y. Mack & Co. have been known to the trade for over eighty years as makers of the finest edged tools, as mentioned above. The catalogue of carpenter's tools, which is sent to our readers on request will show the many styles, sizes, etc., with prices, which this company makes. It will give the carpenter who is using their tools an additional pride, both in his work and in keeping his tools.

THE FIREPROOFING HAND BOOK.

When the contractor is asked to figure on a job of fireproofing, one of two courses is open to him. Either he must take somebody else's word for what the job is worth and subtlety, or he must be prepared to estimate the work himself.

The handbook issued by the General Fireproofing Company, 310 Logan avenue, Youngs-

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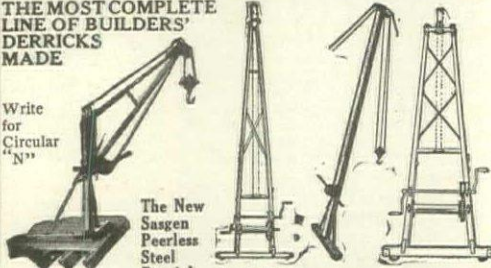
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town, Ohio, will greatly assist the contractor in making up his estimates or bills of material. In the hand book are given many illustrations, tables, specifications and directions for installing the various forms of fireproofing. Details of construction are given so that the contractor can see exactly how much work it is to put the reinforcing material and the concrete or stucco in place. The booklet covers the subject of fireproofing thoroughly in a most practical manner.

MR. W. B. BROWNE.

The selling organization of The Peck, Stow & Wilcox Company of Southington, Conn., New York, N. Y., and Cleveland, Ohio, has been fortunate in securing the services of Mr. W. B. Browne.

Mr. Browne has a long and intimate acquaintance with the hardware trade, having represented the Simmons Hardware Company



for eleven years, during which time he was very successful with the best trade on the Pacific Coast. His experience as a successful salesman in the hardware lines, however, reaches back over ten or eleven years of practical experience prior to his connection with the Simmons Hardware Company.

It goes without saying that he has many strong personal relations with the trade, and his friends will wish him all success in his new association with this old-established concern, whose organization dates from 1819, and who claim to be the largest individual manufacturer of mechanics' hand tools, as well as the oldest and largest maker of tinsmiths' and sheet metal workers' tools and machines.

Advertisers' Section.

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PHENIX REVERSIBLE WINDOWS.

If it were possible to make windows so that it was only necessary to wash one side of them, there would not be the necessity for improving the style of windows commonly found in our buildings, but owing to the actual conditions which it is necessary to devise some plan or construction by which the window can be cleaned on the outside as easily as on the inside.

A great many devices have been tried to eliminate the outside cleaning, all of them more or less complicated and a puzzle to the contractor and builder, and almost impossible of operation by those who must do the frequent cleaning.

The Phenix Reversible Window was designed to virtually bring the outside of the window inside, and therefore make it possible to clean it with little effort and no risk of life and limb. The advantages of such a device are apparent to everyone, and a pamphlet issued by the Phenix Manufacturing Co., 928 Center street, Milwaukee, Wis., describes this window in detail.

KEES BUILDING SPECIALTIES.

A recent circular issued by the F. D. Kees Mfg. Co., Box 811, Beatrice, Nebraska, shows photographic reproductions of a large number of bungalows, residences, barns, etc., in which the Kees Metal Building Corners have been used. Every carpenter knows what a particular job it is to cut and bevel the ends of weatherboarding so as to make a perfect mitre joint. This takes time and quickly runs up the cost of the work.

With the joint permanent, it might even be excused, but the fact is that no matter how skillfully the work is done or how well it is nailed and painted and put together, the joint will warp and spread open in time, leaving unsightly openings which not even putty and paint can cover.

Even where corner boards are used, it is a nice job to fit the siding tight up against it, and there is always a chance for the corner board to shrink a little and so pull away from the ends of the weatherboarding.

The Kees Metal Building Corners are so made as to perfectly cover the corner joint, and saves all of the labor of close fitting. As it covers the material for a couple of inches each way from the corner, there is no possibility of the joint ever being exposed.

The Kees Metal Building Corners are so treated that they can be painted exactly the same as the siding, and in consequence are practically unnoticeable at a short distance away. Being galvanized, they will not rust, but will last as long as the building. They are made in a number of styles and sizes to suit various conditions.

The F. D. Kees Manufacturing Company will be glad to hear from contractors and builders who are not familiar with these corners and will be glad to advise them regarding their proper use, etc.

Advertisers' Section,

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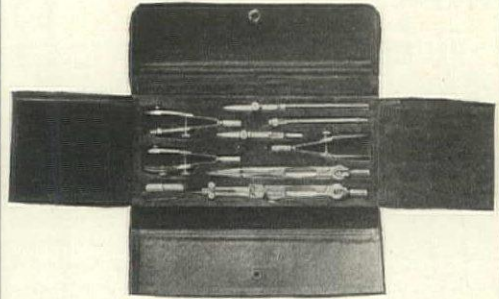
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The tenth edition of the catalogue of Kolesch & Co., 138 Fulton St., New York, is fully illustrated with every device used by the modern draftsman, architect, and engineer. It describes in detail a complete line of drawing and tracing papers, sunprint papers and equipment, drawing instruments and materials, surveying instruments, accessories, etc.



Kolesch & Co. have been located for many years in their present place of business and are well equipped to advise their customers regarding the various materials and supplies listed in their catalogue. A great many of the instruments

are designed for the finest engineering work, which the average contractor would not ordinarily have to do, but there are also listed the various instruments, tools and appliances which the carpenter, contractor and estimator will use.

The catalogue contains some three hundred and thirty-six pages, and is a complete catalogue for its purpose.

UNIVERSAL SASH BARS.

In order to humor the ideas of their clients, a number of our readers have had to install show windows of unusual designs. Each particular job has something different in it. One owner wants extremely large windows, while another prefers comparative narrow lights with small bars between. Still another merchant wants the front divided up into rounded lights or possibly built out in bay windows.

The contractor who thus has to figure on curves and angles in connection with plate glass store fronts is at something of a disadvantage unless he has the catalogue of the Voltz Manufacturing Company, 911-13 Penn. street, St. Joseph, Mo., to guide him. This catalogue shows the numerous possibilities of Universal Sash Bars for store front work.

One of the features of the Universal Sash Bar is that it will keep the window from frosting during the winter. A great many merchants at present are adopting expensive methods to overcome this difficulty but better results can be obtained by simply installing the Universal Sash Bar in the store fronts.

The catalogue of the Voltz Manufacturing Company contains a great deal of information of interest to the builder who is going after this class of jobbing work or who is building new stores or similar work.

BUILDERS' HARDWARE.

Catalogue No. 5, issued by the Rehm Hardware Co., 1503 Blue Island avenue, Chicago, Ill., lists a great many tools, appliances, devices, hardware, etc., of interest to the builder and contractor. The catalogue is so complete that the contractor will have no

Advertisers' Section.

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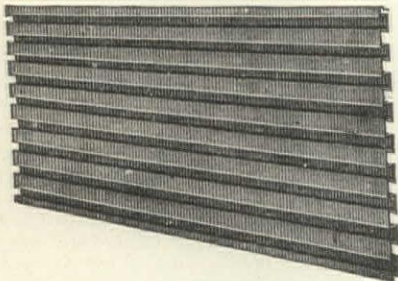
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difficulty in listing all of the hardware needed on any building, while the prices will be found to be most attractive.

The Rehm Hardware Company get out at frequent intervals a special bulletin containing numerous bargains of hardware, tools, and other supplies for the contractor. Those of our readers who are taking contracts on work can have their names placed on the mailing list for these bulletins, in which case they will be kept posted on all changes in prices as well as in the special sales, which mean money saved to them.

FERRO-LITHIC REINFORCING AND FURRING PLATES.

The demand for an absolutely fireproof construction led to the designing of Berger's Ferro-Lithic Reinforcing and Furring Plates. These plates have been used with most satisfactory results for fireproof roof construction, for floor reinforcement, skylight curbs, siding and similar construction. As will be seen by the cut herewith, the ferro-lithic plate consists of heavy black steel of special quality,



Berger's Ferro-lithic Plate

made in the Berger mills, and formed into a series of lateral corrugations, dovetailed to hold the concrete or plaster in place.

A plate of this character must possess certain qualities. It must be available in such sizes as to adapt itself to practically any job. As these plates are made twenty inches wide and in any length up to ten feet, it will be seen that they can readily fit any desired space. The tapering corrugations hold the concrete or plaster very firmly and allow this covering to be put on with comparatively little labor.

The tests made on this material show that it is extremely satisfactory wherever it has been used. Its natural strength as well as its reinforcing qualities makes a floor or roof which is both strong and light.

A catalogue of these plates, which is being sent out by the Berger Manufacturing Co., Canton, Ohio, describes these plates and their use, together with specifications, and details of work already in place

RED CEDAR SHINGLES

The first glimpse of a house in the country is usually that of the roof, the side walls being hidden by trees and shrubbery. When one considers the passion for bungalows with their broad expanse of roof as well as their tend-

Advertisers' Section.

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The Kauffman Company

679 ROSE BUILDING CLEVELAND, OHIO

ency to nestle close to the ground, one realizes that to make the first impression good, the roof must be of a pleasing character.

The use of red cedar shingles for the roof as well as for the exposed walls makes a most pleasing effect possible. The natural color of the shingles harmonizes with the surrounding landscape.

The nature of red cedar shingles is such that they are practically proof against decay. Red cedar logs have been found which must have laid on the ground for centuries, without deterioration. The use of these shingles on the roof, therefore, when properly laid, insures the owner against the necessity for re-shingling during his lifetime.

The Red Cedar Shingle Manufacturers Association, 4197 Arcade building, Seattle, Washington, has prepared a Bungalow Book containing many beautiful, practical and up-to-date designs and floor plans for bungalows and moderate-priced residences. These show the beautiful effects which can be obtained by the use of red cedar shingles. This book is sent free to those of our readers who are interested in getting the very best effects in their buildings.

ORNAMENTAL IRON WORK.

The contractors in the smaller cities do not have a structural or ornamental iron concern in their vicinity from whom they can get such work as iron railings, stairs, fire escapes, balconies, fences, stable fixtures and similar work in light iron and steel.

The Mack Iron & Wire Works Company, 6 Warren street, Sandusky, Ohio, are prepared to furnish this class of work for all sections of the country. Their catalogue shows many designs for work in this line as well as window guards, lawn seats, grilles and wickets, gates, signs, trellises, steel doors, lawn ornaments, etc.

Those of our readers who have work of this kind in contemplation will be interested in the prices which the Mack Iron & Wire Works will give them.

TWELVE YEARS OF SERVICE

The Pearson Manufacturing Co., Robbinsdale, Minn., have sent us one of their nailers which has been in constant use since 1901. The owner of this nailer, Mr. Henry Anderson, Waupaca, Wis., writes that it has been used—and abused—by a good many men during its twelve years of service, and that it has been repaired a number of times, but even now is capable of doing good work and probably would be for several years to come. The photograph shows this nailer as it looks today, and the reader can see the owner's initials scratched on the side. Although the recent styles of the Pearson Nailer have a number of improvements over this old pattern, the fact that this one has stood all of this treatment would indicate that the newer styles would do equally as well and possibly better.

The Pearson Nailer is now made in several sizes, and are painted different colors for the different size nails. The carpenters who have

Advertisers' Section.

PASTE THIS DOME ON LETTERS YOU WRITE TO ADVERTISERS. IT HELPS.



used these nailers, like Mr. Anderson, have been greatly pleased with the results, and keep them at work whenever there is a shingling job to do.

The many advantages of using the Pearson Nailer are fully described in the circular



A Pearson Nailer After Twelve Years of Hard Service

which the Pearson Manufacturing Co. sends on request. These nailers can be obtained from practically any hardware dealer, and they carry an absolute guarantee of satisfaction. With this sort of a proposition it is perfectly safe to try them out, as that is the only way their advantages can be fully appreciated.

EVENING STUDY.

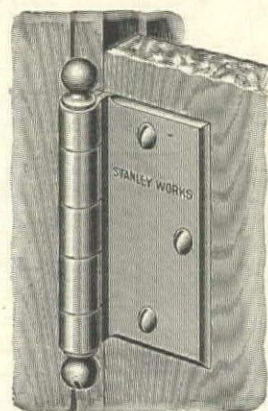
The Chicago Technical College, 1018 Lake View Building, Chicago, Ill., announces the start of new evening classes in the design of steel and concrete structures, foundations, etc. The students in these classes are instructed by practicing architects and engineers from the leading offices in Chicago, and a student is, therefore, assured that the knowledge which he gains will be that used on up-to-date jobs.

The uses of steel and concrete are extending so rapidly that the student must keep up with the new ideas or he will soon be left behind. The course of instruction mentioned above will enable him to keep well to the front in this line of construction.

PLUMBING AND STEAM SUPPLIES.

The catalogue of plumbing and steam supplies, issued by B. Y. Karol, 768-72 W. Harrison St., Chicago, shows a complete line of fittings, as well as a portion of the large stock of plumbing goods and accessories which Mr. Karol keeps on hand. The various fixtures illustrated and described are all high grade goods, which will pass the closest inspection. The catalogue will enable the contractor to select the fixtures, supplies, tools, etc., needed for practically any job of plumbing and gas fitting.

Advertisers' Section.



TRADE
SW
MARK

TRADE
SW
MARK

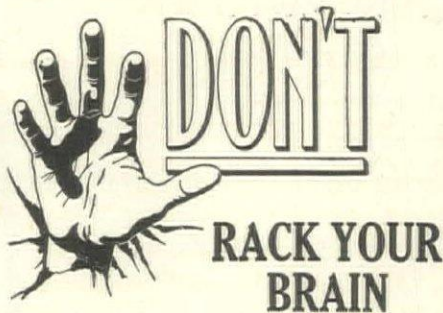
Stanley's Ornamental Surface Butt

Saves Time and Labor
and Pleases the Owner

The handsome beveled edge design harmonizes with the popular patterns of hard ware. The slotted ball tip enables you to easily reverse the pin for either right or left hand doors.

Write for Booklet N

THE STANLEY WORKS
New Britain, Conn.



trying to figure out the lengths and cuts
of rafters. Use

OUR LITTLE BOOK

It's Free--Send today

It gives the lengths and cuts of common, hip, valley and jack rafters for seventeen different pitches of roof.

We stamp this rule on all our rafter framing squares. We manufacture the only practical take-down square.

NICHOLLS MFG. CO.
OTTUMWA, IOWA

PASTE THIS DOME
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ON LETTERS YOU
TISERS. IT HELPS.



**FREE TRIAL
Rapid Floor
Surfacer**

Made in
Three Sizes

M. L. SCHLUETER
109 N. Canal St.
Chicago

PEARSON'S AUTOMATIC SHINGLE NAILER

Pays for itself on one fair-sized job. Works well on any pitch of roof. Prevents getting stains in cut or bruised hands, or contracting diseases of the mouth.

Made in two sizes—The Blue Nailer is for common 3d, No. 14 gauge wire nails and the Red Nailer is for the galvanized 3d, No. 13, 1 1/4 inch wire nails.

It will come right to your door, quick, by insured parcel post, all prepaid for only \$5. Write for circular N.

PEARSON MFG. CO.
Robbinsdale - - Minnesota



It Makes Good

Galvanized Iron Cut Nails

For shingles, slating, boat and wharf building, fencing, sheathing and all exterior work use



Anchor Brand Iron Cut Galvanized Nails

as they will outlast the best of wood under all climatic and weather conditions.

Write for Prices

E. & G. Brooke Iron Co., Birdsboro, Pa.

The Fox Floor Scraper
A \$25 Floor Scraper

Guaranteed to do perfect work. Simple of construction. Easy to operate. Leaves a smooth finish. Shipped on five days' free trial, freight charges prepaid.

Price \$25.00

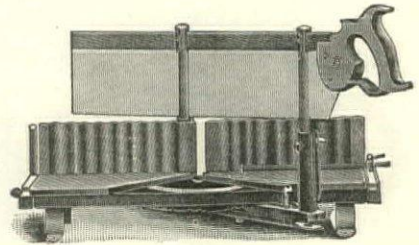
Fox Supply Co.
Dept. N, BROOKLYN, WIS.



GOODELL STEEL MITRE BOXES.

In designing the Goodell Mitre Box, the manufacturers endeavored to see how good a one they could make regardless of cost, and they believe that in quality of materials it is superior to others on the market, being made of Bessemer steel, and from the nature of the materials used, it should outlast the cast mitre boxes many years.

There are a number of improvements on the Goodell Mitre Box which are not found on other makes. The graduations are such that time is saved in making changes, it being so designed that two opposite cuts can be quickly and accurately made. When desired, automatic stops hold the saw up out of the way, allowing the free use of both hands in placing the work. The guides are unusually long,



The Goodell All-Steel Mitre Box

thus holding the saw steady, even when raised to its highest point.

When desired, an extra angle attachment can be added, which allows one to increase the angle above forty-five degrees, while there also goes with the box a gauge for sawing duplicates up to twenty inches in length.

But no matter how well a mitre box is made, constant use will wear it some. The Goodell Box is designed with provision for taking up any wear on the guides, so that the cut will always be properly made. The box is automatically locked at all regular angles and by a simple device it can be locked at any angle.

The catalogue of the Goodell Manufacturing Company describes these mitre boxes and gives the prices at which they are regularly sold. They are found in practically every first-class hardware store, or they can be purchased direct.

THE VAN DUZEN CONCRETE MIXER.

On account of the weight of the materials, the mixing of concrete has always been one of the places where the contractor tries to save on his labor. To turn a ton of stone, four or five hundred pounds of sand, two or three hundred pounds of cement and water, over three or four times requires a lot of shoveling, and when you are through it makes about a yard of concrete, which must still be wheeled or shoveled into place.

It is, therefore, no wonder that the contractor tries to satisfy himself with turning the mass over once or twice and calling it a mix.

Everyone knows this is not the right way

Advertisers' Section.

PASTE THIS DOME
WRITE TO ADVER-



ON LETTERS YOU
TISERS. IT HELPS.

to do, but when they do not have a mixer, the tendency is to get the work done as quickly and as cheaply as possible.

The Van Duzen Concrete Mixer made by Van Duzen, Roys & Co., 326 Dublin avenue, Columbus, Ohio, is designed to perform the work of mixing quickly and economically. As generally arranged, the mixer is provided with a gas engine of suitable size to turn the drum and operate the other necessary machinery. The mixer is so arranged that it will discharge directly into a wheelbarrow standing on the ground beside it, thus saving in the labor of putting the concrete in place.

The Van Duzen Mixer is made in a number of styles and sizes to suit the needs of various contractors. A catalogue describing these mixers shows their construction in detail as well as gives other valuable information to the contractor.

IDEAL WALL BOARD.

It is deplorable how many rooms, offices, shops, etc., are left with inferior wall finishes, exposed rafters, joists and studs, cracked plaster, etc., when by the use of Ideal Wall Board any ordinary carpenter or good mechanic could give the room a most satisfactory interior.

Ideal Wall Board as made by the Roberds Manufacturing Company, 104 Railroad street,



An Ideal Wall Board Interior

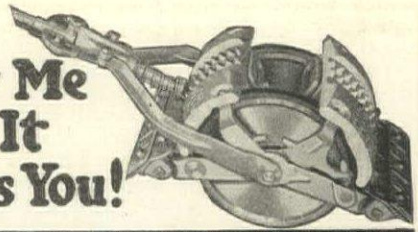
Marion, Ind., consists of several layers of special fibre stock held together by layers of pure asphalt. This makes it particularly tough, durable and waterproof, as well as making it an ideal material for sound proofing.

The advantage of wall board over lath and plaster for many purposes is not fully realized by our readers. The harder the wear and the more severe the conditions, the more need there is for this ideal material.

The catalogue which the Roberds Manufacturing Company are sending out to inquirers shows a number of rooms in which this modern, sanitary, fire-resisting and non-conducting wall finish was used. A number of "before and after" pictures are shown,

Advertisers' Section.

**Pay Me
As It
Pays You!**



You don't have to put up any money to get my scraper. Just make a small deposit five days after arrival; then five days later start making monthly payments. These payments will hardly exceed ordinary daily rental fees—and

The WEBER DOUBLE ACTING Floor Scraper

can easily be made to earn enough extra profits to more than take care of them. Write for my free trial offer today if you want to get a good scraper and get it right.

Wanted.—One Good Agent in Each Town

JOHN F. WEBER, Pres.
WEBER MFG. CO.
661 71st Ave.
West Allis, Wis.



TAKE THIS HALF LB. BOX OF STANDARD ZINC SHINGLE NAILS --- FREE

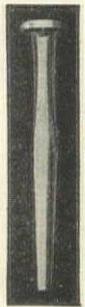
We send it free, postpaid, to architects, contractors, carpenters, builders and men interested in good building—to show that they are pure zinc all through, absolutely rust proof, nice to handle, easy to drive and will add years to the life of a wood shingle roof.

Write now for this Free Sample, and specify and buy them for every job.
W. H. MAZE COMPANY
Manufacturers PERU, ILL.



Look For **THIS CROSS** On the Head of Every Standard ZINC Shingle NAIL.

It Is Our Registered Trade Mark



PASTE THIS DOME WRITE TO ADVER-



ON LETTERS YOU TISERS. IT HELPS.

which would indicate to the reader some of the many ways in which this material can be used to advantage.

Ideal Wall Board comes in several widths from thirty-two to forty-eight inches wide, and in any length up to sixteen feet. This will allow the contractor to select the width and length which will just meet his conditions, and will frequently allow him to put up all of the wall board with practically no cutting.

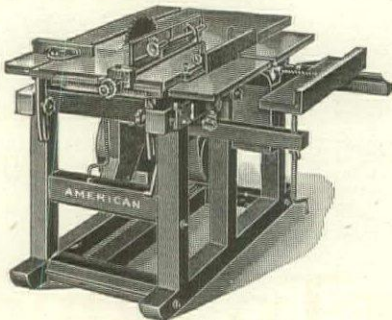
This Wall Board can be used both over old plaster or other wall finish and on new work. The catalogue suggests many ways in which wall board can be used as well as gives letters from numerous customers who have had this wall board used in their buildings.

The Roberds Manufacturing Company are anxious to show contractors the value of this material, and will either quote delivered prices on a definite list, or if the plans are sent them, they will name a price for the necessary material. Those who wish to see what Ideal Wall Board is can obtain samples, prices, etc., direct from the manufacturers.

MILLWORK DONE ON THE JOB.

When the contractor hands in his figure on a nice contract, he realizes that he must figure close and must be prepared to do his work economically and right the first time. He must be prepared to exercise numerous economies in the way of construction and management, one of the least of which must be that his men must always be supplied with material and that there is no delay due to waiting while cutting up timbers to size, cutting bridging, flooring, etc., or doing any of the numerous little jobs which can be done to advantage on a portable woodworker.

The American Portable Woodworker, made by the American Saw Mill Machinery Co., 80 Laight street, Hackettstown, N. J., is designed to help out the busy contractor in this line of work. This woodworker is built with a gasoline engine or electric motor in the frame



The American Woodworker

so that it is really portable, and can also be started at a moment's notice. The cost of power is only a small fraction of what it would cost to do the same work by hand, while the saving in time makes the use of a machine of this character almost absolutely necessary on every job.

The American Woodworker is practically a complete planing mill. With it the most intricate work can readily be done, which will save the contractor in both time and material. On some jobs the contractor keeps one man steadily on the machine, while in other cases each man does his own work on it.

The catalogue of the American Woodworker will describe its many other good points to our readers and will probably show them where it is greatly to their advantage to have one or more of these machines, according to the size of their job.

THE YANKEE TOOL BOOK.

Yankee Tools made by North Brothers Manufacturing Co., Philadelphia, Pa., are to be found in practically every store in the world, and are used in mechanics in every line of work from automobiles to yachts. The great variety in which Yankee Tools are made



A Yankee Tool Set

is shown in the Yankee Tool Book, which describes in more or less detail their labor-saving tools such as ratchet screwdrivers, spiral screwdrivers, automatic or push drills, breast and hand drills, etc.

The book illustrates a number of the ways in which these tools can be used as well as the various attachments which go with them. The book is more or less of a guide by which the mechanic can select the tools suited to his use as well as makes numerous suggestions for labor-saving ideas.

The mechanic who is not posted on the merits of Yankee Tools should have this tool book as a guide.

The increasing use of the automobile brings with it the necessity for numerous repairs both at home and in the garage. A special booklet indicates some of the uses which the Yankee Tools may be put to in this class of work. The mechanic can probably see a more or less complete line of Yankee Tools at any hardware store, but should he not be able to, Department N, of the North Brothers Manufacturing Company is prepared to give him whatever information he desires.

A DOOR TRIM PLANE.

The Stanley Rule & Level Co., New Britain, Conn., always in the forefront in plane construction, have recently gotten out a special plane for making mortises for butts, face plates, strike plates, escutcheons, etc., without the use of a butt gauge or chisel. It might almost be called a mechanical chisel in

ARKANSAS

Builders are entitled to this even quality material which lessens the cost of labor.

SOFT PINE

These qualities appear in every piece: Soft texture, rich color, beautiful figure.

If you want value for the money you invest in the structures you build, use Arkansas Soft Pine.

You are entitled to full returns on every dollar you invest. *You get full returns when you use this Good Lumber.*

With it the workman weaves the best that is in him into the structure upon which he is employed. His *best* becomes a part of the building and the owner secured the *double benefit of Best Material and Best Workmanship.*

Using Arkansas Soft Pine, that great enemy of good building, *listless, slovenly work is completely eliminated, and the carpenter imparts to the structure his good will, highest knowledge and greatest skill.*

You get this added value at a lower labor cost, for Arkansas Soft Pine may be fitted and secured in place in less time than inferior lumber.

If you are interested in building or expect to become interested, send for a copy of

How To Build

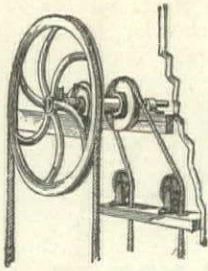
Arkansas Soft Pine Bureau
308 South Canal Street CHICAGO, ILLINOIS

PASTE THIS DOME
WRITE TO ADVER-



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Storm Paragon Dumbwaiter



is one of many styles made to serve and serve well in any style of structure.

AUTOMATIC—operates easily and has same reliability as our entire line.

We can "fit" your need. Our catalogue will interest you and we can help you. Write us.

The Storm Mfg. Co.
52 Vesey St., Newark, N. J.



Sanitary Automatic Dumbwaiters

Also Refrigerated Dumbwaiters. Save carrying food to and from the cellar. Perfectly ventilated; screened openings, and finished inside with durable white enamel. Keeps food perfectly. Occupies no space as top lies flush with kitchen floor. You can walk over it. Operates simply with push button or lever. Write for particulars and prices. Prices moderate.

York Automatic Dumbwaiter Works, 369 West Market St., York, Pa.

STEEL CEILINGS



Are you figuring on using a medium priced Steel Ceiling? Get our catalog by all means. It shows a line of beautiful ceilings of sufficient variety to please almost any individual liking, yet at prices surprisingly low.

The possession of this catalog and a knowledge of our line and prices will save you many a dollar if you are an occasional or frequent buyer of Steel Ceilings.

Write for it today

INDIANAPOLIS CORRUGATING COMPANY
INDIANAPOLIS : : : INDIANA



"WIFE'S JOY" BALL BEARIN DISAPPEARING DUMBWAITER

Saves 3,650 trips to cellar annually. Operates on press of button. No pulling of ropes. Absolutely guaranteed. Shipped on trial. Send for catalog. We also furnish all kinds of elevators.

American Elevator Co., Inc., Bloomsburg, Penna.

Hot-Water Heated \$215

You will be surprised at the extra profit you can make on an Andrews System in your next job—and how satisfactory it will be to your clients.



For Old or New Houses

The Andrews method of cutting and threading all pipes and laying out the entire material to exactly fit your job makes it easy for you to screw the plant together and make the steam-fitter's profit. Write for Heating Book, Free Estimate and Free Thermostat Offer.

Andrews Heating Co.
1383 Heating Bldg., MINNEAPOLIS, MINN.

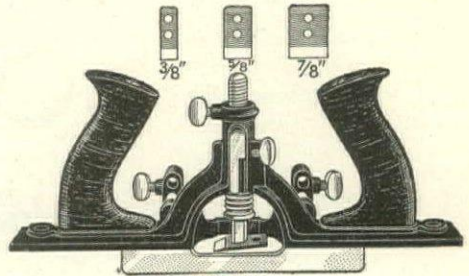


PASTE THIS DOME WRITE TO ADVER-



ON LETTERS YOU TISERS. IT HELPS.

that it is practically automatic in its action. The circular which the Stanley Rule & Level Co. is sending out describes this Door Trim Plane in detail and, what is unusual in a circular of this character, gives explicit directions for its use, thus allowing the carpenter to see



No. 171 Stanley's Door Plane

exactly the nature of the work which it will do. This circular describes only this one tool, so if the reader wishes the complete Stanley catalogue, he should ask for it in addition to this circular.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, ETC.

The National Builder, published monthly at Chicago, Ill., required by the Act of August 24, 1912.

Editor, Fred T. Hodgson, 537 S. Dearborn street, Chicago, Ill.

Managing Editor, Charles A. Miller, Jr., 537 S. Dearborn street, Chicago, Ill.

Business Manager, Fred D. Porter, 537 S. Dearborn street, Chicago, Ill.

Publisher, Porter-Hodgson Company, 537 S. Dearborn street, Chicago, Ill.

Stockholders, Fred D. Porter, 537 S. Dearborn street, Chicago, Ill.; Geo. A. Fargher, 537 S. Dearborn street, Chicago, Ill.

Known bondholders, mortgagees and other security holders, holding 1 per cent or more of total amount of bonds, mortgages, or other securities: A. E. Taylor, 24 N. 5th avenue, Chicago, Ill.; C. S. Roberts, 5505 Cornell avenue, Chicago, Ill.

PORTER-HODGSON COMPANY,

Fred D. Porter, Treasurer.

Sworn to and subscribed before me this 16th day of September, 1913.

GEO. H. BILLINGS
Notary Public.

(My commission expires April 8, 1914.)

MONEY IN FLOOR FINISHING.

Few men have greater opportunities for making money than those directly interested in the building field. But these opportunities are often overlooked, not because a carpenter is not a first class workman or a contractor right on the job when it comes to being asked to quote figures, but the trouble is that many men connected with the building trade are not born salesmen for their own services. They do not understand how to take advantage of the opportunities knocking at their own doors

Advertisers' Section.

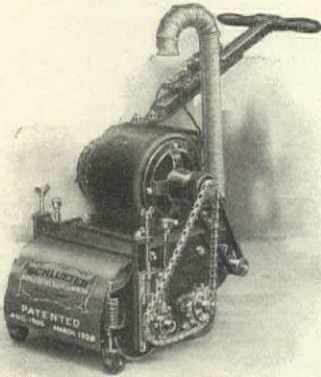
every day. They have simply never thought of going out after business the way many manufacturers do.

Take, for instance, the flooring end of the building trade. There was a time when everyone laid carpets in nearly every room in the house, but now the fine hardwood floors specified by architects and bought and laid by up-to-date contractors and carpenters has changed that to rugs.

Then again, there are certain cities where dancing has become exceptionally popular and that means more dancing halls, pavilions, etc., where the very best flooring is laid. And then again, there is the bowling alley which can now be easily found in every place of any size and it wasn't so many years ago either that this sport was almost unknown.

The carpenter, contractor and builder who has kept pace with these changes knows that the old way of finishing a floor by hand is too slow and expensive. It takes machinery to properly finish the modern floor.

Now, machinery in most lines of manufac-



Schlueter's Floor Surface with Electric Power

turing is a very expensive proposition. It takes the average manufacturer sometimes years to design and have made the right kind of machines needed. It takes thousands of dollars to even get the average manufacturer started into business. It takes the average manufacturer, too, often many years before he begins to realize real money on his investment.

In the building field, however, a carpenter, contractor or builder can buy a machine for a few hundred dollars that should put him into a paying business from the very start. This has been proven by the sale of over 5,000 O. K. Schlueter Automatic Floor Surfacing Machines which have been sold to men directly interested in building construction. These machines are manufactured by M. L. Schlueter, 109 N. Canal St., Chicago. They are sold on a Free Trial proposition and are designed and manufactured to successfully work on either old or new flooring and to do the work so quickly and well that the owner and operator of the machine, so Mr. Schlueter claims, can make money right along with it.

Mr. Schlueter will mail circulars describing his machine on request.

Advertisers' Section.



Why Should I Specify Birch?

Because Birch is a hard, durable, wear-resisting wood that in the highest degree combines service, beauty and economy. The figure, color, and satiny lustre of Birch always please.

Where Should I Specify Birch?

For doors, casing, base, panels, beams and all interior trim. Birch finish is the best finish.

When Should I Specify Birch?

Whenever you have anything to say about the finishing of a modern office, store or apartment building, hotel, residence or bungalow. Whether in a palatial mansion or humble cottage, Birch gives permanent satisfaction.

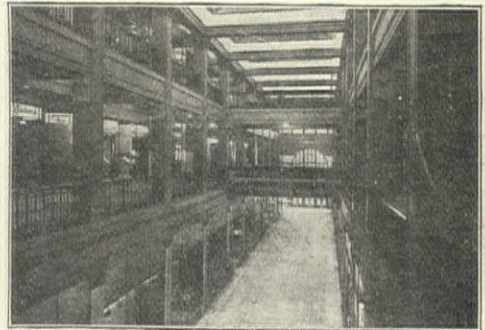
What Should I Do to Learn About Birch?

Ask at once for Birch Book "D" and the Birch Panels sent postpaid by

The Northern Hemlock and Hardwood Manufacturers Association

Dept. D

Wausau, Wisconsin



Jenkins Arcade, Pittsburgh, Pa.—Finished Entirely in Birch

PASTE THIS DOME
WRITE TO ADVER-



ON LETTERS YOU
TISERS. IT HELPS.

Fixtures Stay Fixed

--if you fasten them with Richmond Screw Anchors



Simplicity and durability make Richmond Screw Anchors superior to any device for fastening fixtures on a wall built of any material. Gov't tests have proved it.



Send us 50c, tell us what work you require them for, and we'll send you a trial supply. You'll never use any other afterwards. Ask for Circular N.

Richmond Screw Anchor Co., 9N Church St., New York

IMPROVED QUICK AND EASY RISING

ELEVATORS

and Dumb Waiters, Automatic Hatch Gates. Send for Circulars.



Kimball Bros. Co., Council Bluffs, Ia.

THE STEEL SQUARE

Two Volumes. A practical treatise on the use of the Steel Square. By Fred T. Hodgson. 600 pages, 500 illustrations. The author was the first—really the only—to write on this important tool, and the two volumes contain the easiest as well as the latest method of using the Steel Square for the solution of the many problems in building construction. The two volumes are of the greatest value to the young carpenter. Single Volume, Part I, cloth... \$1.00 Part II..... 1.00 Two Volumes..... 2.00

Postpaid at These Prices

Hodgson Book Company

539 S. Dearborn St., Chicago

PHOENIX INSIDE SLIDING BLINDS

Comfort : Convenience : Economy

The lately patented springs and corrugated steel rods put the "Phoenix" far in lead of less improved styles.

WRITE FOR CATALOG P-T.

Phoenix Sliding Blind Co., PHOENIX, N. Y.

THE WINTHROP TAPERED ASPHALT SHINGLES

Make the cool, gray slate colored long lasting roofs

So specify, buy, and put them on every job. They are light in weight, durable, fire resisting, weather, wind and sun proof. Laid with regular shingle nails, same as wood, and fully guaranteed.

Write for Catalog and Sample

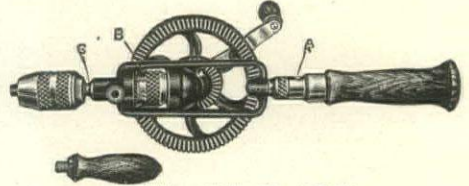
The Winthrop Asphalt Shingle Co.,

10 Sixty-First Street

Argo, Illinois

CARPENTERS' TOOLS.

The latest catalogue of the Millers Falls Co., 28 Warren street, New York, N. Y., shows a large number of special tools for carpenters' and builders' use. The special tools and devices include magazine, hack saw frames, ratchet braces, corner bit braces,



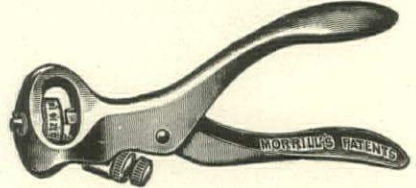
A Millers Falls Hand Drill

chain drills, hand and breast drills, bench drill presses, boring machines, automatic boring tools and screwdrivers, carving tools, mitre boxes, mitre planers, jointer gauges, hand vises, etc. This interesting catalogue will be sent to our readers on request.

SAW POINTS.

The best made saw will in time become dull and require filing and setting. If this is not properly done there will be a great deal of hard work for the carpenter, as well as unsatisfactory work. To file and set a saw properly requires a certain amount of skill, and also requires a definite knowledge of exactly what the filer wants to accomplish.

"Saw Points" is the title of a neat little booklet issued by Mr. Charles Morrill, 96



Lafayette street, New York, N. Y. It tells how to joint, set and file handsaws, as well as containing a great deal of valuable information. Mr. Morrill will be glad to send this booklet to our readers on request.

NEW DOOR BOOKLET.

The Stork Millwork Company 607-20 W. Jackson Blvd., Chicago, have a new booklet on the press describing their line of both panel and front doors.

This booklet is arranged in such a way that contractors will find it unusually easy to specify and order just what they want. For instance, one page shows a very attractive pine door design, in over forty different sizes, and the sizes are listed with prices opposite, so there is no chance for any error in ordering.

The illustration shown here is one of the many designs of fir, white pine, veneered oak and birch, and yellow pine doors described in the new booklet. It is their No. 315 and a fir door of unusually fine workmanship, ma-

Advertisers' Section.

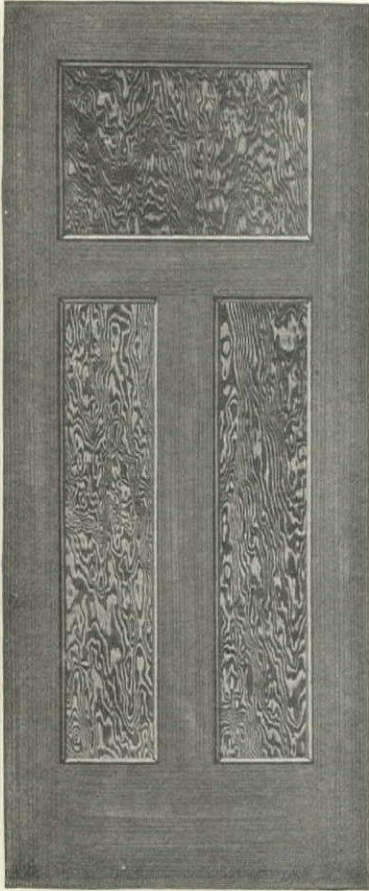
PASTE THIS DOME WRITE TO ADVER-



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terial and good style; a door that is in big demand at this time. Another door that is especially well liked by all is a two panel door and this is carried in stock in over thirty different sizes.

The Stork Millwork Company have been



A Stock Door

selling high class doors direct to contractors and builders for some years. They want to send this new door booklet, together with price, etc., to every reader of THE NATIONAL BUILDER interested in first class designed and well built doors at low prices. They are prompt shippers.

BAY STATE BRICK AND CEMENT COATING.

The concrete contractor who has had difficulty in waterproofing his buildings will appreciate the merits of Bay State Brick and Cement Coating as manufactured by Wadsworth-Howland & Company, 82-84 Washington street, Boston, Mass., and described in their booklet "I." This booklet contains a great many photographic reproductions of buildings in which this waterproofing has been used, together with a long list of buildings in practically every state in the Union. It also

Advertisers' Section.

**BAYONNE
ROOF AND DECK
CLOTH**

Best Prepared Roofing Canvas

for
**Piazza Floors, Porch
Roofs and Decks**

Easiest to Lay

Lasts Longest

Looks Best

John Boyle & Co., Inc.

112-114 Duane St., 70-72 Reade St.,

NEW YORK, N. Y.

202-204 Market Street, St. Louis, Mo.

See Sweet's Catalog, Page 603, and
Write for Sample Book T9

**GULF STREAM
ROOFING
CANVAS**

Standard Brand of Plain White Canvas

MANTELS

AND FIREPLACES



BEFORE building or remodeling, be sure to send for our large new Catalog, describing the most complete line of Colonial, Mission and Standard Mantels in the country. Also brick mantels and a large selection of fireplace fixtures, consoles, colonnades, etc.

All Our Goods Are Guaranteed As to Quality

CHAS. F. LORENZEN & CO.

128 Reaper Block, Clark and Washington Sts., CHICAGO

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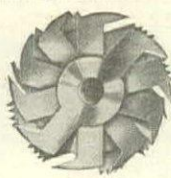


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Huther Bros. Patent Groover or Dado Head

Will Save Cost in Three Days Use.
Can be used on any Circular Saw Mandrel.

For cutting any width groove from 3/8" to 2" or over. Will cut a perfect groove, either with or across the grain, and leaves edges smooth. Will ship to any responsible firm on ten days' approval; if not satisfactory you are at liberty to return at our expense. We also make a specialty of concave ground smooth cutting circular Mitre

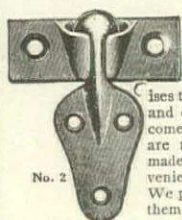


Showing Arrangement of Cutters.

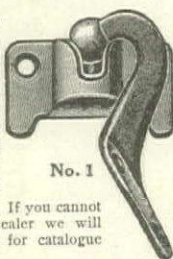
Saws, for either rip or cross cut; Grooving Saws for all kinds of special work; Lock Corner Cutters, Concave Saws, Etc.

HUTHER BROS.
SAW MFG. CO.
1105 University Avenue
Rochester, N. Y.

Advice to Carpenters and Contractors



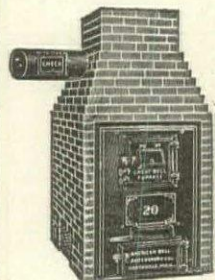
No. 2



No. 1

Place your order now for Diehl Ball and Socket Storm Sash Hangers. This promises to be a busy season and our motto is: First come, first served. There are no other Hangers made that afford the convenience that ours do. We prefer that you buy them from your dealer. If you cannot get them from your dealer we will furnish them direct from the factory. Send for catalogue and prices. Address

Diehl Novelty Co., Glenbeulah, Wisconsin



A Hot Air Furnace

For Less Than \$50 Complete
FOR 5 AND 8 ROOM DWELLINGS

An unheard of Price and a most Remarkable and Indestructible Furnace. No Pipes—no Lost Heat.

American Bell & Foundry Co.
NORTHVILLE, MICH.

The Red Book Series of Trade School Manuals

By F. Maire, Director of the Chicago School of Painting, Decorating and Paperhanging. 6 volumes. Illustrated.

- (1) Exterior Painting, Wood, Iron and Brick. (2) Interior Painting, Water and Oil Colors. (3) Colors, What They Are and What to Expect from Them. (4) Graining and Marbling. (5) Carriage Painting. (6) The Wood Finisher.
- The arrangement of the above volumes is such that the student is gradually advanced upon the branches treated and the questions at the end of each lesson will become an index of reference which he will find useful. Instructors will surely welcome these valuable manuals, as they will save them numberless repetitions. The student who cannot leave home to attend a school will find his task of learning the various branches treated greatly facilitated by procuring these volumes. Cloth, each, postpaid.....\$0.60

Hodgson Book Company 539 S. Dearborn St. Chicago

contains a color card showing the various colors in which it can be obtained and from which practically any desired shade can be made.

The object of Bay State Brick & Cement Coating is to decorate and protect concrete, cement, stucco and brick surfaces. It overcomes the dull, monotonous color of ordinary Portland cement, and prevents such surfaces from showing any spots, blotches, discoloration or dampness after a storm. By filling all of the pores in the surface, it prevents air cracks and other disfigurements. When metal lath is used with stucco, this compound prevents any moisture getting to the lath and so prevents the deterioration of it. By excluding dampness, it preserves all of the building materials, as well as insures a dry inside wall.

Bay State Brick and Cement Coating can be used not only on the exterior but on the interior, where it gives the soft, velvety effects of water color. As it is unaffected by dampness, it has far greater durability than any other of the products used for this purpose, and it can be washed without injury. It is one of the few compounds which bears the label of the National Board of Fire Underwriters, and when used on wood tends to lessen the fire risk.

The literature which Wadsworth-Howland & Company are sending to our readers contains much more valuable information, prices, etc.

A USEFUL CHRISTMAS PRESENT.

It is getting close to the time when the contractor who has the best interests of his men at heart begins to think of an appropriate present for them. One of the very best which we are able to suggest is a Master Slide Rule, made by the Dahl Manufacturing Co., 51-B East 42nd St., New York City.

The Master Slide Rule differs from all other rules in that it is possible to measure the exact distance between two surfaces such as the width between jambs, piers or openings of any kind. The measurement on the rule indicates the exact distance at any point on the surfaces, and the rule can be moved away, leaving the reading exact. In other words, it is not necessary to measure as with the ordinary two-foot rule for a distance of say 18 1/2 inches and hold your finger on the approximate point where the surface lines up. The rule measures between the actual surfaces, not between the outside or edges. The advantage of this is possibly clearly shown when measuring the opening of a window frame set in a heavy masonry wall. It is impossible to so unfold a rule to have it extend across the opening, and one must either make two measurements of it or guess at the exact opening, with the consequent liability to error. As a matter of fact, a measurement can be taken with the Master Slide Rule absolutely in the dark as the proper reading remains indicated on the rule until it is intentionally changed.

The Master Slide Rule makes the very nicest present for a carpenter whether he is an employe, a husband, brother or sweetheart. It is one they will appreciate and will think of the giver every time they use it.

Advertisers' Section.

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ARCHITECTURAL DRAFTING.

The increasing complexity in modern structures calls for the highest grade of instruction in drafting as well as a thorough understanding of the principles of construction used in modern buildings. The draftsman who is trained along these lines and has a thorough knowledge of the principles of construction, materials, methods of doing work, etc., is reasonably sure of a steady position at a good salary.

There are, of course, a number of ways by which such a training can be secured. By starting as an office boy in an architect's office many of the architects of today have secured their present knowledge and prestige, but this takes time and one must start early.

If one has the means he can go to any one of a number of schools or colleges which will give him the necessary training, but this takes all of his time so that he is earning nothing while learning and a man of mature years hesitates about joining a class of much younger men such as can afford to go to these schools direct from high school or even from grammar school.

The Chicago Engineering Works has made a careful study of the requirements which a first class draftsman must have. They have consulted the architects, engineers, contractors and others who employ this kind of men and from the various sources of information they have prepared a number of courses in architectural and mechanical drafting and designs. These courses are intended to be followed at home during leisure hours while the students may be at work during the day. The time of completion of these courses is, therefore, entirely optional with the student and the courses are, therefore, arranged so that each student is practically in a class by himself, his studying, examinations, etc., being followed as he has time to devote to it. Notwithstanding this isolation, however, the various courses are wonderfully complete, the student being given practically all of the information which he would acquire by many years experience in the drafting room. By this system of instruction the student is also given individual help whenever he desires it which enables him to progress very rapidly.

The advantages of a complete architectural drafting education are too apparent to need any explanation. Through it, the carpenter is enabled to become a first class draftsman, structural draftsman, architect or engineer. The corresponding increase in his salary will be judged entirely by his ability to progress.

The Chief Engineer of the Chicago Engineering Works, Room 528 Engineering Building, Chicago, Illinois, has prepared a book entitled "The Road to Success." It tells how to become an expert architectural draftsman and explains the methods of instruction of the Chicago Engineering Works. The Chief Engineer advises us that he is making a special offer to NATIONAL BUILDER readers.

Advertisers' Section.

FLINTKOTE *Rex-tile* TRADE-MARK SHINGLES

take the roof out of the ordinary, every-day class and add that quiet refinement which is always associated with well-roofed houses.

If you build to sell, use *Rex-tile*—you'll get more for your houses.

If you are the man who lays the roof—lay *Rex-tile*—it will put money in your pocket.

If the roof is for your own house—put on *Rex-tile* and you will have a handsome, durable roof of permanent color that won't leak or catch fire.

Made in red and slate colors.

Write for samples, circular
and prices

Flintkote Manufacturing Company
Pearl and High Sts., Boston, Mass.

New York

Chicago

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All the Roofs in the World

would be covered with

SHELDON'S SLATES

If everyone considering this important question realized the absolute permanency and economy of this wonderful colored stone product of Nature. In towns and cities where it is known 75% of the roofs are covered with it. All others should be.

If you, Mr. Contractor, are located where **Sheldon's Slates** are not used you will find it a mighty profitable business to introduce them. Better get in touch with us **today**.

Sheldon's Slates possess every desirable advantage a good roof must have, and are free from the many undesirable disadvantages of artificial materials. Nothing has ever been devised by man that can equal **Sheldon's Slates** from any standpoint. They're made by Nature and by nature perfect.

Our booklet "The Reason Why" contains many more facts you ought to know. May we send a copy?

F. C. Sheldon Slate Company
GRANVILLE - - - NEW YORK

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Diamond RAPID TRADE MARK FIRE Drill
 REGISTERED

The most economical means of drilling holes in brick, stone or concrete.



Patent applied for

Strikes blows like hand hammer with greatly multiplied speed. Write for bulletin No. 91.

Diamond Expansion Bolt Co., 90 West St., New York

Typewriter Sensation!

Read my great \$2 a month offer in September issue of The National Builder. Send for my catalog containing unusual bargains on all makes of machines.

Harry A. Smith, 180 No. Dearborn St., Chicago

An Opening for a Mortise Lock Can be Cut in Two Minutes by using the **Miller Door Mortiser**

Little labor is required, and a perfectly true job is assured. Makes no difference what thickness the doors are, the device works true on them all. Complete with five cutters, covering locks from 1/2 inch to 1 1/2 inches thick. A real time and labor saver. Sent subject to trial.



A. W. Miller Mfg. Co.
 Riverside, Calif. Cincinnati, Ohio

Our Butt Mortiser and Rule Gauge for 75 cents. Postpaid

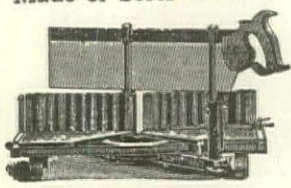
Three Tools in One SQUARE LINE GAUGE MITER



Compact, strong, no loose parts. Guaranteed accurate. Should be in every carpenter's and mechanic's tool kit. If your dealer can't furnish you with "The Rule Tool" send 25c for one postpaid. Pays for itself a thousand times over.

The Rule Tool Co., Herman and Vesey Sts., Newark, N. J.

GOODELL MITRE BOX
 Made of Steel — Cannot Break



First in Quality & Improvements

Automatic stops for holding saw; corrugated backs; graduated; gauge for duplicate cuts, and many other features. If you want the best you will take no other.

Send for Circular E

GOODELL MFG. CO., GREENFIELD MASS.

CORNICE MOULDINGS.

To the man who is perfectly satisfied with perfectly plain cornice in his parlor, dining-rooms, halls, etc., the special offer which Timothy F. Horan, 10 Maple St., Cooperstown, N. Y., is making to our readers will not take much of an appeal. To those, however, who want something new, something different, and something a little bit better than their neighbors have, it will be mighty interesting.

The Monarch Patent Cornice Moulds, which are manufactured by Mr. Horan, is designed to make a great variety of cornice mouldings with the least possible effort and a minimum of materials. It can be used by any mechanic who can use a trowel and float and it will make either plain or fancy cornice in much less time than any other device.

This cornice mould is so compact and light in weight that the complete set consisting of the blade holder, ten selected blades giving various artistic contour lines and all the other devices used with it, can be sent by parcel post.

The Monarch Cornice Mould is especially made so as to be lasting as well as efficient and economical. The frame is aluminum, which gives it maximum strength for the weight of material. The manufacturer is so confident of its good qualities that he offers to send it on ten days trial to our readers. He believes that no one who uses it and sees the fine class of work which it does will ever want to be without it.

COMMON SENSE ABOUT INTERIORS.

The aim of the wood finisher is to obtain, with as little expense and time as possible the most beautiful and harmonious effects. This cannot be obtained without labor and the labor must be expended not only for applying the finishes but in preparing the surfaces to receive them. A high degree of skill is not always necessary nor must large amounts be expended to get tasty and harmonious results. The comparatively inexperienced workman who can follow closely and intelligently the suggestions of the manufacturers will often secure better results than more experienced workmen who do not apply the same thought and effort.

The interior finish is varied by the use of rare and hard woods which are expensive to begin with and often require much skill and labor to properly finish them. The beautiful ivory surfaces, the piano finish, and similar work are accomplished by a great deal of labor, sometimes ten or fifteen coats being applied with rubbing after every coat or so. This, of course, is an extreme finish and it is questionable whether it is in any better taste than that which is possible with two or three coats and which is within the limit of cost of the average house owner.

In other words, it takes more than money to secure good taste and good finish.

A great many interiors have the main finish applied in the most satisfactory manner and then the whole effect is spoiled by improper decorations. Excess of color and a jumbling

Advertisers' Section.

PASTE THIS DOME ON LETTERS YOU WRITE TO ADVERTISERS. IT HELPS.



of style and ornament will ruin the finest finish and must be carefully avoided. Not the least trouble comes in the furnishings of the house which may be such as to spoil an otherwise attractive interior.

The Lowe Brothers Company, 473 E. Third St., Dayton, Ohio, have made a careful study of interior finish and have published a number of booklets in the interest of better taste. Their idea has been to educate the home builder as much as to secure the use of their excellent paints, stains, varnish, etc. One of their books entitled "Common Sense About Interiors" goes into considerable detail regarding the proper finishes, woods to be used, etc., for floors, trim, walls, ceilings, etc. A great deal is given on the choice of woods, preparation of surfaces, finishing in natural, stain, gloss or flat enamel, as well as refinishing old work. The treatment of hardwood floors, both old and new, is gone into exhaustively. The walls and ceilings are given much space and the notes in regard to them are valuable. The last few pages of the book are given to a tabulation of the right finishes for the various surfaces throughout the building and indicate the large number of materials made by the Lowe Brothers Company, which the home owner or contractor can use for the various places. The Lowe Brothers Co. will be glad to hear from our readers and to send them the various books which they have for distribution. They are also prepared to make suggestions for finishing particular rooms or exteriors where an especially pleasing effect is desired.

Our readers are urged to take advantage of the Lowe Brothers offer.

STORM SASH HARDWARE.

The latest catalogue of the Diehl Novelty Company, Glenbeulah, Wis., describes among other hardware specialties a complete line of storm sash hardware. This includes hangers for various styles of buildings, brick moulds, etc., special devices for holding the sash closed or partly open as desired. This latter device is especially convenient in localities where it is necessary to open the window and storm sash for ventilation. This device permits of doing this and is readily operated from the inside.

As the storm sash must be removed in the summer, the above mentioned hinges are designed to allow the storm sash to be taken off at a moment's notice. In fact, the work of changing from storm sash to screens requires very little time and can be done from the inside of the house, it not being necessary to erect ladders, scaffolding, etc., to reach the upper windows.

The catalogue of the Diehl Novelty Company also shows some very unique devices for use in erecting storm houses, screens, portable buildings, etc. This catalogue will show the energetic carpenter where he can make money for himself and reduce the cost to his clients on work of this character.

Advertisers' Section.

LUMBER

Direct to You at Saw Mill Prices

We sell direct from mills and save you all dealers' and middlemen's profits.

Dimension stock, all sizes, 2x4 to 2x12, strictly No. 1, \$17.50 per M.

Timbers, all sizes, 4x4 to 10x10, strictly No. 1, \$17.50.

No. 1 Fencing, \$20.00; No. 2, \$15.50.

No. 1 Flooring, dressed and matched, 1x4, \$20.50; No. 2, \$14.50.

No. 1 Flooring, dressed and matched, 1x6, \$20.50; No. 2, \$16.50.

No. 1 Boards, up to 1x10, 10 to 20 ft. lengths, \$18.50; No. 2, \$16.50.

If boards are shipped, 50c per M extra.

No. 1 Drop Siding, 1x6, \$20.00; clear and free from all defects, \$23.00.

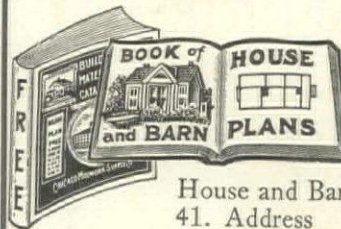
Extra Clear Red Cedar Shingles, \$3.50; Star A Star, \$3.15 per M.

Barn Boards, 1x12, surfaced one side, selected, \$23.00 per M.

Send list of requirements and will name prices freight paid to your own city. All our lumber is new, bright, clean—no wreckage. We positively guarantee satisfaction, safe delivery and grades to the highest standard.

We can also save you money on all kinds of millwork, doors, windows, storm sash, paint, hardware, roofing, plumbing, heating, etc.

Two Valuable Books Free



Write today for Building Material Catalog No. 31. Also Book of

House and Barn Plans No. 41. Address

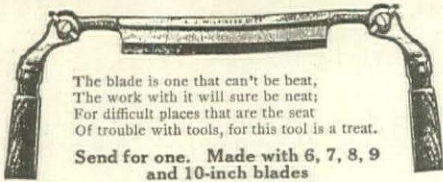
CHICAGO MILLWORK SUPPLY CO.
AMERICA'S GREATEST SASH AND DOOR HOUSE.
 1423 West 37th St., CHICAGO, ILL.

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The Reputation and Workmanship that mean *Satisfaction* and *Service* back this **Adjustable Handle Draw Knife**



The blade is one that can't be beat,
The work with it will sure be neat;
For difficult places that are the seat
Of trouble with tools, for this tool is a treat.

Send for one. Made with 6, 7, 8, 9
and 10-inch blades

A. J. Wilkinson & Co.

Box 3594

Boston, Mass.

The Famous Barton Planes and Edge Tools for Carpenters and Other Workers in Wood

Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalog. Be sure to specify **Carpenter's Catalogue**. A postal will bring it, together with our story book, "True Stories," which will be found very interesting and



instructive to those who are satisfied with the best tools only. **MACK & CO., Sole Makers**
Brown's Race Rochester, N. Y.



Miller's Bungalow Plans

are used exclusively in our book, "**Bungalows and Other Things**," which contains photographs and floor plans of many artistic homes that can be built for \$1,500.00 up. Get this book, it is the best of its kind on the market. Pick out the house you want and we will furnish the plans and specifications for \$5.00 to \$15.00. The book is receiving high praise from contractors and builders.
Price \$1.00

Burd F. Miller Co.

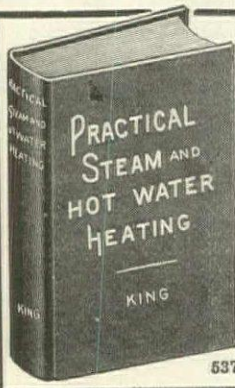
25 Brandeis, Omaha, Nebr.

ONLY SELF-SETTING PLANE

Sent on Trial. Free—Carpenter's pencil, circulars and our \$1.00 certificate which we receive as \$1.00 as stated thereon, if you mention National Builder. Another pencil if you send 10 addresses of carpenters. **New Self-Setting Plane**. Sample sent for trial as per our circular if local dealers do not have it.



GAGE TOOL CO., :: VINELAND, N. J.



HEATING AND VENTILATING

By **ALFRED G. KING**

367 Pages. Over 300 illustrations. The most elaborate and complete work that has ever been published for the use of **Heating Contractors, Steam Fitters, Apprentices, Architects and Builders.**

Price Postpaid \$3.00

HODGSON BOOK CO.

537 S. Dearborn St., Chicago, Ill.

WOODLIFE SHINGLE STAIN.

The use of a shingle stain permits the architect or contractor to secure practically any color, design or effect which may be desired and at the same time preserves the wood against decay, the attack of insects, etc.

The Woodlife Shingle Stain is made in a great variety of colors from which any color combination can readily be made. These shingle stains can be used not only on the exterior of the building, but they are just as effective when used on the interior woodwork, furniture, etc., the stain bringing out to the fullest extent the natural beauty and grain of the wood.

Woodlife Shingle Stain is made by the Woodlife Co., 188 Montague St., Brooklyn, N. Y., who will send to our readers on request color cards, prices and other information.

FACTS FOR CARPENTERS.

There are two or three very strange notions going about the world. One of them is that the world owes every man a living. The man who takes this literally and tries to collect the living without working for it is apt to take a rather pessimistic view of the matter. The living which he gets is usually inferior to that of the man who starts out to earn his living in a more legitimate way. The world has a good living for every man who is willing to collect it by working for it.

Other men believe that Fate and Providence have a great deal to do with their condition. Ten to one they acquire this belief very early in life and have made little or no effort to change their condition.

The fact that there are higher positions than what they hold and jobs paying more than what they are getting should lead them to fit themselves for the next position or job in that line. The man who is ready for a better job when the vacancy occurs is the one who is promoted and the man who is fitted for a position is the one chosen.

The question is what job is open to the carpenter, to which he can aspire? For one thing, he can become a foreman. This means that he must thoroughly understand his work and be able to lay out the work both for himself and those under him, to foresee difficulties which may arise, to see that the right quantities of proper material are on the job for the men and that the work progresses as rapidly as the weather and other conditions permit.

Should he have a natural inclination for drafting, another excellent line of work is open to him. Aided by the practical training which he has acquired while working at the bench or on the job, he can readily solve the many problems of construction, details, planning, specifications, etc., which are found on every building.

A valuable feature of either of the above

Advertisers' Section.

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jobs lies in the fact that they are far more permanent than day work as a mechanic. Inclement weather does not interfere with their pay and the ability to turn from one line of work to another or to do any part of the work on the building keeps them on when the specialized man is let go.

The carpenter is particularly well fitted for advancement. In order to learn his trade, he has had to apply himself to hard work, steady hours and careful measurements involving intelligent thought. He has had little time for day dreaming but has had to bend every effort to do his work skillfully and quickly. As a rule, he has had good men to guide him and serve as examples and teachers.

But, there is a limit to what these men practical and efficient and skilled, though they may be, can teach him. They have reached the height of their ambition upon becoming journeymen. The carpenter whose ambition lies above this must seek for knowledge outside the shop and outside the job. Not only that, but his increased knowledge must be gained outside of working hours for he still depends upon his steady job to earn his living.

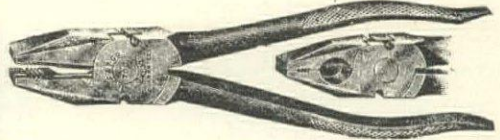
With the intention of aiding these carpenters who wish to advance beyond their fellow-men, the International Correspondence Schools inaugurated their several courses of study tending to lead to better pay and better positions. One of their courses is called "The Building Foremans Course" and was written to meet the requirements of carpenters, masons, bricklayers, plasterers, roofers and other building mechanics who wish to become foremen or superintendents of construction. The course is intended to familiarize one with modern building construction from the very beginning of a building, through excavating, shoring and piling, foundations, masonry, carpentry, fireproofing, to the very tip of the sheet metal finial or flag pole. The course is written in a language which the mechanic can understand, in fact, in his own terms and the technical terms used in the trades. He is instructed in the things necessary for a foreman to know with no attempt at a mass of technical information which the higher trained engineer or architect would require. This will enable him to understand the sequence of work about the building apart from his own trade as carpenter and he will understand how the various trades, masonry, plumbing, steam fitting, painting, roofing, etc., must dovetail into the other before a complete building and how each must progress at the right time to avoid delays.

We have given above but a brief outline of the Building Foreman's Course, a much more complete description and synopsis of the subjects taught being found in the booklet which the International Correspondence Schools, Box 1332, Scranton, Pa., will be glad to send to our readers. This booklet will quickly show any carpenter how many details there are in the building business of which he has little or no knowledge, and it should lead him to investigate International Methods of Instruction.

Advertisers' Section.

Particular, High-Grade Workmen

Are the men you'll find using **UTICA PLIERS**, because a good workman knows that he cannot produce his best work with inferior tools. He knows the plier that slips easily into his hand when it is in its natural grasping position, on which he can exert great pressure when necessary without hurting the tender muscles of his hand, is the tool that makes him a better mechanic; he knows those keen, strong cutting edges can't be found on anything but a **UTICA PLIER**.



He knows he can rely on it at all times to stand by him and help him to do more and better work, whether he is a Carpenter, Lineman, Plumber, Electrician, Wire Worker, Tinner, Metal Worker, Farmer, Concrete Worker, Jeweler or Autoist. We make **Utica Efficiency Pliers** for them all, and you can see them at the best of dealers in hardware and electrical supplies.

*"Insist on **UTICA PLIERS**; They're the Best"*

We would like to send you a copy of "Plier Pointers," free. May we? A post card will bring it.

Utica Drop Forge & Tool Co.
Utica, New York



The Razor That Shaves

Get acquainted with the cleverest safety razor you or any other man ever drew over his face. It's the

KEEN KUTTER

Junior Safety Razor and sells for \$1.00, packed in a neat traveling box.

No matter how many Safety Razors you have tried, buy a Keen Kutter Junior. It is the safe Safety Razor. It is a revelation in shaving. It makes the natural sliding stroke possible to the most awkward shaver. It is always ready for a fine, cool, close shave—not a pull or a balk.

"The Recollection of Quality Remains Long After the Price is Forgotten."

Trade Mark Registered. —E. C. SIMMONS.

If not at your dealer's, write us.

SIMMONS HARDWARE COMPANY, Inc.

St. Louis New York
Philadelphia Toledo
Minneapolis Sioux City
Wichita



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SAFE SCAFFOLDING.

The illustration herewith gives a very good idea of the use of Scaffold Brackets, which have come to the front very fast in the last two years and have practically displaced the old style wooden staging and scaffolding.

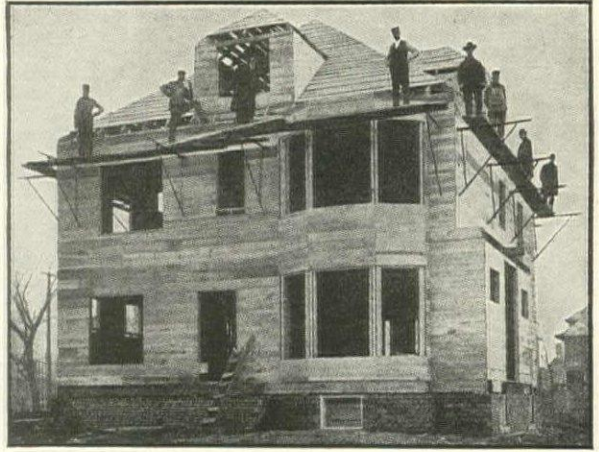
It has been said that Scaffold Brackets will save contractors from \$50 to \$100 on every house they build in labor and lumber, to say nothing of the extra safety of the brackets themselves.

When you consider that the Detroit folding brackets will stand a strain of from 1,500 to 2,000 lbs., you can readily realize that two or three planks laid across these brackets makes the safest kind of scaffolding.

The Detroit Folding Bracket Company is putting out a sheeting bracket so constructed that it does not pull out on the sheeting board, but 90% of the strain is a direct downward pull. This bracket is becoming very popular and is one of the most widely sold and best thought of sheeting brackets on the market.

This same company puts out a studding bracket which is by far the heaviest and most

substantial bracket of its kind and is guaranteed to carry a load of over a ton.



Contractors and builders can obtain full particulars by writing The Folding Scaffold Company, 57 Fort street, West, Detroit, Mich.

DISTINCTIVE HARDWOOD FLOORS.

The Wood Mosaic Co., 33 Hebard St., Rochester, N. Y., carry in stock more than fifty varieties of foreign woods, many of them rare and costly, by which they are able to offer to those who wish special designs and effects practically any results desired. In ebony they have, besides the well known black, the rarer golden striped; in mahogany, both red and white; the various shades of green and purple mahajua; teak; English oak; tigerwood, tupil wood, etc., from various foreign and tropical forests.

The Wood Mosaic Company, in order to be in a position to advise architects and builders regarding distinctive hardwood floors, have an exceptionally complete library showing designs, photographs, etc., of notable residences and other buildings both at home and abroad. This enables them to harmonize their floor designs with any style of decoration.

But it must not be considered that all of the products of the Wood Mosaic Company is in rare and high priced woods which can be used only for the palaces of the wealthy. Their products include ornamental hardwood flooring, parquetry, wood-carpet, hardwood flooring, steel woven flooring, fireproof flooring and wood-mosaic. They have several large mills in this country, one located in Southern Indiana in the heart of the white oak belt and another in Western New York. They carry in stock a great number of standard sizes and designs, while their facilities for special work enables them to make shipment within a very few days.

One of the novel patterns made by the Wood-Mosaic Company is known as steel woven floors which is particularly designed for fireproof buildings. This flooring is held

in place by steel bands in such a manner that no floor sleepers or nailing blocks are required. This style of floor as well as the various other styles, patterns of parquetry, borders, etc., are described in the catalogue which will be sent from the Rochester office.

The products of the Wood-Mosaic Company can be obtained through any one of a large number of agencies, located in practically every large city in the country, or it can be obtained from the factory direct.

GOLDEN WEST HOMES.

The reign of the bungalow is being rapidly extended over our entire country. Conservative districts, where only the designs which came over in the Mayflower were supposed to be acceptable to the taste of the people are finding that the bungalow effects from the open simple livable plan to the tasty and home-like exterior are being insisted upon not only by those who are to live in them but by those who are building them to rent.

But just as there can be poor designing in Queen Anne and Colonial styles, so there can be poor design in bungalows. It would seem natural in selecting designs for bungalows to go where they have been an unqualified success for many years. In southern California they have become the accepted home for all classes of people, some being built as cheaply as two or three hundred dollars while in others the cost runs up to five thousand dollars and more.

E. W. Stillwell & Company, 410 Henne Bldg., 122 Third St., Los Angeles, Cal., have been planning bungalows and similar buildings for many years. They have selected a number of

their representative plans and combined them into three volumes entitled, "Representative California Homes," "West Coast Bungalows" and "Little Bungalows." The purpose of these books is to show the owner, carpenter and contractor the best arrangement as well as exterior appearances which can be obtained in this line. These books will give one a great many excellent ideas both in planning and in design and they will enable the owner or carpenter to select the particular plan which meets with their approval.

E. W. Stillwell & Company are making a special price of \$1.00 for these three books to our readers. They are so satisfied that the purchaser will like them that they offer to refund the money if not satisfactory.

GAS FOR COUNTRY HOMES.

The Milburn Homegas Machine is designed to give the country home, camp or cottage as good lighting facilities as the city residence. By the use of acetylene gas, manufactured by the Milburn Homegas Machine, isolated buildings have all the advantages of the city in this respect.

The Homegas Machine is simple and economical, utilizing every particle of the gas forming material without waste. It is economical also in the space which it occupies, a very small space being sufficient to contain it.

Lighting by acetylene gas is as safe, if not safer, than by the commercial gas used in our large cities. The machine itself can be located in an outside building if desired. In designing the Homegas Machine, the Alex V. Milburn Company, 1420-26 W. Baltimore Street, Baltimore, Md., had the small country place in view and it has proven wonderfully satisfactory in such places.

The Alex V. Milburn Company are also well known as manufacturers of lighting devices of all kinds. The contractor who has night work to do or work in basements, tunnels, etc., will find that their lighting apparatus will give them practically daylight at a very low cost. The apparatus is portable so that there is not the expense of stringing wires, hanging lamps, etc., which require time and which cannot be considered for the great variety of work.

The complete catalogue of the Milburn Company will show the various machines and devices in detail and will also outline to the inquirer a plan for establishing an agency in their vicinity.

THE GREAT BELL FURNACE.

One of the best ways of judging the value of any building equipment is to see what those who have used it say about it. The literature of the American Bell & Foundry Company, Northville, Mich., includes a number of enthusiastic letters from carpenters, owners, and others who have installed and are using the Great Bell Furnace. This furnace is made in a number of styles and sizes to meet various conditions, the various styles and sizes with their dimensions, weights and list prices being given in the literature which the manufactur-

Advertisers' Section.



Bungalow designed by White & Sons, Architects, Clarion, Iowa, sided with Asbestos Building Lumber

ASBESTOS BUILDING LUMBER

NOTE especially that the building which is reproduced in colors on the front cover and described in detail in the editorial news pages of this issue of *The National Builder* is sided with Keasbey & Mattison's Asbestos Building Lumber.

All the panels between the timbers are sheathed with this material—a *specialized form of reinforced concrete*—light in weight, easily applied, impervious to weather, and fireproof.

For costs, see the specifications printed in the article.

Asbestos Building Lumber is steadily growing in popularity, and it is well worth your while to write us for detailed facts.

Keasbey & Mattison Co.

Factors

Dept. H, Ambler, Penna.

Branch Offices in Principal Cities of the United States

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**Phenix Hangers and Fasteners
— For Storm Sash**



SIMPLE—easily applied—
rust-proof—non-rattle—
and practically unbreakable.
Positively the best storm sash and
screen hangers and fasteners you
can buy. If not at your dealer's,
send for samples today. Hangers
only, 10c retail; hangers and fasteners,
25c. Catalog sent on request.

PHENIX MFG. CO.
028 Center Street, Milwaukee, Wis.

"Huberize Means Economize"

**Do You Know Huber
The Building Materials Man?**

If not, you should get acquainted by writing
for his **two big books** of "Building Materials"
and "Wood Mantels."

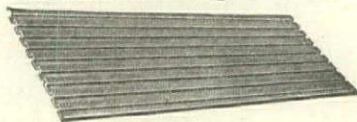
Every Contractor, Builder and Prospective
Home Owner should have these **two books**.
They are free on request.

Write "Huber" Today

The Huber Builders Material Co.
39-43 Vine Street Cincinnati, Ohio



**Berger's Reinforcing
and Furring Plate**



Write for Catalog

The Berger Mfg. Co., Canton, Ohio

For the best service address nearest branch

New York Boston Minneapolis
St. Louis San Francisco Philadelphia

**Hammer Insurance
SPECIAL**



Our No. 21½ "Vandor Vanadium" Nail Hammer—We
will send you Parcel Post for your dealer's name and
\$1. This Hammer we insure for life. Made for hard work
and lots of it. You can return it any time if it proves
defective and get a new one.

**This hammer is warranted to draw anything
from a headless brad to a spike.**

Drop Forged from the toughest Vanadium Steel. Second
growth hand shaved Hickory Handle. Tempered in oil.
Easy to work with. Get one to day. **Remember, only \$1
and your dealer's name. Mail your order NOW.**

VAN DOREN MFG. CO., Inc.
(Vandor Dept.) Chicago Heights, Illinois

ers are sending out. The catalogue also lists
the various other equipment needed to install
the heating plant such as register boxes, pipe
fittings, etc.

A feature of the Great Bell Furnace consists
in an arrangement whereby a hot water coil
may be used in it. This can be used either for
supplying hot water for the kitchen and bath
room or for heating an additional room which
cannot readily be reached by the hot air pipes
or which it is desired to heat a little warmer
than the other rooms.

The catalogue describes the various styles
of furnaces in detail and will enable the con-
tractor or owner to select the one which will
give him the best satisfaction.

TYPEWRITER CORRESPONDENCE.

The reception which a letter receives is
governed greatly by the conditions. If you
send a man money almost any kind of a pen-
cil scratch looks good to him. When, how-
ever, you are going to ask a favor of him,
ask him for work or to be allowed to figure
on a contract which he has at his disposal,
the very best methods are none too good.
The contractor who writes in long-hand to an
architect, to be allowed to figure on a con-
tract, does not stand as good a show as the
contractor who uses a typewriter and has
an up-to-date letterhead. In the first place,
his letter is more easily read, there being no
chance to misread any part of it. It also
stamps him as one business man writing to
another and he is given credit for that. It
shows, too, that he is up-to-date in business
matters and the assumption is therefore,
that he has kept up with the time in construc-
tion.

Mr. Harry A. Smith, 180 N. Dearborn street,
Chicago, Illinois, has a plan by which any
reader of the NATIONAL BUILDER may obtain a
new first class typewriter at a fraction of the
regular price. This typewriter, the Smith
Premier, No. 2, has been on the market for
several years and has proven extremely sat-
isfactory. Besides a free trial proposition,
the typewriter is covered by the manufactur-
ers standard guarantee for one year so that
there seems to be no way in which the pur-
chaser can lose out on the proposition.

Mr. Smith will be pleased to hear from any
of our readers who are not at present using
a typewriter that he may make his plan clear
to them.

THE OSHKOSH QUADRUPLE MIXER.

The Oshkosh Mfg. Co., 414 S. Main St.,
Oshkosh, Wis., are placing on the market a
concrete mixer designed to perform the heav-
iest work and to turn out the work with the
least labor. The mixer, as ordinarily built,
is mounted upon a truck so that it is read-
ily portable from place to place and from job
to job. It is, therefore, possible to mix the
concrete right where it is wanted, in many
cases it being possible to dump the concrete
directly into the trenches, thus saving almost
half of the labor ordinarily used in the opera-
tion. The Oshkosh Mixer is also designed

Advertisers' Section.

PASTE THIS DOME ON LETTERS YOU
WRITE TO ADVERTISERS. IT HELPS.



with a self-loading device, so designed that while all the material for a complete mix is introduced into the drum at one operation, still it is poured in slowly so as not to choke the mouth of the hopper or reduce the action of the drum. This arrangement allows the mixer to be charged from a wheelbarrow directly on the ground without the use of an incline platform. This allows a larger load with less labor than is ordinarily employed.

As ordinarily arranged, the Oshkosh Mixer is provided with a steam engine of ample power to operate the mixer continuously at its full capacity. When desired, the apparatus can be equipped with a gasoline engine or an electric motor and should it be advisable to change from one to the other, the change can be effected very easily.

In designing the Oshkosh line of concrete mixers, every effort was made to secure machines which would not only mix and discharge concrete in the quickest and best manner but to combine in them strength and durability while operating at a minimum cost.

The Oshkosh Mixer is made in a number of sizes which are listed in a circular which the manufacturers are sending out on request. This circular describes the mixer in great detail as well as its operation and advantages. The various styles made with their equipment, etc., are listed for reference and the Oshkosh Mfg. Co. will be glad to quote prices delivered to any station.

A DISAPPEARING DUMBWAITER.

The man who calculates the number of trips which the average housewife makes to the basement during the year is amazed at his own figures. The thousands of trips made represent a whole lot of hard work on the part of the housewife to say nothing of the time involved. Pretty nearly all of these trips can be saved through the use of the ball bearing disappearing dumbwaiter made by the American Elevator Co., Bloomsburg, Pa. This dumbwaiter is designed to travel from the first floor down to the basement and to serve either as a dumbwaiter or as a refrigerator for the storage of food. Being kept in a cool basement means a great saving in the ice bill as well as in the amount of food spoiled.

The American Elevator Co. have named this elevator "Wife's Joy" on account of the favorable reception it has been given by the womenfolks. It can be installed in practically any kitchen and, when not in use, takes up absolutely no room, the top of the dumbwaiter being flushed with and finished the same as the floor. Pushing a button, however, operates the dumbwaiter and brings it up from the basement. The dumbwaiter is returned to the basement by merely pressing down on the top and is automatically held down when it reaches its lowest position.

The American Elevator Co. also manufacture a complete line of dumbwaiters for all purposes as well as hand and power, freight and passenger elevators. Their complete catalogue will be sent to our readers on request.

Advertisers' Section.



The Man Who Can!

There are but two kinds of men in the world—men who can and men who can't. Men who can are trained and men who can't are not. No matter what his occupation, you will find that the man who does things has been thoroughly trained in his particular line of work. Just compare him to the fellow who continually "falls down"—he's the man who can't hold a good job because he failed to get the training he needs.

Success today depends upon the amount of time and energy you spend in fitting yourself for your life work. No matter how strong, or intelligent, or willing you are, if you aren't specially trained you will be held back—you will see other men promoted over your head—you will not get the money you would like to earn. Successful men may have no more brains than you, but they do have the one thing you lack—training.

Resolve, then, to become specially trained. Decide today to fit yourself for a trade or profession and make your mark in it. Remember, it all depends on you. If you have the determination to get ahead, reasonable ability and a willingness to learn, training will start you on the road to success—a better job—bigger pay.

How you can become a trained man and earn more money

The American School of Correspondence, an educational institution chartered under the same laws as your state university, stands ready to help you. It will train you, in your spare time and in your own home, in any branch of Engineering, Business or Law, or will prepare you for entrance into any resident college. You can get the training you need without leaving home or giving up your work and the American School will arrange for you to pay as best suits your needs.

Fill in and mail the coupon today—now. It's the first step toward becoming a trained man—a man who can.

American School of Correspondence, Chicago, U.S.A.

Your Opportunity Coupon

Check the course you want and mail the coupon now

American School of Correspondence, Chicago, U. S. A.

Please send me your Bulletin and advise me how I can qualify for the position marked "X."

N. B. 11-13.

- ... Electrical Engineer
- ... Elec. Light & Power Supt.
- ... Electrical Wireman
- ... Telephone Expert
- ... Architect
- ... Building Contractor
- ... Architectural Draftsman
- ... Structural Engineer
- ... Structural Engineer
- ... Concrete Engineer
- ... Civil Engineer
- ... Surveyor
- ... Mechanical Engineer
- ... Mechanical Draftsman
- ... Steam Engineer
- ... Municipal Engineer
- ... Gas Engine Engineer
- ... Gas Tractor Engineer
- ... Lawyer
- ... Bookkeeper
- ... Stenographer
- ... Private Secretary
- ... Accountant
- ... Cost Accountant
- ... Cert'd Public Acct't
- ... Auditor
- ... Business Manager
- ... Fire Ins. Inspector
- ... Fire Ins. Adjuster
- ... Fire Ins. Expert
- ... Moving Picture Op'r
- ... Sanitary Engineer
- ... Irrigation Engineer
- ... Textile Boss
- ... College Preparatory
- ... Auto. Mechanician

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BUCK BROS.

60 Years of Tool Making Behind Buck Bros. Products



Our line of tools includes Gouges, Plane Irons, Chisels, Drawing-knives, Nail Sets, Screw Driver Bits, Carving Tools, etc. Our reputation guarantees them all. Catalog shows them all. Write for it.

BUCK BROS. : : MILLBURY, MASS.

STOP THOSE RATTLING WINDOWS

Do away with sash weights, cords, pulleys and pocket frames and save money by using **AUTOMATIC SASH HOLDERS**

Proved by Use—Unexcelled for windows without pocket frames. Excellent for new windows.



Send for circular and prices, or \$1.00 for trial set prepaid; state approximate weight of sash.

AUTOMATIC SASH HOLDER MFG. CO., 48 Church St., New York.

The Master Slide Rule

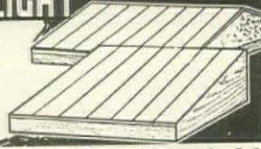


is the **only Rule in the World** whereby inside measurements of doors and windows, etc., can be taken rapidly and accurately. It is also far superior to any other rule for outside measurements of walls and ceilings, etc., as it can be extended and closed instantly. **Mechanics, Builders, and Architects, try one today! Don't wait!**

On receipt of 15 cents per lineal foot, a 4, 5, or 6-foot rule will be sent to you prepaid. Large profits to agents. Write for circulars and particulars.

Dahl Manufacturing Co., 51B E. 42nd St., New York


BOWERS' SKY LIGHT



You will surely save money by writing Bowers for illustrated circular on Skylights. Don't buy a Skylight until you get it. It gives prices on all standard styles and sizes. Write now.

F. M. Bowers & Son, 926 West Washington Street, Indianapolis, Ind.

Are You Going to Build?



Send 25c in silver (and 10c postage) for our big \$1 book of plans. "LOW COST MODERN HOMES," with houses from \$1,000 to \$3,000. "PALATIAL MODERN HOMES" from \$3,000 to \$10,000, price 25c and 12c postage. "COTTAGES AND BUNGALOWS" from \$300 to \$9,000, price 25c and 5c postage.

J. H. DAVERMAN & SON, Architects
1342 Murray Building GRAND RAPIDS, MICH.

READING THE BLUE PRINT.

There's a certain time in every man's life when he realizes certain deficiencies. This realization doesn't always come at the same age. It depends on how rapidly the man has developed. Some learn this valuable lesson at twenty, others at thirty and forty, while some never learn it at all. The latter are the men that make and swell the ranks of the "failures"—they are the rank and file of the "down-and-out" class—they are the poorly paid untrained laborers who never get beyond the hand-to-mouth existence. This is the class that fills our poorhouses and creates the greatest of all problems for our commonwealth to solve.

Some wise man has said, "It is no disgrace to be ignorant, but it is a disgrace to remain so." Technical training at one time was hard to get. It costs time and money to go away to school. That is why the average boy, a few years ago, became an apprentice immediately upon leaving the grade school. He didn't have a chance to get the technical knowledge so necessary and which cuts such a big figure in Success today. He became a



good carpenter, a good bricklayer, a good stonemason simply by following the rule of thumb methods of his boss.

Time and necessity have wrought great changes in the building field. It takes more than a good carpenter to build a modern home, a church, or a skyscraper—the men who take these jobs must know their business, they must be trained men. Before they even get a job like this, they must first know how to read the modern blueprint correctly.

I have heard hundreds of carpenters say, "Well, I lost money on that job but the blueprint fooled me." And perhaps you have been up against the same proposition many a time. Maybe you didn't know just why you lost money but nine times out of ten it was because the blueprint fooled you.

Here's Opportunity knocking and knocking hard at your door again. The American School of Correspondence was founded fifteen years ago to help just such men as you, men who didn't have the chance when they were young but men who had the courage to realize and gauge their lack of training before it was too late. Here's a school that will bring the training you need right into your own home—a school that will literally sit up nights with you and show you how to do your work in the

Advertisers' Section.

PASTE THIS DOME  ON LETTERS YOU WRITE TO ADVERTISERS. IT HELPS.

most modern technical way. They will teach you how to read the modern blueprint whether it be of a four-room cottage or a twenty-story skyscraper.

If you are built of the right stuff and desire to become a leader in your trade, a man of importance in your town, here's a chance you have probably overlooked. Read, for instance, on one of the following pages the announcement of this great school. It tells you how to become an expert draftsman. Drafting, as you well know, is the foundation of all engineering professions. Not only do they offer to teach you drafting at a very reasonable price, but offer absolutely free of charge a complete set of drawing instruments, a set that would actually cost you from twenty to twenty-five dollars at your local dealers. They will also supply you, without cost, a complete cyclopedia of drawing so you will have at your elbow for quick and ready reference, a set of books that will solve all the intricate drafting problems which may confront you while you are studying their course.

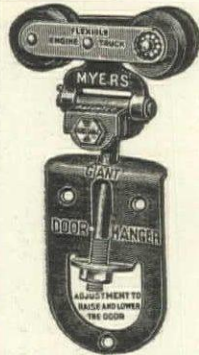
The fact that such a course is offered by the American School of Correspondence stamps it with the final mark of reliability and 100 per cent efficiency. This great school of correspondence with its magnificent building, its corps of nationally known instructors, its staff of counseling expert engineers and its complete mastery of the science of teaching by correspondence, means that at least the contractor, the carpenters or the builders who aspire to Success in business life, has at his command, the greatest correspondence teaching facilities in the world to train him to a mastery of his chosen profession. The efficiency of this School is recognized by the highest type of professional men. Its courses and expert assistance are used not only by college graduates seeking special training, by successful engineers desiring to polish up on particular lines, as well as by thousands of other men who have obtained from this School their entire training for big Success.

H. W. JOHNS-MANVILLE CO.'S GALVESTON, TEX., BRANCH.

The spirit of business enterprise which characterizes this aggressive concern is once more evidenced by the opening of a new office and warehouse in Galveston, Texas. The H. W. Johns-Manville Co. now boasts three offices in the Lone Star state, viz.: at Houston, Dallas and Galveston. At the last named place, in a modern brick warehouse of large proportions, will be consolidated the stock for distribution to the different offices and throughout the firm's Texas territory.

The H. W. Johns-Manville Company is among the country's largest houses dealing in roofing, building materials, packings, pipe coverings, insulating materials and electrical goods, and is the world's largest manufacturer and distributor of asbestos goods. This concern owns extensive asbestos mines in Danville, P. Q., Canada, and has nine factories located in various cities throughout the United States.

Advertisers' Section.



MYERS GIANT

and New-Way
Adjustable Tendem
Door Hangers
PATENTED

For Tubular Girder Track

Are adjustable up or down, and in or out. Trolley Wheels are heavy turned steel, revolving on steel roller bearings, and run inside the tubular girder track. Not affected by rain, sleet or ice. Write for descriptive circulars and prices.

F. E. MYERS & BRO.
ASHLAND, OHIO

METALLIC WEATHER STRIP

Not Like Others



These Are Tight

Applied in 15 minutes at 200% profit. Write to
E. I. Church & Co., West Hanover, Mass.

"Reliable Erie" Hoists

Simple, Dependable, Low Priced



Here is "Reliable Erie" No. 3 Double Drum Hoist of 2,000 pounds capacity. It meets the demand for a hoist for pulling or hoisting at two places on the same job. We also make a reversible hoist which is described in our catalogue, tells how to operate and gives details on our other hoists

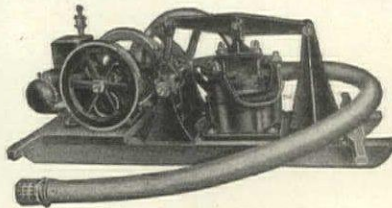
Erie Clutch & Pulley Co.,
120 W. 12th Street Erie, Pa.

Ricoey's The Building Mechanics' Ready Reference—Carpenters' and Woodworkers' Edition. A fine leather-bound book for the pocket. 226 pages; gilt edges. A new and first-rate book of short cuts for men who "travel the shortest road and win the race," accompanied with a handy book of forms of time cards and memoranda.

Price, postpaid \$1.50

Hodgson Book Company
537 S. Dearborn St. Chicago

DIAPHRAGM PUMPS

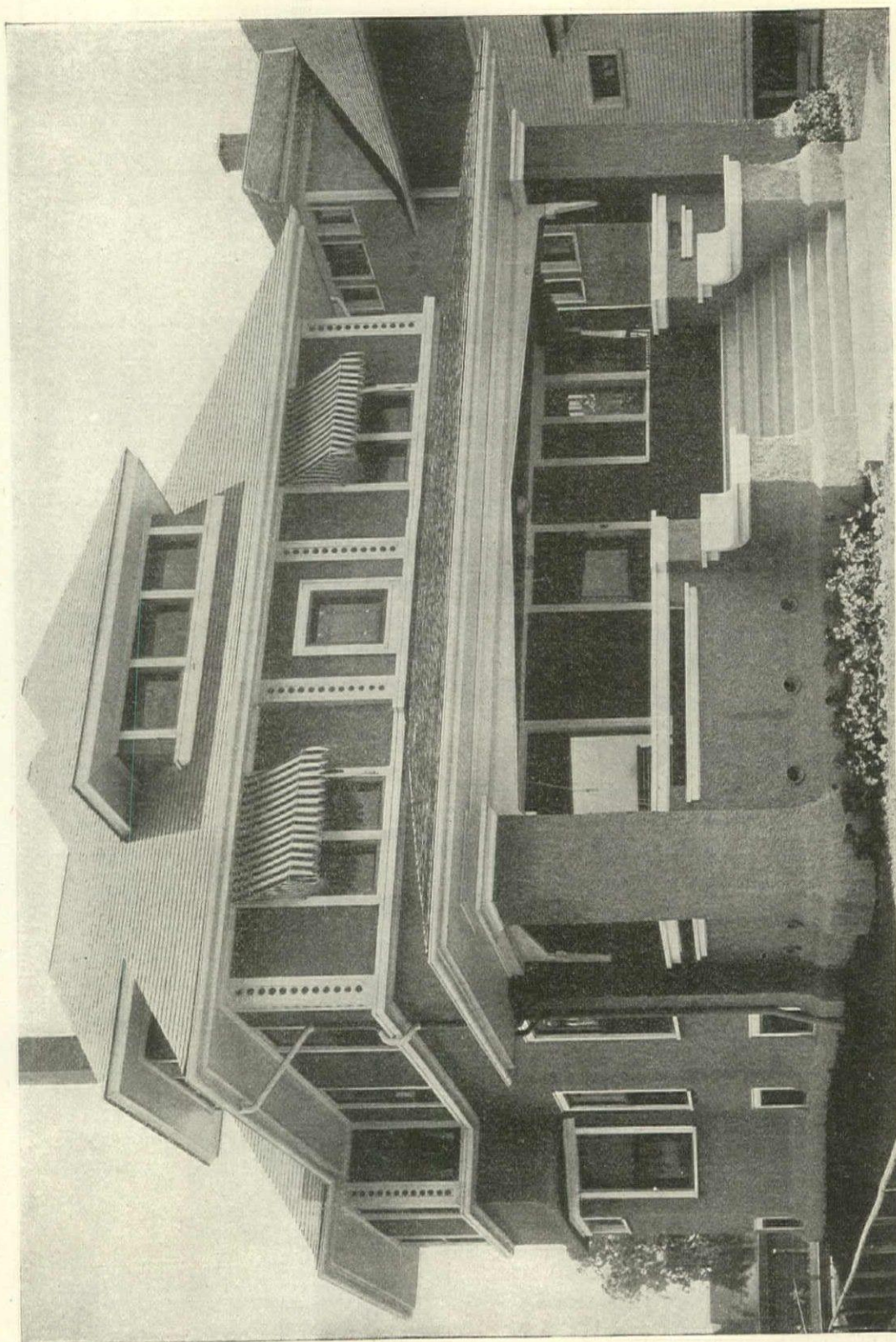


For Contractors and Builders

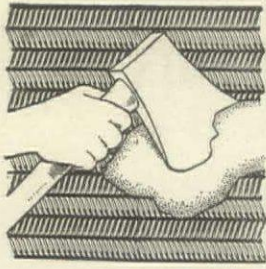
These pumps, connected with our gasoline engines, furnish the most efficient method known for pumping out sewers, man-holes or trenches. Ask us for No. 21 Bulletin.

Bates & Edmonds Motor Co., Lansing, Michigan

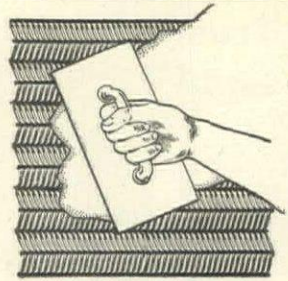
PASTE THIS DOME  ON LETTERS YOU WRITE TO ADVER- TISERS. IT HELPS.



A STUCCO HOUSE



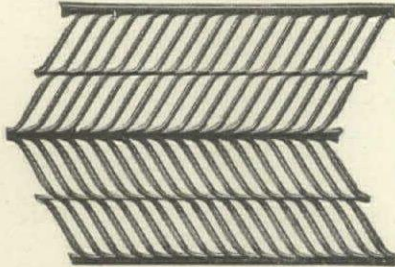
Who will cover the most lath, the man with the Axe or the man with the Trowel?



The plasterer uses a trowel because it presents a flat surface to the mortar and spreads it.

HERRINGBONE LATH

and the trowel work together, which permits first-class work to be done with great speed. The diagonal strands of **Herringbone Lath** present a flat surface to the mortar, spreading it instead of cutting it.



The extreme rigidity of **Herringbone Lath** permits the lather to erect at least 10% more lath than is possible when using other makes. This rigidity also affords a firmer plastering surface than any other make of lath.

Herringbone Lath gives you all the quality requisite in a metal lath to secure perfect satisfaction at the lowest possible price.

Our **Herringbone** book should prove interesting to you. May we send you a copy?

The General Fireproofing Company

311 Logan Avenue Youngstown, Ohio



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Trus-Con Joist Hangers

Made in all sizes and styles for use with brick or concrete block walls or with wooden or steel beams.



Avoid cutting away and weakening of timbers and walls—save labor, time and money.

Trus-Con Joist Hangers are made from open hearth steel plates, and are proven by actual test to be the strongest on the market.

Note the bulb-shaped reinforcement at upper angle.

We also furnish Post Caps, Post Bases, Wall Plates and Base Plates made in rolled steel, malleable iron or cast iron.

Write for catalog and prices

Trussed Concrete Steel Co.
384 Trussed Concrete Building
DETROIT, MICH.

Stanley Tools "No. 34"

A Hand-Book full of interesting information for

**Carpenters
Machinists
Masons
Plumbers
Amateurs**

**Pattern Makers
Cabinet Makers
Millwrights
Wheelwrights
Householders**

It not only illustrates and describes over four hundred **Stanley Tools**, but also contains a number of very handy tables.

Convenient size to carry in the pocket.

Sent postage prepaid to any part of the United States or Canada without charge.

Ask for Catalog No. 34B

Address

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

DUMB WAITERS

The difference in price between the "Sedgwick" and lower priced dumb waiters is not great. The difference in quality is expressed by "satisfaction" and "dissatisfaction."

You cannot afford to lose the good will of your customers by selling them anything but the best. The "Sedgwick" are the best.

The Sedgwick Machine Works are specialists in the manufacture of Hand Power Elevators and Dumb Waiters and will send you free of charge their complete catalog, and will furnish special recommendations and estimates prepared by their experts on each job.

Sedgwick Machine Works

80 Carrol St., Poughkeepsie, N. Y.
130 Liberty St., New York

Gas for Country Homes

This machine puts its comforts within reach of the smallest home as well as the large home.



Simple and economical. Enhances property value. Guaranteed to give satisfaction. *Send for complete catalog.*

Responsible Agents Wanted

The Alexander V. Milburn Co., 1420-26 W. Baltimore St., Baltimore, Md.

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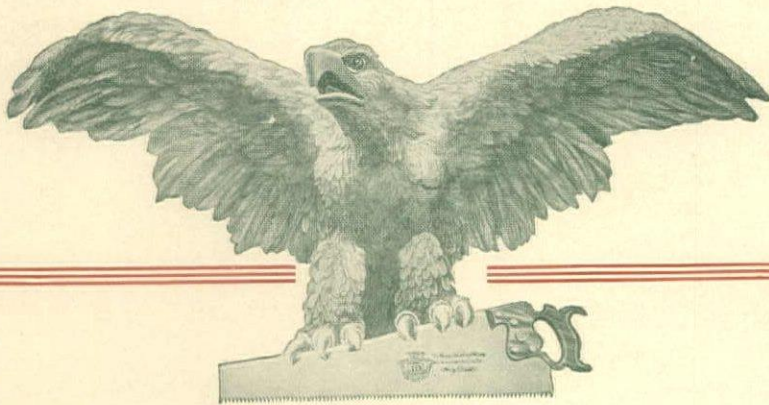
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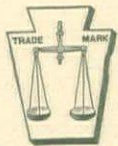
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