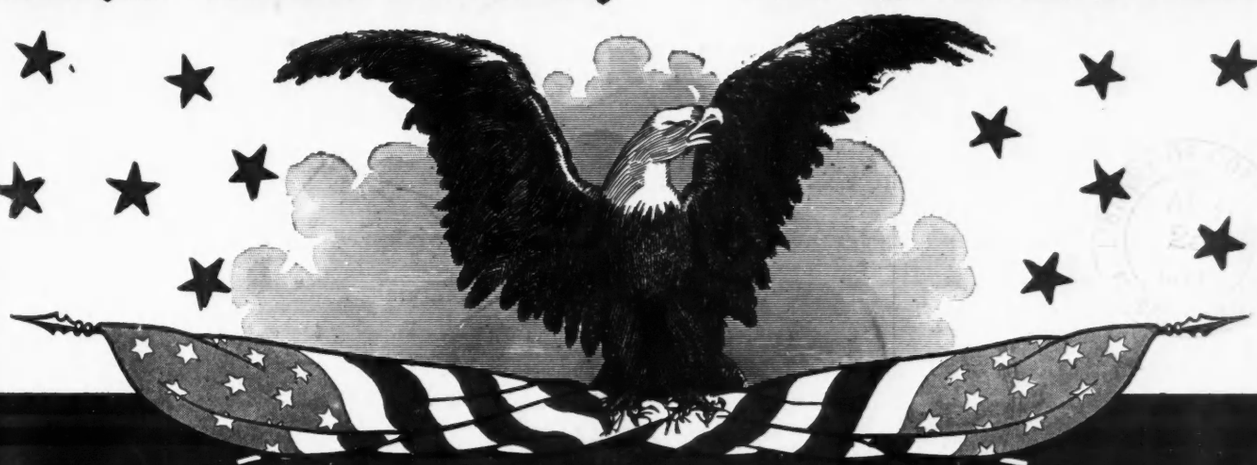
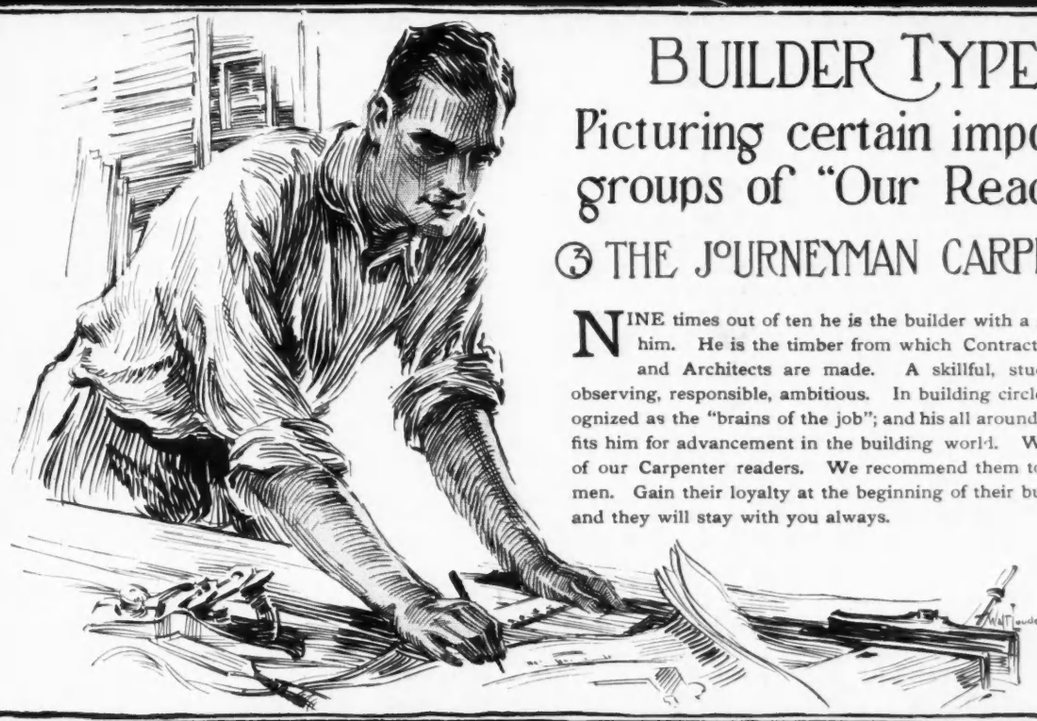
AUGUST 1914

# AMERICAN CARPENTER AND BUILDER



THE WORLD'S GREATEST BUILDING PAPER

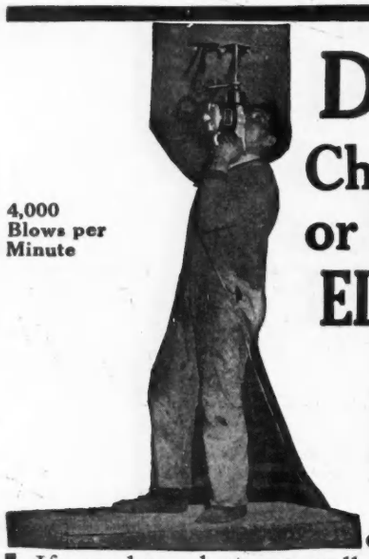


## BUILDER TYPES

### Picturing certain important groups of "Our Readers"

### ③ THE JOURNEYMAN CARPENTER

NINE times out of ten he is the builder with a future before him. He is the timber from which Contractors, Builders and Architects are made. A skillful, studious man—observing, responsible, ambitious. In building circles he is recognized as the "brains of the job"; and his all around training best fits him for advancement in the building world. We are proud of our Carpenter readers. We recommend them to all business men. Gain their loyalty at the beginning of their building career and they will stay with you always.



4,000 Blows per Minute

# Do Your Drilling,

## Chipping, Caulking, or Surfacing with an ELECTRIC HAMMER

or the Manually Operated

# Drilhammer

If you have a lot of work to do, the solution of the problem for you is our **Electric Hammer.** If you have but a small amount of work to do at any one time, the **Drilhammer** is the thing to use. In either case you can do the work **ten times as fast.**

### Our Drilhammer

does the work in one minute that takes ten times as long by cruder methods. Strikes 1,000 powerful hammer blows per minute. Operater simply turns the crank. Centrifugal force does the work. Hardened tool steel hammer elements revolving at high speed strike the blows.

Exceedingly simple in construction. Has no springs to weaken or wear out. Makes an immense saving in the cost of drilling concrete, brick, stone, tile, conduit, walls, floors, ceilings, etc.

Made in two sizes and accomodates drills from ¼ in. to 1¼ in. Can be carried in regular tool kit. Sold at a price that will enable every mechanic to have one. Write for circular 132 and prices.

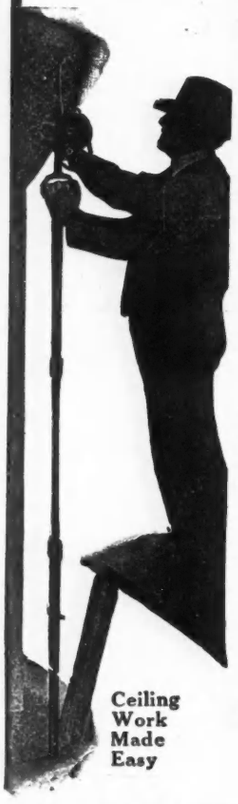
### Our Electric Hammer

is ten times as rapid as the old-fashioned, hit-and-miss method of striking the head of a drill or chisel with an ordinary hammer.

It does not cost a fifth as much for power to operate it as the pneumatic or steam-driven types. It does not involve any complicated generating equipment and transmission lines, such as piping, hose, etc.

It can be installed in half a minute and taken down in less time.

It is portable, self contained, and always ready for the job. Simply attach plug to any convenient electric light socket.



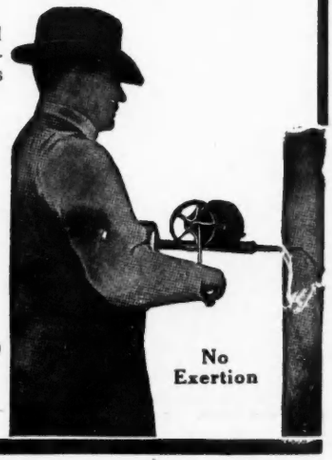
Ceiling Work Made Easy

### This ELECTRIC HAMMER

is practically automatic;—i.e. the same pressure that holdst he tool against the work closes the switch in the handle and starts operation. Delivers four thousand blows a minute. Built for various voltages. Requires only one or two amperes on 110-volt circuit. Circular A-13 describes it.

**For use on direct current, or can be used on alternating current by using a motor generator set.**

*Send for the Circulars illustrating and describing these hammers. The price at which they are sold make it desirable that you should own one immediatelp.*



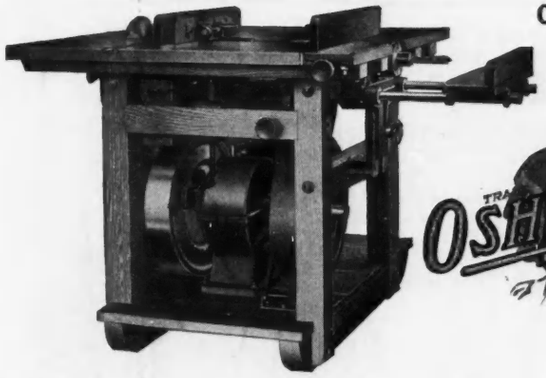
No Exertion

## ORR & LOCKETT HARDWARE Co

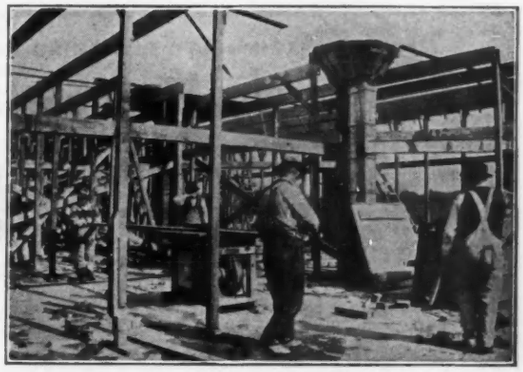
Established 1872

**Main Office, 14-16 W. Randolph St., Chicago**

**Branch Offices** { 401 Broome St., New York
Room 608-79 Milk St., Boston



**Complete Set of Attachments FREE**



An Eveready Saw Rig Saves the Wages of Six Men

NEW LIST OF AGENCIES

CHICAGO, ILL.—Oshkosh Mfg. Company, 1440 Monadnock Bldg.
ATLANTA, GA.—Oshkosh Mfg. Company, Southern Sales Office, 604 Walton Bldg.
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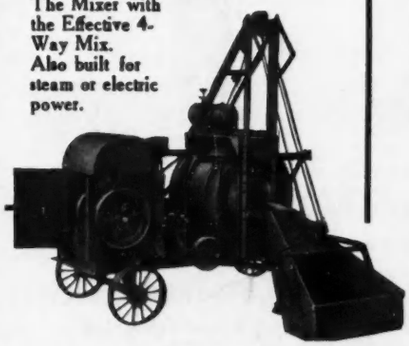
MIXERS AND PUMPS EXCLUSIVELY.

NEW YORK, N. Y.—John J. Duggan, Room 1652, 50 Church Str.

### *Oshkosh Mixer*

It will pay any contractor to get acquainted with the OSHKOSH MIXER. Request brings full information. Write us today for prices and Special Offer.

The Mixer with the Effective 4-Way Mix.
Also built for steam or electric power.



# Ask for the Bore and Stroke of the Engine

Whether a Portable Saw Rig will *pay* you or not, depends largely on the *Engine*. It requires *power* for a machine to turn out the work of from 4 to 6 men and soon return its *full cost*. Some makers of Saw Rigs *claim* all kind of power for their machines. We state the facts—bore, 4¾ inches—stroke, 6 inches. More than that, we guarantee our Engines will develop over 4 actual brake horse power. Now for some tangible

## Proof of What the Eveready Portable Saw Rig Has Done

Note we did not say *will do*. One contractor who formerly bought factory-made window frames, now makes all his own frames with our machine, at 30% less cost and secures even better frames. Another, a building contracting concern, used our machine in building a church and it saved them enough the first season on that *one* contract alone to almost pay for the Saw Rig.

Our Eveready Saw Rig is not a frail, weak machine like some are, but built heavy and strong enough for any service. It is also constructed so that it is easy to *move* from one job to another. Also, so *simple*—anyone can operate it. Besides doing cross-cutting and rip-sawing, it joints, sands, jig saws, grooves, bores, miters, and grinds tools. All attachments complete come with it—*no extras* to buy. Send for our Catalog, which gives complete details and contains a long list of letters from well known users.

***Live Agents Wanted in Open Territory***

## OSHKOSH MFG. COMPANY

**316 South Main Street** **Oshkosh, Wisconsin**

# The Master Mixer for the Master Builder

The selection of a Concrete Mixer demands only the same "horse sense" you use when you buy any other tool—you don't take chances on "unknowns" or imitations—you've cut your wisdom teeth.

You know that the original **LITTLE WONDER** opened to your profession a source of great profit by enabling you to quickly and easily do concrete work that previously had been awarded to others.

You've heard many good things about the **LITTLE WONDER "FIVE"**—possibly something like this, taken from the recent letter of a purchaser:

***"I had two other mixers before buying the Little Wonder, and now I wish they were all LITTLE WONDERS."***

We have thousands of similar letters on file.

## LITTLE WONDER "FIVE"

**With Side Loader and Automatic Water-Measuring Tank**

***Capacity WITH Side Loader 5 Cubic feet per batch— 70 to 100 cubic yards per day***

***Capacity WITHOUT Side Loader 5 cubic feet per batch— 35 to 50 cubic yards per day***

***"The Mixer that Makes the Money"***

Now, you've long wanted a mixer. You want the **master machine.** You want the one that the experience of many Master Builders shows pays the largest dividend on investment—the mixer of widest known efficiency, of greatest durability, of absolutely guaranteed satisfaction, or no sale, and one that will mix mortar.

The **LITTLE WONDER "FIVE"** with Side Loader, meets the requirements of any sized job and extracts the last cent of profit by its smooth, rapid work. Mixes one batch while the following is loaded. Loader takes barrows endwise or sidewise on ground level—no inclines to climb, no staging to build. Drum is wide mouthed, no movable parts inside and easily cleaned. Mix visible, consistency easily regulated and neither slops nor clogs. Double drive bearings. One lever control. Work it with any crew you chance to have.

First-class gasoline engine runs the mixer for about 35 cents per day, and is detachable for other work. Only one sprocket chain. Frame and axles steel I-beam section. Steel wheels, wide tires, standard tread. Easily moved about or shipped.

***TEN DAYS' FREE TRIAL, with or without Side Loader, and we pay the freight if you're not satisfied***

## WATERLOO CEMENT MACHINERY CORPORATION

**103 VINTON STREET, WATERLOO, IOWA**

| NEW YORK | PHILADELPHIA | CHICAGO | KANSAS CITY | MONTREAL |
|---|---|---|---|---|
| 11 Broadway | The Bourse | 9 S. LaSalle St. | Commerce Bldg. | Corestine Bldg. |

# You Have Seen This Name

**The STANDARD LOW-CHARGING**

on the many mixers in constructing homes and buildings, along public highways in making curbs, gutters, roads, bridges, streets and in fact every possible place where concrete is used.

The use, of both the small mixer known as the "SSS," capacity 3 to 5 cu. feet, and the larger called "The STANDARD," capacity 3 to 40 cu. feet, from coast to coast, as well as those shipped to foreign countries, has given international prominence to their makers,

## The Standard Scale and Supply Co.

In every mixer, thousands throughout the United States, you see the product of this company. Their owners investigated their many merits and many advantages:

Low-Charging, 24" from ground.
No Complicated Loading Hoist.
Open drum for constant inspection.
Batch type design which municipal engineers are demanding, etc., etc.

These features have added dollars in greater profits to the users of this line—it will to you.

The scope of our product goes still further. We manufacture most every equipment for contractors. We maintain a duplicate part system. Every piece of machinery is protected by the prestige of the name and the guarantee of the maker. Our experience has covered almost twenty-five years.

Therefore, when you invest in a Standard engine, hoist, material elevator, cart, barrow or other equipment, you may be assured that you have obtained as good as can be procured.

## Correspondence Invited

from contractors considering big or little machines who are interested in bigger profits. Our Catalog No. 448, will be mailed to you tomorrow.

**THE STANDARD SCALE & SUPPLY CO.**

Chicago, 1345-47 Wabash Ave. Pittsburgh, 243-45 Water St. New York, 136 W. Broadway
Cleveland, 1547 Columbus Road Philadelphia, 35 South Fourth Street

# "Straight to the Mark"

THE FAMOUS LINE

You are trying to hit the mark of greater success. The Sidney "Famous" goes straight to that mark! With a "Famous" Wood-worker in YOUR shop you will find business **picking up right along.**

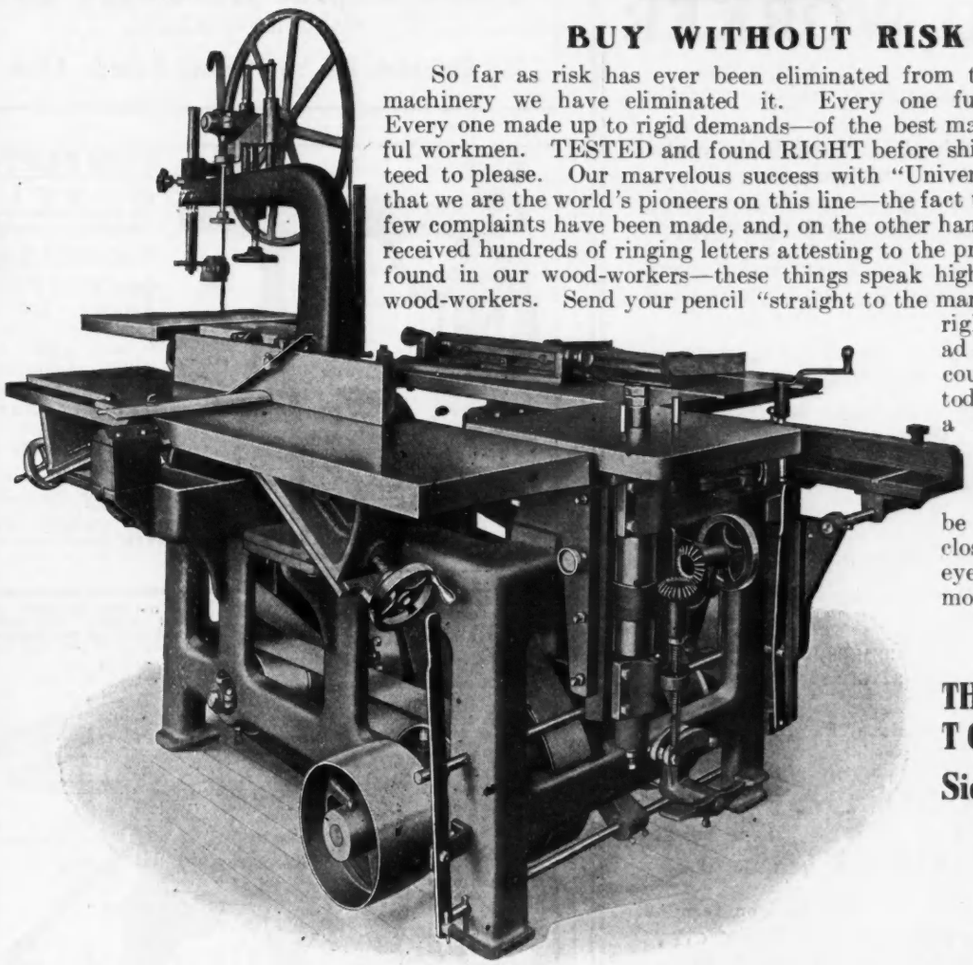
THE SIDNEY TOOL CO.,
Sidney, Ohio

Gentlemen: Show me how your line will enable me to Hit the Mark of greater success. Send Catalog No. 12 of a

Signed.....

Address.....

# The Famous "31" Universal Woodworker saves time, cuts cost, eliminates much hand labor——PAYS!



## BUY WITHOUT RISK

So far as risk has ever been eliminated from the purchase of machinery we have eliminated it. Every one fully guaranteed. Every one made up to rigid demands—of the best materials, by careful workmen. TESTED and found RIGHT before shipped. Guaranteed to please. Our marvelous success with "Universals"—the fact that we are the world's pioneers on this line—the fact that exceedingly few complaints have been made, and, on the other hand, that we have received hundreds of ringing letters attesting to the profit possibilities found in our wood-workers—these things speak highly of SIDNEY wood-workers. Send your pencil "straight to the mark" in the upper right corner of the ad — fill out the coupon and mail it today. Paste it to a Post-card. It will come straight to us, You will thus be aiming a little closer to the "bull's eye" of more money.

**THE SIDNEY TOOL CO.**
**Sidney, Ohio**

# An Investment in a Lifetime of Satisfaction

**The day of the power woodworker is here. Carpenters and Contractors who watch conditions closely, agree that competition makes a power woodworker necessary for modern building.**

**All about you you will find Carpenters and Builders who are using woodworkers. They are making a success of it. They have found it profitable to get out their dimension stuff and all their millwork quickly. They have found out that a power woodworker saves time and the wages of a good-sized crew.**

**A Crescent Universal Woodworker will save you all the delays, the disappointments and the "bum" work you have had to put up with for years. It is the means of getting ahead on your contracts. It enlarges your capacity for handling contracts. It makes you independent of others for material. Above all, it cuts down your wage expense and turns into your own pocket the profits you have been handing to the material dealer.**

### *For the Shop, the Job or the Lumber Yard*

The Crescent is approved by shrewd men because it has its place wherever building material is being prepared. Use it in the shop, winter or summer, getting material in shape for your jobs. No matter what is needed—framing timbers, braces, door or window frames, sash, stair work, porch work, moulding—anything and everything in the nature of wood work for your contracts. Use it right out on the job when advisable. Many Lumber Dealers have purchased a Crescent because it gives them all the facilities of a fully equipped planing mill.

### *Four Men Can Work at the Same Time*

The different parts of the machine are so arranged that each one is easily accessible. Four men can work on the Crescent at the same time without in any way hindering each other. Each part of the Crescent can be started or stopped at will. It is not necessary to run the whole machine when only one part is in use. Each unit is distinct and separate from the others and can be so used.

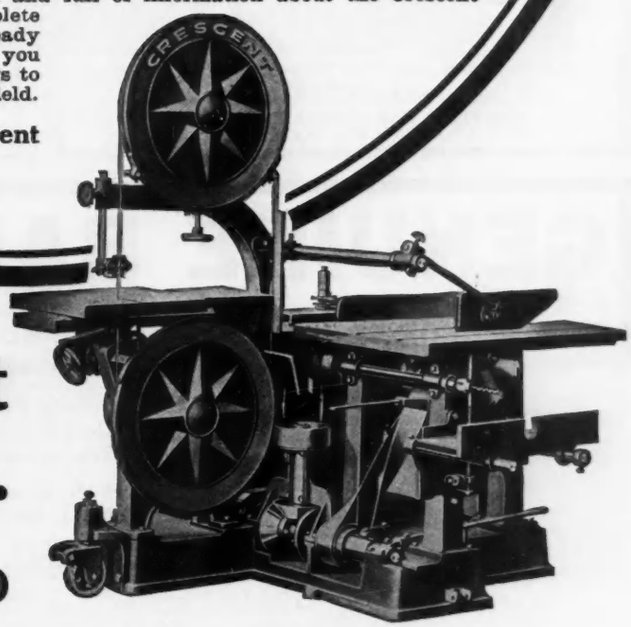
## Crescent Universal Woodworker

Is a combination of machines which includes Band Saw, Jointer, Shaper, Saw Table, and Borer. Other attachments may be added when wanted to make the Crescent adaptable as a Re-Saw, Hand-Feed Molder, Tenoner, Panel-Raiser, Pole-Rounder, Disk-Grinder, Knife-Grinder, Plain Grinder and Hollow Chisel Mortiser. The base is one single casting on which the various parts are mounted. For variety of work, construction, durability, and price, The Crescent is really an investment for a lifetime of service and satisfaction.

## New 1914 Catalog

**—a book of 142 pages, well illustrated and full of information about the Crescent Universal Woodworker and our complete line of woodworking machinery is ready to distribute. We suggest that you write for your copy now. It pays to be a leader in the building field.**

**Investigate the Crescent NOW!**




# The Crescent Machine Co.

**224 Main Street**

**LEETONIA OHIO**

# WRITE US

**FOR OUR NEW 1914 CATALOG**

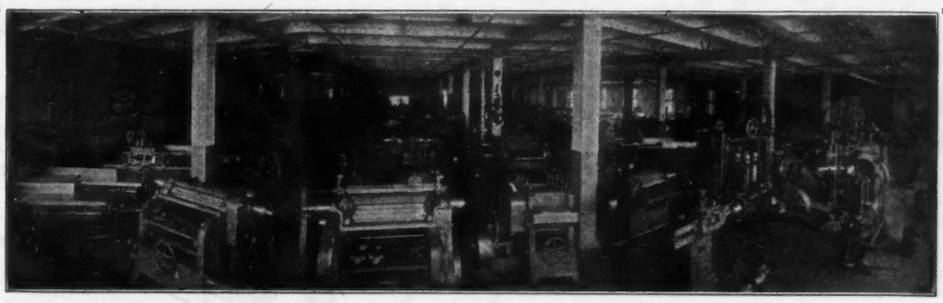
AS PIONEERS in the manufacture of PORTABLE SAW RIGS, we are entitled to claim that we manufacture the BEST Portable Saw Rigs on the market today; in fact, we make them complete in five different sizes to meet every requirement of the trade.

We also manufacture hoists, pumps, elevators, mortar mixers, concrete chutes, air compressors, gasoline engines, etc.

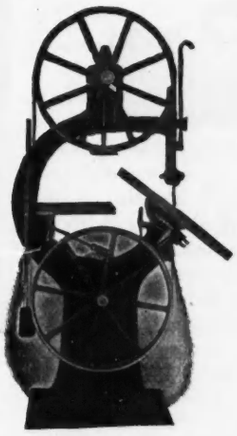
***Write Us for our new 1914 attractive Catalog***

## C. H. & E. MANUFACTURING CO., Inc.

**322 Mineral Street** **MILWAUKEE, WISC.**

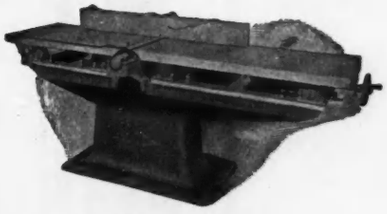


Section of Main Floor Exhibit and Salesroom



Chicago Band Saws
27-32-36 inch wheels

**Everything in wood working machinery and supplies for Contractors, Carpenters, Builders, Interior Finish, Sash and Door, Planing Mills, Furniture, etc.**



Chicago Jointers
8-12-16 inch

*Write us Your Wants and Get Our Special Price*

Chicago No. 9 Combination Saw

## Chicago Machinery Exchange

**1215-1223 Washington Blvd. :-: CHICAGO**


## Cash Prizes for Personal Experience Letters About EXTRA PROFITS

THERE are many ways in which carpenters and builders pick up considerable money "on the side." There are any number of popular building novelties and pieces of modern equipment for buildings that are being sold by carpenters and builders. Hustlers in the building field secure the agency for such building specialties and find it no trouble at all to work up a nice little business in connection with their regular building work.

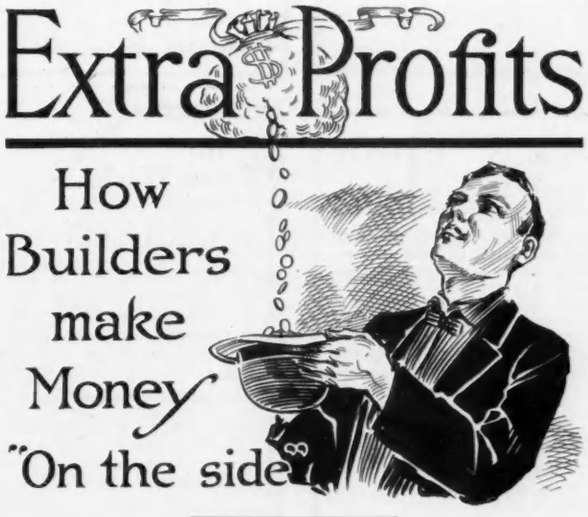
We believe that a good many more of our readers might just as well be picking up these extra profits. Of course, conditions are not the same in all localities; but almost everywhere a wide-awake man can find sale for some of the special lines announced in our advertising pages.

### New Department

We want to begin a new department next month under the illustration heading shown at the right, "EXTRA PROFITS, How Builders Make Money on the Side." We want to hear from all of our readers who have been handling agency propositions in connection with their building work. We want brief, straightforward letters that tell actual facts. Give us your personal testimonials about the way the agency business goes and also what effect it has on your regular building work. All letters must be signed, but names will not be published if requested not to.

**For the best letter each month we will pay $10.00 (in goods selected from our advertising pages); also $1.00 (in advertised goods) for every other letter published.**

Study through our advertising pages and note the variety of interesting offers for carpenters and builders to act as local agents. There seem to be good opportunities for profits in connection with each of the following:




| | |
|---|---|
| Dumbwaiters | Wall board |
| Store Fronts | Floor finishing |
| Ventilators | Steel roofing |
| Skylights | Waterproofing |
| Silos | Door and window screens |
| Furnaces | Lighting systems |
| Bath room outfits | Lightning rods |
| Vacuum Cleaners | Detachable hinges |
| Coal chutes | Keyless locks |
| Metal ceilings | Shinglers chairs |
| Metal shingles | Clothes driers |
| Weatherstrips | Popcorn machines |
| Wood mantels | |

We would like to hear from builders who have had experience in handling any of these. Your advice and encouragement may be worth many dollars to other builders. Address EXTRA PROFITS Editor, American Carpenter and Builder, Chicago.

## Contents for August 1914

AMERICAN CARPENTER AND BUILDER



**American Carpenter and Builder**

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

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AMERICAN CARPENTER AND BUILDER COMPANY

RADFORD BUILDING, 1827 PRAIRIE AVE., CHICAGO

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VOL. XVII AUGUST, 1914. No. 5

## Reasonable Demands

FOLLOWING is the accepted report of a committee appointed by the Carpenter Contractors' Association of Chicago to formulate and recommend changes in all building specifications under head of Carpentry.

The Chicago association has mailed this report to every local architect, asking that the same receive the hearty co-operation of the specification makers. The carpenter contractors feel that certain items generally contained in the carpenter's specifications should be eliminated or adjusted as follows:

No. 1. Broken glass is specified to be paid pro-rata by the carpenter. Should be eliminated.

No. 2. The patching of plaster by carpenter should be eliminated.

No. 3. The protection of cut stone shall be specified so that the responsibility of the carpenter contractor ceases after covering same, and anyone removing covering be held liable for the damage thereto.

No. 4. If carpenter is required to furnish watchman, specify time services of said watchman are required.

No. 5. The delivery of hardware and responsibility of same shall be limited to the delivery of boxes and cases, but no responsibility is to be assumed by the carpenter for contents thereof.

No. 6. Priming of frames should be eliminated from carpenter's specifications as factories refuse to prime frames.

No. 7. Lumber for bracing of iron will not be furnished by carpenter.

No. 8. Carpenter will not clean the rubbish of other contractors.

No. 9. Setting of iron should be eliminated from carpenter's specifications.

No. 10. The carpenter contractor will not furnish any labor or material for work that is required and not specified or shown on plans, but necessary to complete the job.

No. 11. The carpenter shall not be held liable for any damage to finished floor by other trades.

No. 12. Carpenter will not be responsible more than 30 days after completion of building for fitting of doors, locks, or windows, caused by the settling of walls or joists and swelling or shrinkage of woodwork.

✣

NO sharp bargains—do more, not less, than promised.—*Andrew Carnegie.*

## U. S. Supreme Court Places Responsibility for Contract Statements

THE discussion of contract provisions oppressive to contractors has received a valuable addition from the Supreme Court of the United States in its recent opinion in the case of Hollerbach & May, where William B. King, of King & King, Attorneys, Washington, D. C., who is a member of the National Association of Builders' Exchanges, so successfully represented the contractor.

The Government called for bids for repairing an old dam on the Kentucky river. *The specifications said that the old dam was backed with broken stone, sawdust and sediment.* When the contractors did the work, it was found to be backed with *sound cribwork, filled with stones!* The removal of this cost far more than the removal of broken stone, sawdust and sediment would have cost. The contractors sued for this difference.

The Government relied for its defense on general cautionary clauses in the specification, saying that bidders must visit the locality, make their own estimate of all difficulties and contingencies, ascertain the nature of the work and obtain the information necessary for an intelligent proposal. The contractors responded that they were excused from doing this in regard to the backing of the dam, because the specifications told them exactly what would be found there and that they had a right to rely upon the statements on that subject in the specifications.

The Court of Claims agreed with the Government's contention. The Supreme Court took a view more liberal to the contractors. It said that the specifications unequivocally asserted what would be found behind the dam and that the contractors had a right to presume that the Government spoke with knowledge and authority. "We think this positive statement of the specifications must be taken as true and binding upon the Government and that upon it rather than upon the contractors must fall the loss resulting from such mistaken representations." Accordingly, judgment was given against the Government for the excess costs incurred by the contractors.

The decision is of general importance, because many contractors, particularly for foundation work, sewers, or plumbing, sign contracts stating particular facts in positive terms. When more costly conditions are found to exist, the contractors are told that these representations of facts are not binding on the owner because somewhere else in the specifications the contractors are told to be on their guard against everything. This decision of the Supreme Court answers this position. *It says that the contractors have a right to assume that positive statements in the specifications are true and, if not true, that the burden does not fall on the contractor, but on the owner, government, municipality or individual, which has misrepresented the facts.*

If contracts and specifications were properly drawn, the responsibility for local conditions should always fall on the owner. He furnishes the place for the work. He should state definitely what the conditions are for doing the work. He should not expect the contractor to gamble on these conditions. This decision is in line with enforcing a proper responsibility on the owner.

## Urge Fire Prevention

THERE are many ways in which builders can fight the fire fiend. One of the most effective is to be thoroughly familiar with the approved fire prevention principles and to advise all who will listen—customers or prospective customers—telling them what to take care about, that their property may be safe.

While some building materials are unquestionably more fire-resisting than others, the important thing is really not so much what building materials are used, as how they are used. A building may itself be absolutely fireproof and yet its contents be under great danger from fire. A fireproof authority has likened such a building to a cast-iron stove. It cannot itself burn up, but the contents burn readily.

The National Fire Protection Association, through their fire prevention committee of which Mr. Powell Evans is chairman, has been doing a very praiseworthy work in instructing the public as to common sources of fire danger and how these should be guarded against.

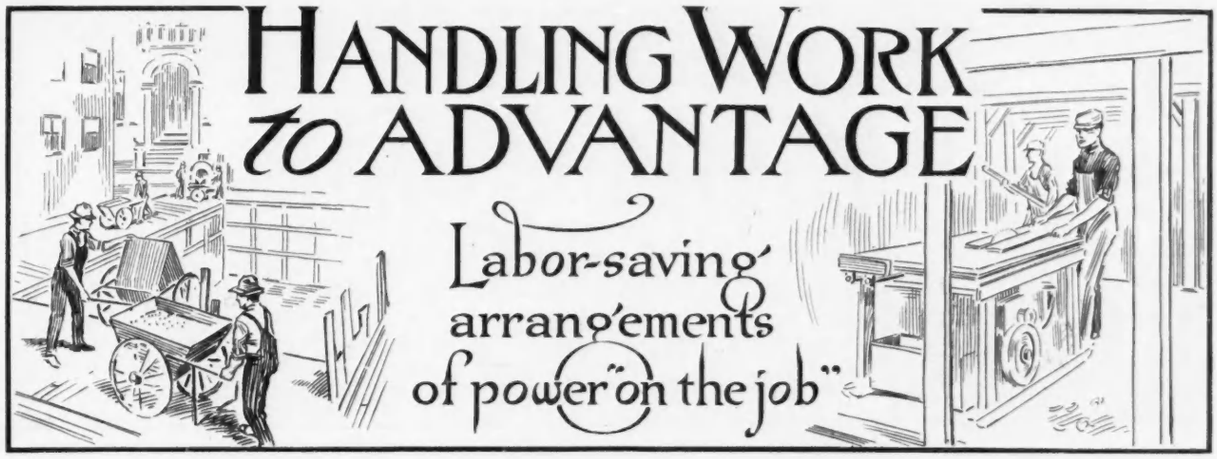
A circular letter sent to all of the hardware dealers who are members of the National Hardware Association, signed by W. D. Taylor, president of the association, and by Mr. Evans, contains the following paragraphs:

Exposure Hazard: This danger from surrounding property is a heavy charge in every average city insurance survey and rate amounting often to one-third of the whole charge. Study your loction and your exposure hazard thereon and the reasonable means of bettering your own property (such as fireproofing doors and windows and outside walls, extending fire walls above the roof, noncombustible roofs, etc.), so as to minimize this physical exposure hazard and consequent insurance rate.

Construction: A large part of your insurance survey and rate is always based on deficiencies in physical construction of your property. Study this (such as unprotected vertical and horizontal openings, too large areas undivided by fire walls, concealed spaces, etc.), and ascertain how they may be reasonably remedied, and how such improvements will reduce your insurance rate.

Protection: The best located and constructed property in the world without adequate fire alarm and extinguishing facilities on the average ultimately suffers undue fire waste, either in buildings or contents or both. A cast iron stove won't burn but it is burning up contents constantly. Study the deficiencies.

Management: Keep your property clean. Half of all American fire waste comes from careless accumulation of dirt and rubbish and disorder. Teach your people cleanliness and order and organize them to detect and extinguish fire and how to call the public fire department quickly when necessity requires.




**Important! Cash for YOUR Way!** This new department belongs to our readers. We invite you to fill it up with brief illustrated descriptions of the little labor saving tricks and methods you are using in connection with your concrete mixing, power hoisting, portable saw rigs, etc. Furnish us a little pencil sketch or photo with each letter if possible.

We want this department to be extra practical and interesting; and to make it more exciting we will pay $10.00 (in goods selected from our ad pages) for the best letter each month; also $1.00 (in advertised goods) for every other letter published. Address LABOR SAVING Editor, American Carpenter and Builder, Chicago.

## Chute With Reservoir Helps Concreting Gang

**INSPECTION OF A CLEVER LITTLE RIG IN USE BY CONTRACTOR VAN DER HORST, KALAMAZOO, MICH.**

WE observed a worth-while idea the other day that was working out well on the new Science Building job at the Western State Normal, Kalamazoo, Mich. The building site was leveled on the top of a hill of clean sand and gravel; the excavated material thrown up in a big pile just outside the foundation wall. On top of this pile Contractor Van Der Horst placed his concrete mixer and built a chute or trough of planks from the discharging end of the mixer down to the foundation wall. The lower end of the trough was given extra depth to form a reservoir to hold about enough concrete to fill two of the wheel carts.

The mixing gang, up above, work right along at their own gait, discharging the slush concrete into the trough where it flows down into the reservoir at the bottom. A man stationed below opens and closes the lift gate as the wheel carts are brought up to be loaded.

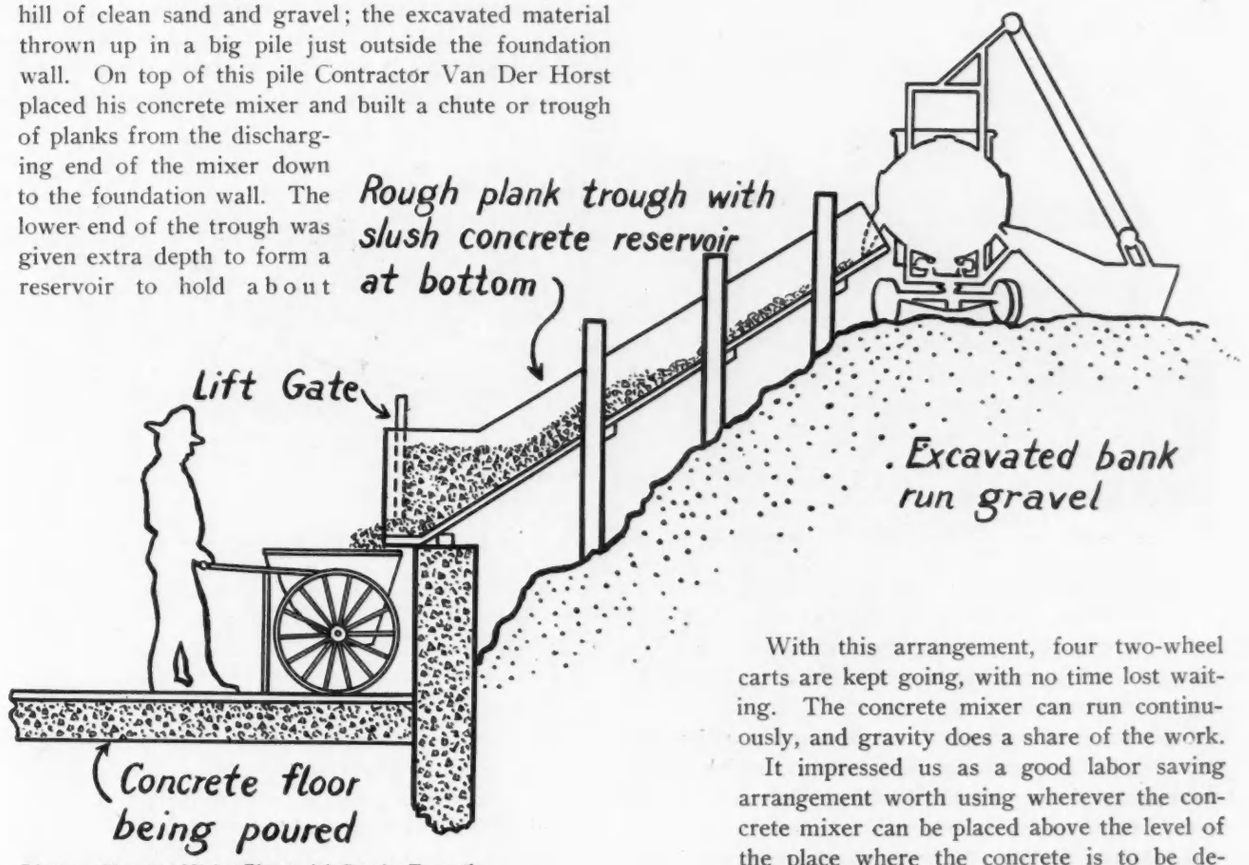
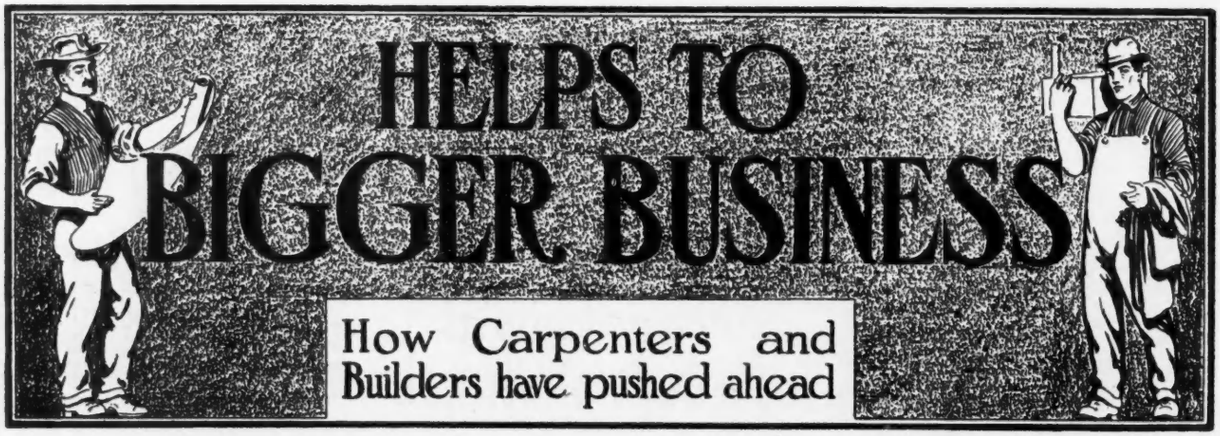



**Diagram Showing Mixing Plant with Gravity Trough for Slush Concrete in Use at Western State Normal Science Building Job, Kalamazoo, Mich.**

With this arrangement, four two-wheel carts are kept going, with no time lost waiting. The concrete mixer can run continuously, and gravity does a share of the work.

It impressed us as a good labor saving arrangement worth using wherever the concrete mixer can be placed above the level of the place where the concrete is to be deposited.




# Power Bungalow Builder on Wheels

**HOW I RIGGED UP A POWER WOODWORKING OUTFIT THAT IS AN EXTRA STRONG AD FOR MY BUSINESS—PAYS FOR ITSELF ON EVERY JOB**

**By W. S. Weaver**
Builder and Contractor, Alhambra, Calif.

IN this part of California, building is mostly frame, and there is considerable cutting to be done on the job—due to the varied architecture of the classy bungalow designs, with their irregular roofs and porches.

I conceived the idea of building a portable saw that would be convenient as an office and store room as well as an advertisement. I bought a low four wheeled truck with wide rimmed iron wheels and on the platform of this I built an amateur bungalow with a flat, white asbestos roof. The sides I covered with shakes and shingles, using casement windows on three sides and a pair of shutter doors on the rear, which are hinged top and bottom and made to swing out—the lower half being used as a platform or approach to the saw and the upper half forming a canopy supported by two braces.

The windows swing outward and are hinged at the top, in the same manner as the doors, which allows long material to be ripped and cut off without reversing the pieces.

In place of glass on the windows, galvanized iron was used so as to resemble glass with the muntins nailed thereon to give the appearance of casement windows.

In Fig. 1 the mill is shown on the job, ripping a piece of 6 by 6-inch Oregon pine, showing the piece fed through the saw from the doorway and taken out through the window at the other end. In this photograph the reader can get a good idea of a southern California home, with flat roofs, which are covered with asbestos or sand coated roofing paper.

Fig. 2 shows the machine sawing studs. The material is handed in through the window opening on one side. With the aid of a gauge and platform they are sawed to the proper lengths and shoved out through the window opening on the other side, ready for use. After all the studs are cut the gauge can be set for cripples, trimmers, fire blocks or bridging, most of which are cut out of the scrap heap.

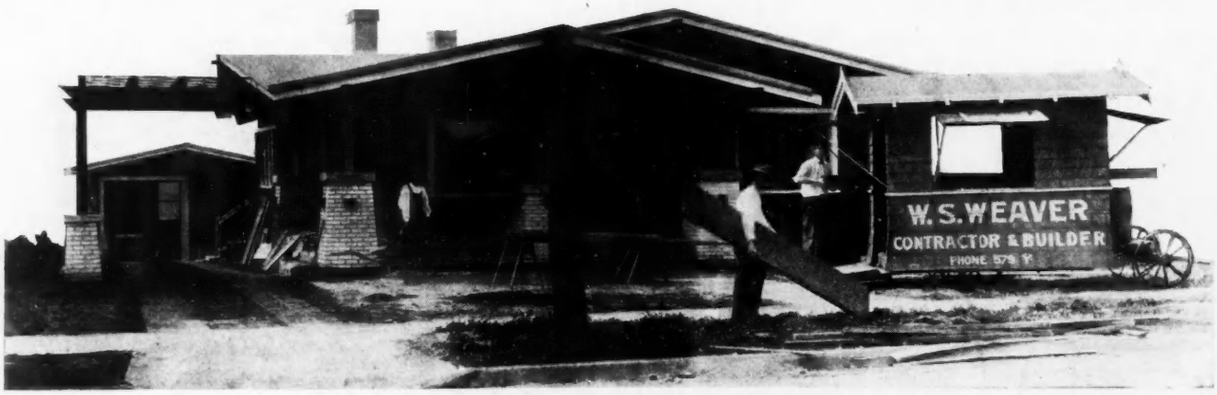
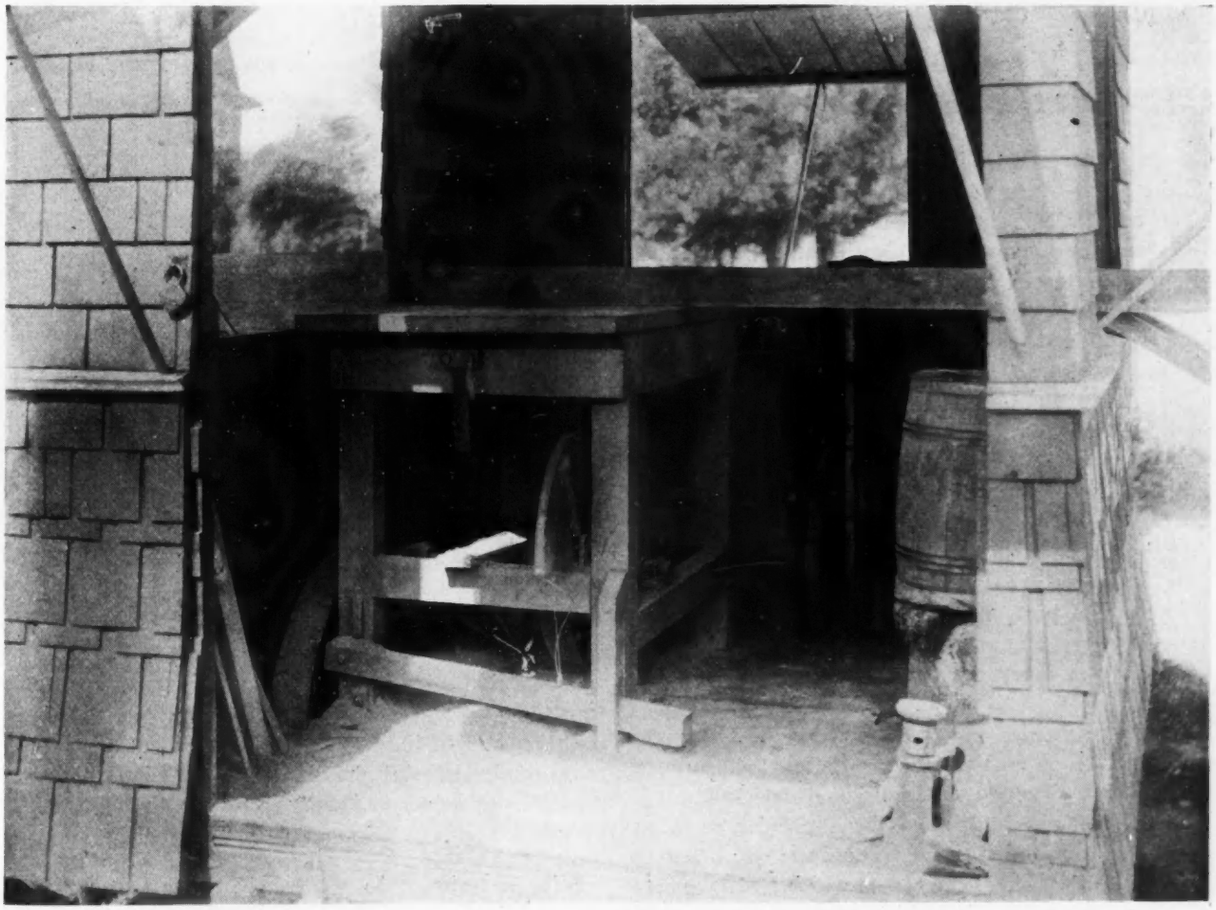



**Fig. 1. Contractor Weaver and His Power Bungalow Builder on Wheels at Work on a Typical California Home Building Job.**

Rafters may also be cut, one end for the plumb-cut and the piece reversed for the show-end cut. It is very convenient in cutting out flare-out pieces—which are usually cut out of 1-inch stock, 4 inches wide at one end and tapering to a point and from 1 to 2 inches in length.

PORTABLE WOODWORKING SHOP FOR BUNGALOW BUILDING.

Fig. 2. W. S. Weaver, Contractor and Builder, Alhambra, Calif., has Enclosed His Portable Power Saw Rig in a miniature Bungalow—A Good Advertising Stunt for Him as He Builds Many Bungalows. The House is on Strong Iron Wheels. One side of the House Opens for a Doorway and the other Three Sides have Hinged Windows. Material can be Worked Through from any Direction to the Saw Table.



BUNGALOW IS BIG ENOUGH FOR CONSIDERABLE STORAGE AROUND MACHINE.

Fig. 3. Close-Up View of Shop Interior, Showing Saw Rig, Gasoline Engine, etc. The Building Locks Up Tight and Safe so thatthe Machinery is Protected from the Weather as well as from Vandals.

There are a thousand various pieces which can be sawed with an outfit like this. I am positive all builders appreciate this without my describing it in finer detail.

Fig. 3 shows the makeup of the machine in the interior. The power is a Fairbanks-Morse, three horsepower gasoline engine, direct drive. The saw is a combination rip and cut-off and is operated back and forth by a foot lever. When the rip saw is used the mandrel is held up in place, stationary, by a steel peg. The table is adjustable so as to regulate the depth of the cut.

**All in all, Bro. Weaver proves himself a good business advertiser. His portable power plant, with its attractive housing, is one of the best business producing ideas for builders we have ever seen. Perhaps, though, you can beat it. What is your way of getting the public eye and so building a bigger business? We will be glad to pass along all good ideas for the benefit of other builders.—EDITOR.**

The narrow belt shown on the right of the engine drives an emery wheel stand with a coarse and fine carborundum wheel, which I find saves lots of time and otherwise hard grinding for the boys, especially after chopping off 20d. nails with their hand axe, or when the mice get after their chisel edges.

There are shelves erected on the inside of my bungalow-workhouse-on-wheels for nail kegs and tool boxes, so they are always under cover as well as locked up at night. (There are always quite a few nails liable to crawl away into somebody's chicken coop or fence, when the nails are not locked up.)

Fig. 4 shows a row of three bungalows which the mill helped to turn out. An idea may be had of the fine wide streets and artistic lamp posts, front lawn and shrubbery that every one here prides himself in keeping up.

In this figure the reader can get an idea how the mill is used as an advertisement. Its nifty appearance causes lots of curiosity and amusement and talk.

This figure also illustrates the convenience of an auto in the contracting game. There are two brackets arranged on the side of the car on which I carry material to and from the jobs, which means quite a saving in time and economy by saving scraps for the next job. The mill is hitched to a bracket bolted to the frame of an Overland car, with which I pull the outfit from job to job.

Our city recently celebrated its anniversary in the way of a carnival, inviting commercial and industrial floats to take part in a parade. I entered my bungalow mill. A double shaft was fastened to the mill after it was stripped of the machinery and a pergola was added to the front end as a place for the driver to sit in. I cut rose bushes and tied them on each side, which gave it a homelike appearance. I

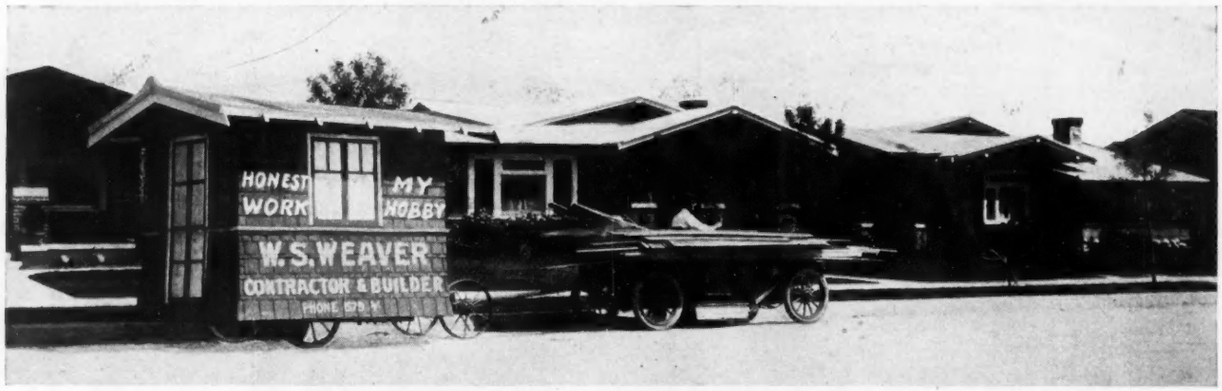



**Fig. 4. Contractor Weaver All Ready to Get Onto a New Job in a Hurry. His Auto has Side Brackets for Carrying Lumber and the Bungalow Power Woodworker Fastens on Behind. The Windows in the Little Bungalow are Galvanized Iron which Resembles Glass.**

was awarded a prize of $25, which helped some toward the original expense of the outfit, and has been paying for itself ever since.

I hope this article will be received with as much appreciation as it is given and should any reader desire more information regarding wood workers on the job I will be glad to give it if possible.

✣

## Building Contract—Extra Work

A building contractor had a written contract for the construction of a building, which contained no provision for extra work. Payment was to be made on full completion. The contractor did not complete the contract. He had, under the owner's express orders, performed certain extra work entirely outside of and independent of the contract. In an action to foreclose a mechanic's lien for the balance claimed to be due it was held that no recovery could he had under the contract, but the extra work done did not come within the provision of the contract as to payment upon full completion, and the plaintiff was entitled to recover therefor. Mitchell v. Dunmore Realty Co., 156 App. Div. 117, 141 N. Y. Supp. 89.

✣

Miss Elderby—"Do you really think that women propose?"

Oldbach—"If they don't there are many marriages I cannot account for."


*Mr. John Simpson, a well known legal authority, has been engaged to set forth in plain English certain important points of law that concern Builders. He will also through this department answer legal questions for Our Readers.—Editor.*

### Duty to Follow Specifications

In an action upon a building contract the owner counterclaimed for damages because of defective cement work. The specifications exacted that the floors of the first and second stories and of the hall to the third story of the building

"be furnished on top with a top dressing three-fourths inch thick put on at the same time as the body of the floor and composed of two parts of Chicago A. A. cement to one part of fine sand and one part of crushed and powdered marble dust or limestone. There is to be a cement base 3 inches high to project ¾ of an inch from plaster above and to be put in place by the concrete floor contractor at the same time and of the same materials as the topping . . . The lower section of each mackolite partition is to be put on first directly on the body of the floor, and the base then brought upon this."

The contractor contended that this method of construction was impossible of performance. The court was not satisfied from the evidence that this was impossible. Doubtless it would have been difficult, especially in the winter season, but this furnished no excuse for noncompliance with what had been agreed upon by the parties, nor did the oral assent of the architect justify performing the work in a different manner. The contract provided that there should be no changes in the specifications or drawings, and no deviations without the written consent of the architect, and that no alteration should be made except upon a written order of the architect, with amount of cost thereof. It was held that the architect's authority was limited, and that he could not direct the work to be done otherwise than as provided by the plans and specifications, except as authorized by the owner, nor relieve the contractor from following the specifications, so that the contractor, having followed a new plan in accordance with the architect's oral permission only, was liable for damages caused by the breach. Volquardsen v. Davenport Hospital, Iowa Supreme Court, 141 N. W. 432.

### Acceptance of Building—Forced Occupancy

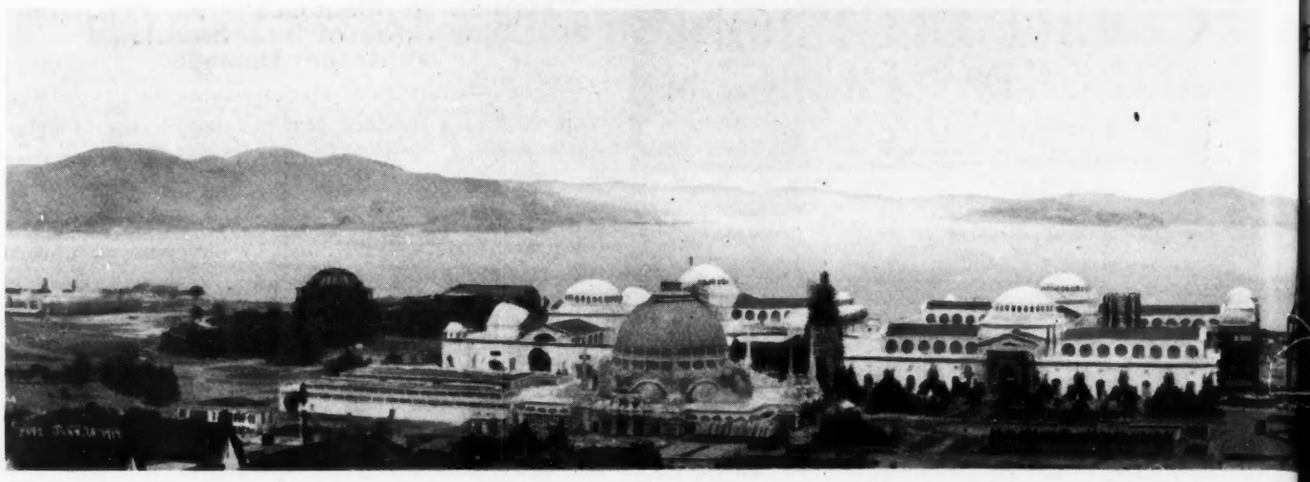
The owner of a building in course of erection who is forced by circumstances, as by the expiration of the lease of the premises then occupied by him, to occupy the building before its completion does not thereby accept it. Japes v. Harmon (Mich.), 141 N. W. 595.

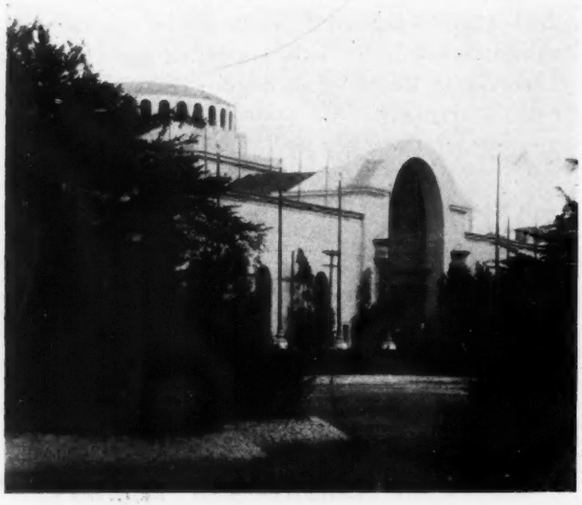
### "Liquidated Damages" or Penalty—Proportion of Sum Stipulated to Actual Damage

When a building contract stipulates for payment of a penalty of a specified sum per day in case of delay in completion, is that sum recoverable by the owner in case of delay, or only the actual loss sustained by the delay? There does not appear to be a satisfactory hard and fast rule laid down by the courts to govern this matter. If the damages are in their nature uncertain or incapable of being ascertained, the sum specified as a penalty will be treated as fixing by stipulation the amount of the recovery. But the difficulty arises when the damages can easily be ascertained. The principle would appear to be that if the sum named as "liquidated damages" (as opposed to actual damages) is so near the actual damages that it may be presumed to have been fixed upon as fair compensation for the loss to be sustained, that sum will be held to be the damages recoverable. But if the stipulation greatly exceed the actual loss, the actual damages should be the measure of the recovery. For example, a building contract stipulated for the payment by the contractor of $20 per day for delay in completion after a certain date. The owner claimed, under the contract, $3,468. The evidence showed that the loss sustained by the owner in being deprived of the use of the building was easy of ascertainment, and that the rate of $20 per day was out of all proportion to the loss sustained. It was held that the provision was properly treated as a penalty and only actual damages, amounting to $1,491, were allowed. First Nat. Bank v. Smith (Tex.), 100 S. W. 311.

### Improper Construction—Liability

A subcontractor for the cut stonework of a building, in an action for the contract price against the general contractor, claimed that when he was nearly finished with his contract he was interfered with by the architect and prevented from finishing the work. A portion of the front wall was, under the architect's order, torn down and rebuilt by another contractor, and the general contractor claimed that the cost of this was chargeable to the plaintiff. The latter maintained that he was without fault in the matter, and that the trouble arose from the fact that the general contractor gave him the wrong line upon which to locate the wall. It was held that the trial court properly instructed the jury that if the plaintiff was at fault in locating the wall, or in putting up the stonework, then the contractor and owner were justived in having the wall taken down and rebuilt at the plaintiff's expense. But if they found as a matter of fact that the line as given to him was improperly located, then he was not responsible for that mistake; and, if the jury found that otherwise the work of the plaintiff was properly performed, he was entitled to recover. The jury found for the plaintiff. Shoemaker v. Riebe, Pennsylvania Supreme Court, 88 Atl. 662.



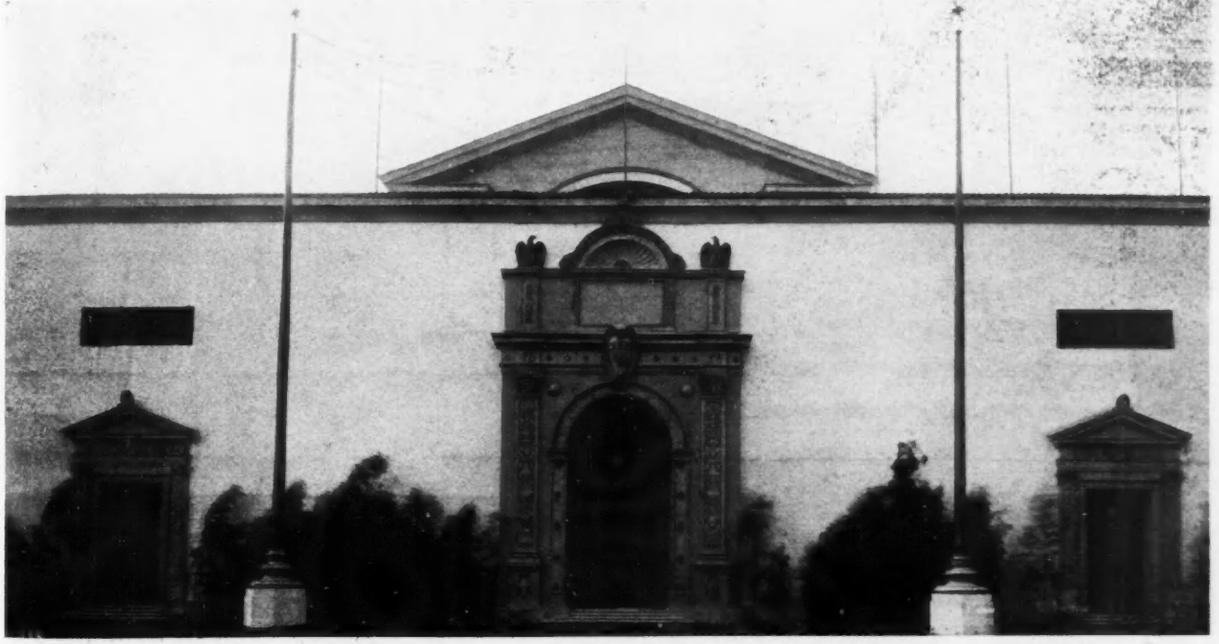


The "Dome of Philosophy," the main western entrance of the Palace of Education. The entrance is 113 feet in height and its interior vault is richly decorated with mosaics. The large central dome of the building seen on the left is 160 feet in height and 100 feet in diameter.

The forecourt or opening of the "Court of the Four Seasons" upon the esplanade along San Francisco harbor. On the left is the Palace of Agriculture; on the right the Palace of Food Products.

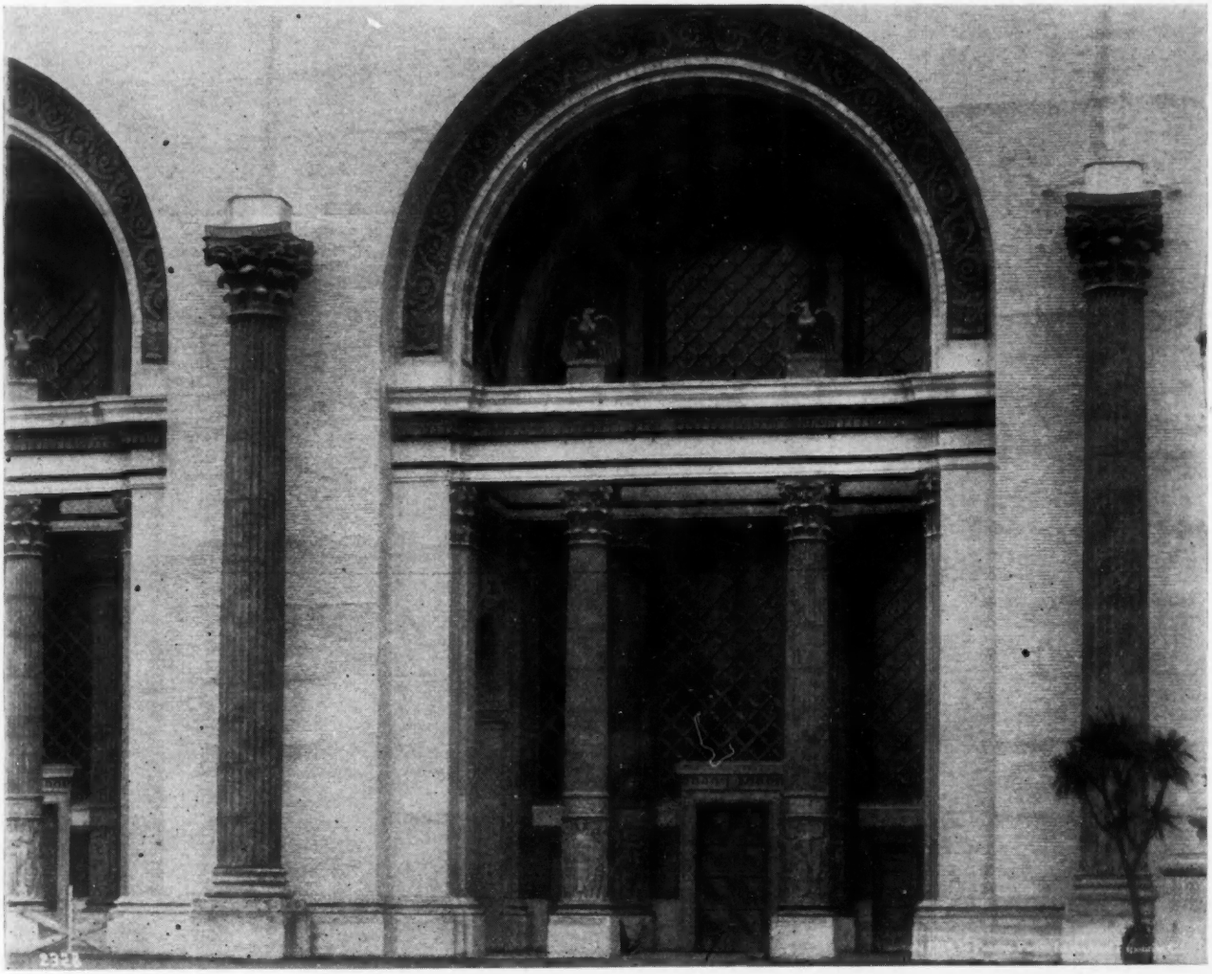
South facade of the Palace of Education. The Three portals shown in the photograph are studied from the Italian Renaissance. The tympanum within the arch of the central main doorway will be decorated with a bas relief by Gustave Gerlack.

The Palace of Food Products, upon the left, and Education upon the right, which show the half-domes known as the Domes of Vigor and Philosophy, respectively, which constitute the main entrances to the palaces. The half domes are each 113 feet in height.

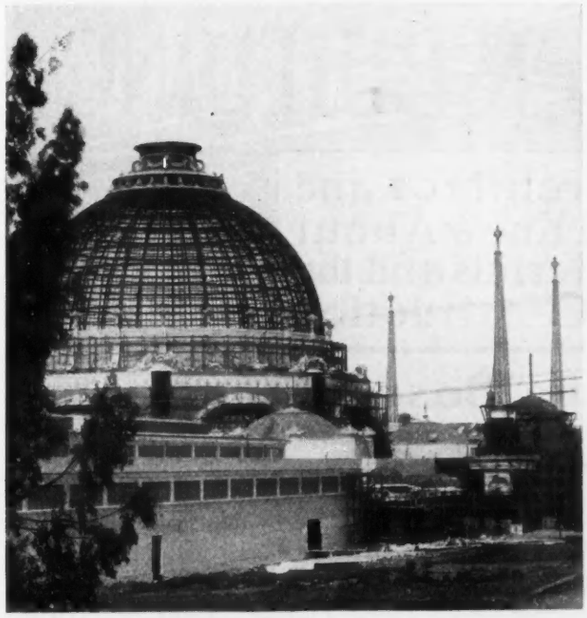


The south entrance to the Palace of Food Products opening on the approach to the "Courts of the Four Seasons."

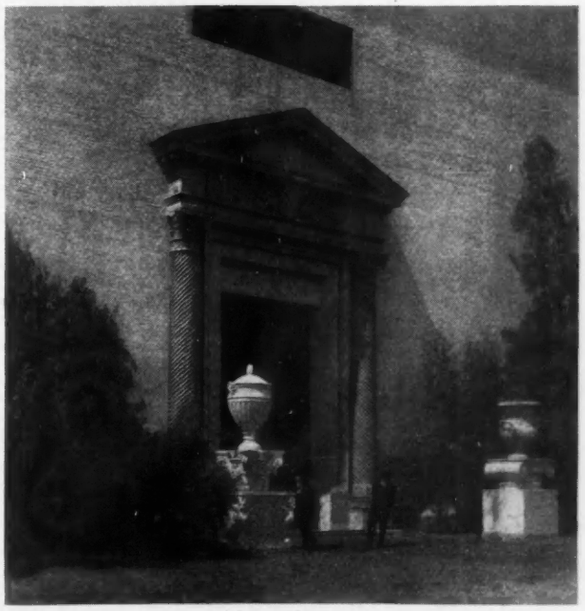
A View of San Francisco Harbor Glimpsed Between the Palace of Varied Industries Upon the Left and the Palace of Machinery on the Right.



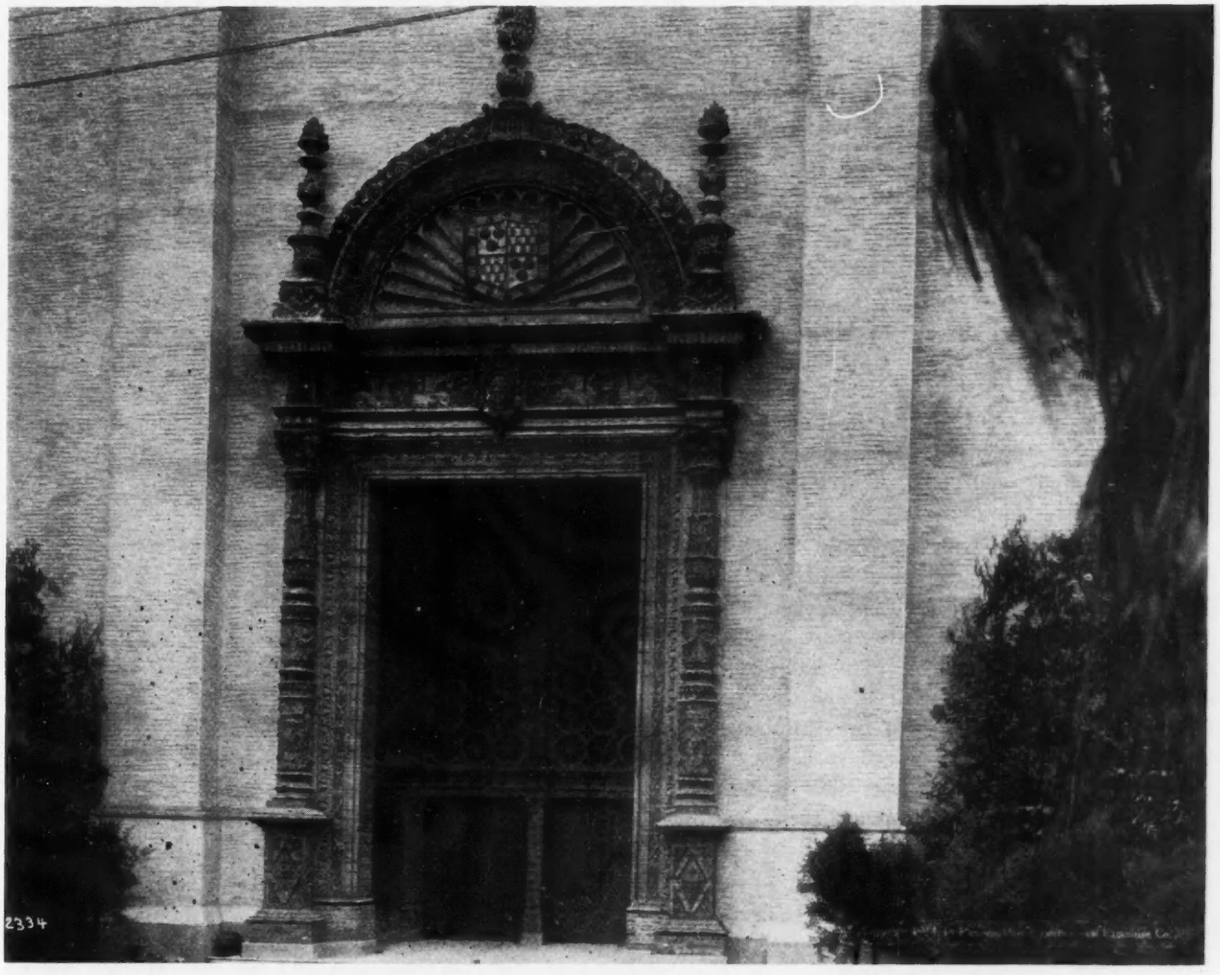
One of the West Entrances of the Palace of Machinery. This Building in Architectural Composition is Roman and the Designer has been Influenced by His Study of the Old Roman Baths. The Decoration is Classic in Form but Modern in Expression and Suggestive of Machinery and Invention.



The largest building ever devoted to a display of plants and fruits. It is the Saracen type of architecture, modeled after the palace of the Sultan Ahmed, and constructed almost wholly of glass and steel. The great crystal dome, 152 feet in diameter and 185 feet high, is the largest hemispherical dome in the world.



One of the south entrances of the Palace of Education. The exterior finish of the Exposition buildings is in imitation Travertine marble and the old ivory shade of this material is the key color of the buildings and grounds. The composition used in this exterior finishing is a specially prepared gypsum product.




One of the small southern entrances of the Palace of Varied Industries. There are three principal entrances upon the south, the central one a replica in part of the great portal of the Hospice of Santa Cruz at Toledo, Spain.


# Noon Hour Talks by the Boss Carpenter

## Talk No. 25—Loads on Roof Trusses

**THE BOSS TELLS HOW TO DETERMINE THE AMOUNT OF LOAD CARRIED BY A GIVEN ROOF TRUSS AND EXPLAINS HOW TO DISTRIBUTE THIS LOAD OVER A TRUSS FOR USE IN CALCULATIONS**

"YOU will remember," said the Boss, "that during the last two talks we have used imaginary loads on our roof trusses when we constructed the stress diagrams for same. Last time I told you that I would show you how to find the values of actual roof loads and ceiling loads such as you will meet in practice. Of course, these loads will vary in different instances and will depend upon the material from which the roof covering is made, kind of ceiling, and upon the material of the truss itself.

"Fig. 14 will show the general method of roof framing where the king post truss of Fig. 13 is used. As you will notice, the rafters are supported by purlins which rest upon the joints of the upper chord of the truss. These purlins extend along the length of the building from truss to truss and serve as a means of holding the roof in position. Thus, the weight of the sheathing and roof covering which is placed on the rafters will be carried directly to the joints of the truss for support. This is as it should be and is shown in Figs. 12 and 13 of Talk No. 24.

"In order to determine the amount of load which is carried at the different joints of the upper chord, we consider that each purlin carries to a joint an amount of load equal to the weight of a panel of roof extending half way between trusses on either side of the truss in question and half way between joints on each side of the joint in question. The dotted lines in Fig. 14 show two of the sides of the panel of roof which is supported at the joint A. The other two sides would be half way between the truss shown and the neighboring truss on each side. For instance, if the trusses in this building are spaced 12 ft. apart along the walls of the building, and if the joints of the upper chord are 10 ft. apart, then the joint A would support the weight of a panel of roof 12 ft. long and 10 ft. wide.

"Since the weight of the truss itself must be taken into consideration, it is common practice to determine by a formula the estimated weight of the truss and divide it into as many parts as there are joints in the upper chord less one. One of these parts is divided again into two equal parts and allowed to act at the extreme ends of the truss. These loads are in addition to the panels of roof already referred to. The end joints of a truss support the weight of a half panel of roof referred to above as well as the half joint load due to the weight of the truss.

"Ceiling loads are determined in a similar manner. That is, in Fig. 14 each joint of the lower chord would be considered to support the weight of a panel of ceiling of a width equal to the distance between centers of panels on each side of the joint in question and of a length equal to the distance between the centers of the spaces between trusses on each side of the one in question. As in the above example, the width of the ceiling panel for the joints of the lower chord, if they are 9 ft. apart, would be 9 ft. and the length 12 ft. on account of the spacing of trusses.

"It now remains to see in any given case what the weights of these panels and ceiling are and to determine the weight of the truss itself if possible. The following table will show you fair values for the weights of different kinds of roofing materials:

WEIGHTS OF ROOFING MATERIALS

| | Weight in Pounds per Square Foot | | | Weight in Pounds per Square Foot | |
|---|---|---|---|---|---|
| Asphalt on felt, without sheathing | 2 | | Sheathing, yellow pine, 1-in. thick | 4 | |
| Ceiling, ordinary lath and plaster | 6 | to 8 | Sheathing, white pine, 1-in. thick | 3 | |
| Ceiling, stamped steel | 2 | | Shingles, wood, cedar | 1½ | |
| Ceiling, wood, ¾-in. | 2½ | | Shingles, wood, cypress | 2½ | |
| Composition, 3-ply | 1 | | Shingles, metal, tin, painted | 1 | |
| Concrete, per 1-inch thickness of slab | 13 | | Shingles, metal, copper | 1½ | |
| Copper, sheet | 1 | to 1½ | Skylight, glass, 3/16 to ½-in. with frames | 4 | to 10 |
| Felt, roofing, two layers | ½ | | Slate, 3/16 to ¼-in. | 7 | to 9 |
| Gravel and felt, without sheathing | 8 | to 10 | Slate, diminishing courses | 12 | |
| Iron, corrugated, No. 18 | 2½ | | Steel, standing seam | 1 | |
| Iron, corrugated, No. 20 | 2 | | Tar and gravel, 4-ply | 5½ | |
| Iron, corrugated, No. 24 | 1¼ | | Tar and gravel, 5-ply | 6 | |
| Iron, flat, galvanized | 1 | to 3½ | Tiles, corrugated | 8 | to 10 |
| Lead, sheet | 4 | to 8 | Tiles, flat | 15 | to 20 |
| Sheathing, hemlock, 1-in. thick | 2 | | Tiles, Ludowici | 8 | |
| Sheathing, spruce, 1-in. thick | 2 | | Tiles, on concrete slabs | 30 | to 35 |
| | | | Tiles, pan | 10 | |
| | | | Tin, on felt | 1 | |
| | | | Tin, without sheathing | ½ | to 1 |
| | | | Zinc, sheet | 1 | to 2 |

"The above table will give weights of roof covering and sheathing. The weight of rafters and purlins

will have to be figured separately and added to the weights given above. An easy way to do this is to determine the number of board feet of lumber in the panel of roof supported by one joint and reduce this quantity of lumber to pounds by the use of the table given below:

AVERAGE WEIGHT OF TIMBER

| | Pounds per Cubic Foot | | Pounds per Cubic Foot |
|---|---|---|---|
| Ash | 42 | Pine, Norway | 36 |
| Chestnut | 41 | Pine, white | 25 |
| Hemlock | 25 | Pine, yellow, Northern | 34 |
| Hickory | 53 | Pine, yellow, Southern | 45 |
| Maple | 49 | Spruce | 25 |
| Oak | 32 to 48 | Walnut | 48 |

"To find the weight of a board foot of these materials divide the weight given in table by 12.

"A rule for finding the number of board feet in a given piece of timber is as follows: Multiply the end dimensions together, divide this product by 12, and multiply this answer by the length of the piece in feet. Thus, a 2x12-in. timber 16 ft. long would contain $\frac{2 \times 12}{12} \times 16 = 32$ board feet.

"In determining the weight of the roof truss itself it is necessary to approximate this quantity at the start and then check up on it later after the sizes of members have been determined. The most complete investigation of this matter is that made by M. Clifford Ricker, results of which are given in his treatise entitled 'Design and Construction of Roofs,' from which the following is quoted:

" 'The weight of the truss varies with its span and rise, with the distance between centers of adjacent trusses, and further with the intensity of the snow and wind loads, that must be supported by the roof.

" 'The formula here given results from the careful designing and calculations of the actual weights of a large number of trusses of longleaf pine and steel rods, for spans increasing from 20 to 200 feet, for rises from 1/10 to 1/4 the span, and for distances between centre planes of trusses increasing from 10 to 30 feet. It may therefore be assumed to approximate the actual weights of roof trusses within the given limits, required to safely support the sum of permanent, snow and wind loads on the roof.'

"The weight of the truss is given in pounds per square foot of the area of the horizontal projection of that portion of the roof supported by one truss.

$$W = \frac{\text{span}}{25} + \frac{\text{span}^2}{6{,}200}$$

"This would mean that each joint of the upper chord would be holding up a weight equal to this value of $W$ multiplied by the same area as used in determining the ceiling loads supported at the joints of the lower chord. This truss weight should be added to the weights which are found for the joints of the upper chord when the diagram is constructed and for use in laying off the load line.

"As an example of the application of the above principles, let us suppose that we have a roof which has trusses like Fig. 14, spaced 12 feet apart and of 36-foot span. This truss has 2 by 8-inch rafters spaced 16 inches on centers and resting on 8 by 10-inch purlins, which are supported at the joints of the upper chord. Roof is sheathed with 1-inch spruce sheathing and covered with metal shingles. The trusses also sup-

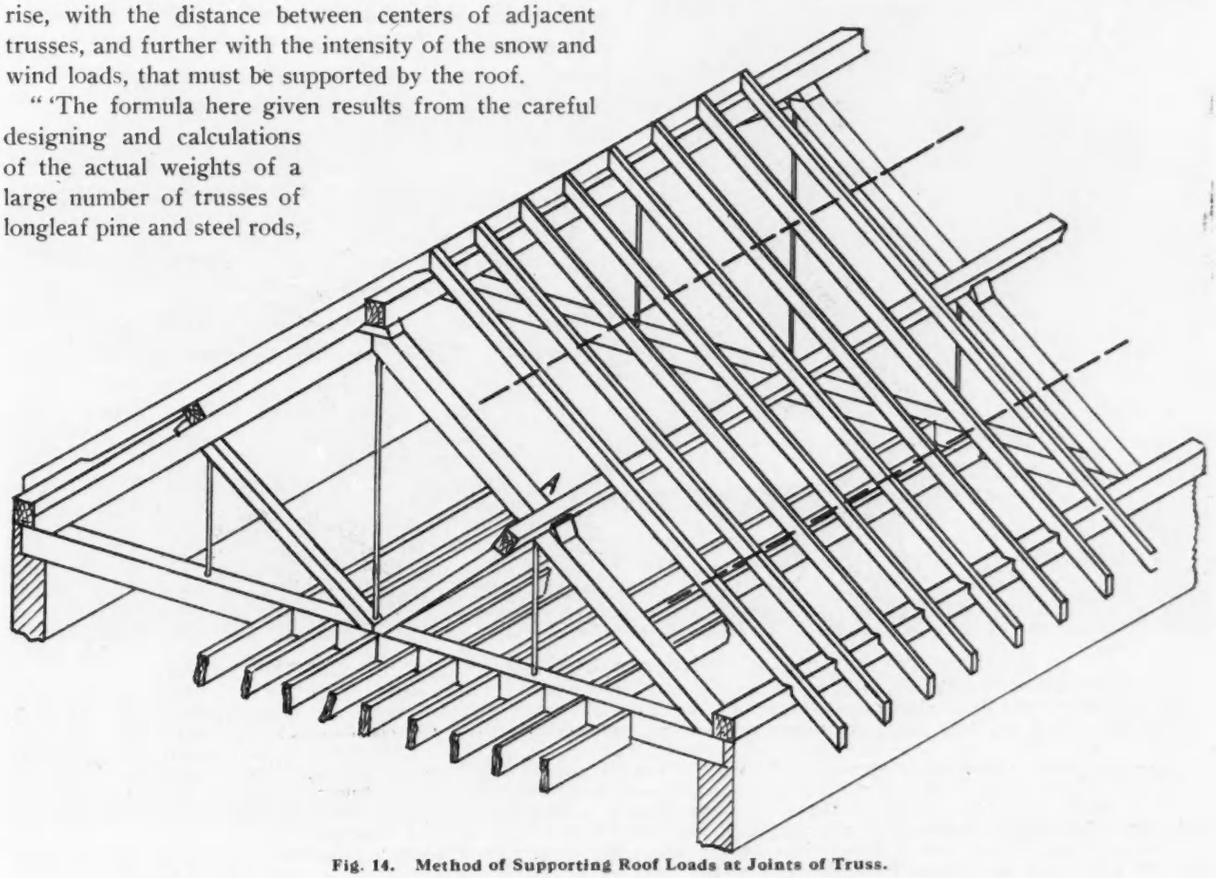


Fig. 14. Method of Supporting Roof Loads at Joints of Truss.

port a lath and plaster ceiling, held in place by 2 by 6-inch ceiling joists spaced 16 inches on centers. We will say that the joints of the upper chord are 10 feet apart, measured along the chord and that the joints of the lower chord are 9 feet apart, measured along the length of the lower chord. This means that each joint of the upper chord supports an area of roof 10 by 12 feet, or 120 square feet of roof. The weight of the roof and purlins on this 120 square feet of roof surface will be found by determining the number of board feet of material used in this space. One piece of 8 by 10-inch yellow pine, 12 feet long, will contain 80 board feet of timber; 120 square feet of roof will contain nine pieces of 2 by 8-inch yellow pine 10 feet long or 120 board feet. Thus, the total amount of timber in rafters and purlins will be 200 board feet of yellow pine. The table above gives the weight of one board foot of yellow pine as about 4 pounds, thus making the total weight for the 120 square feet of roof about 800 pounds, or about 7 pounds per square foot of roof surface. From the formula given above, the weight of the truss itself would be about 1¾ pounds per square foot of the area of the horizontal projection of that portion of the roof supported by one truss. This projection will be 36 by 12 feet or 432 square feet in this case. Each of the three joints of the upper chord between the ends will support ¼ of this area, or 108 square feet, thus making the weight of that part of the truss which is carried at each of these joints 108 × 1¾ or 189 pounds per joint.

"Now we will add up the total roof load which occurs at each of the upper joints of the upper chord excepting the ends.

| | | |
|---|---|---|
| Metal shingles | 1 | lb. per sq. ft. |
| Sheathing | 2 | lbs. per sq. ft. |
| Rafters and purlins | 7½ | lbs. per sq. ft. |
| Total | 10½ | lbs. per sq. ft. |

"Then 120 × 10½ will equal 1,260 pounds for the weight of the roof framework and covering. To this add the weight of the roof truss itself per joint, which makes a total of about 1,450 pounds for each of these joints.

"In a similar manner the weight of the ceiling would be obtained by finding the weight of the 2 by 6 rafters which support the ceiling, and adding to this quantity the weight for ordinary lath and plaster ceiling per joint of the lower cord. These quantities may be obtained from the tables given above.

"Next time we will go a step further and start the calculations for the ordinary type of queen truss such as is found in many types of building construction."

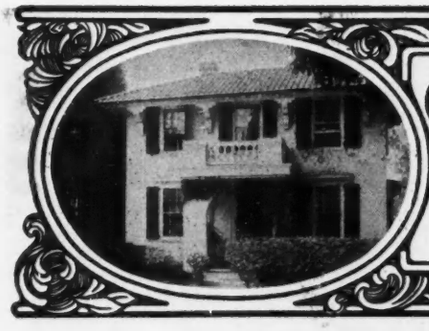
**ELEPHANT PILING TEAK LOGS—TIMBER YARDS OF RANGOON, BURMA.**

**One of the most wonderful displays of animal intelligence and training that can be seen anywhere in the world is that of the timber-yard elephants of Burma. At daybreak every morning the good-natured giants are at work, hauling and piling the teak logs. Kneeling or bending down before a log, the elephant, at a sign from his "mahout" or driver, will push a log with his trunk and tusks, rolling it over and over until the stack is reached. Then, putting his powerful trunk underneath, he will lift it high in the air and deposit it neatly upon the stack, after which he goes to the end of the stack, and if it projects beyond the others, pushes it carefully forward until it is exactly in line.**

**After many years at this work, these elephants display a most extraordinary intelligence in the way they handle their heavy burdens. And truly heavy they are, too, for a n ordinary teak log weighs about two tons.**

**The story is told of one of these old veterans who, after a quarter of a century of service, had the habit of shutting one eye, while he judged the alignment of his logs, but of course we cannot vouch for the truth of this.**

**—J. M. CUMMINGS.**



# CEMENT BUILDING CONSTRUCTION

## Mosaics in Cement Surfaces

NEW METHOD OF ORNAMENTING CONCRETE AND CEMENT PLASTER BUILDINGS

**By B. S. Brown**

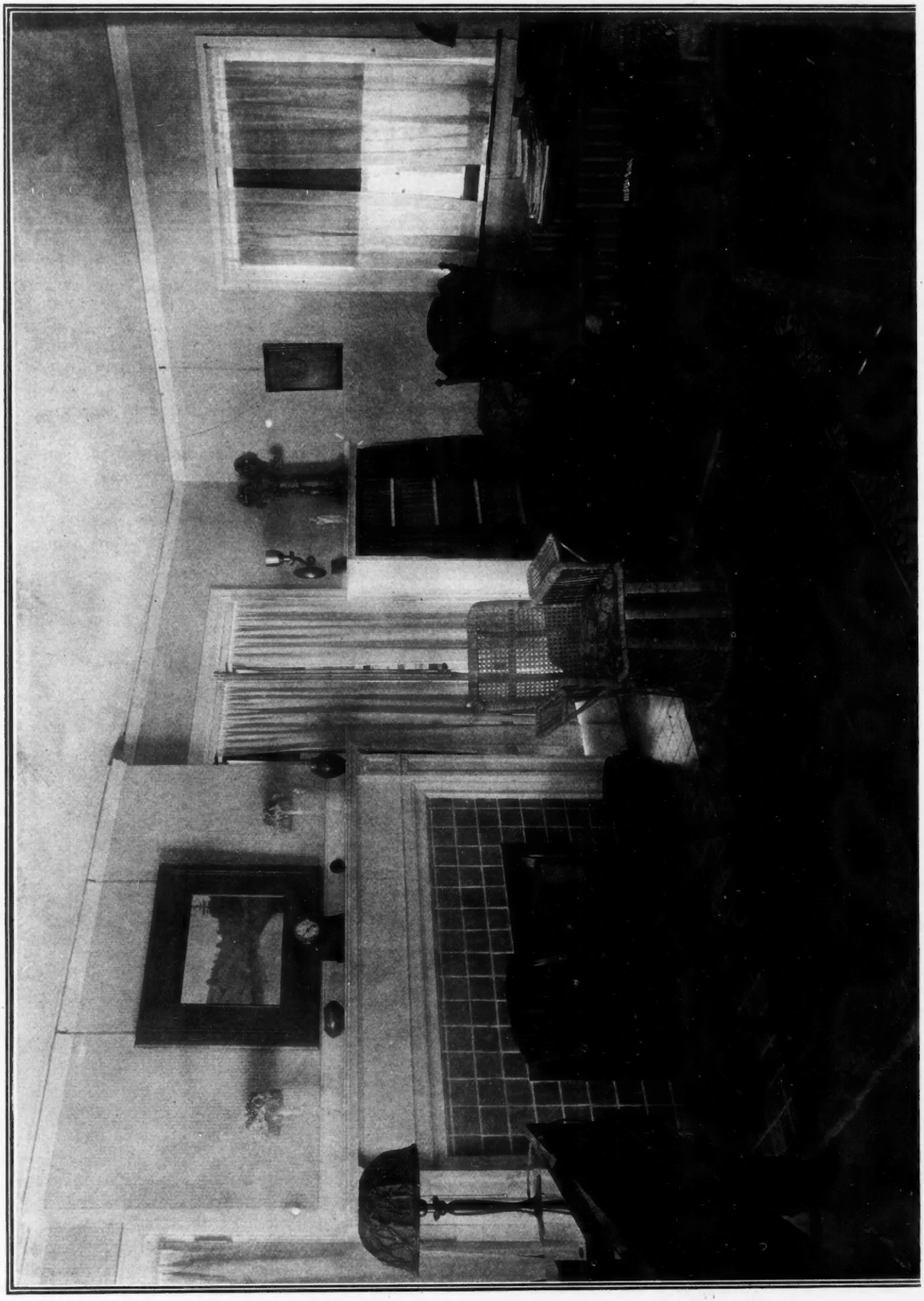
THE use of glazed tiles in large pictures for the decoration of broad walls of public and semi-public buildings, has proved an inspiring example for the builders of dwellings partly surfaced with cement. Many houses are now seen with the blank cement expanse broken here and there by a small square color spot—the spots distributed irregularly, or in geometrical design. Indeed, there seems to be a distinct tendency, in the effort to decorate the monotonous blanks of cement walls, to attain a design. And one sees therefore, the wooden trellises tacked against the walls, which provide the design and relieve the blankness, but which are almost grotesquely out of place in their concrete environment.

Combining the notion that the blank space should be decorated with a design, with the idea that a bit of color should be provided to relieve the grayness of the cement, one finds used a sort of colored cement paint to make small designs to be inset in walls. Pronounced advancement in the art of cement decoration is observable, in the fact that these designs do not fill the whole blank wall space and that the colors are especially devised to harmonize with the gray cement. As a small picture on an interior wall may be most effective any place except in the middle of that wall, so the design for an outer wall should be given a place carefully selected. In one of the pictures herewith, the colored design is placed above the porch, while colored tile are set above the windows of the second story.

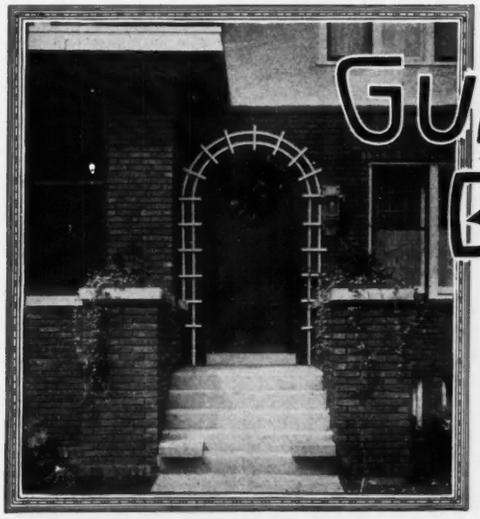
Slab of Cement Bearing an Ornamental Colored Design inset over Porch.

Carrying still further the stained-glass-window example above referred to, the makers of colored cement designs have used them in transom spaces most effectively. The curved panel above the door, shown in the illustration, is a block of cement on the surface of which lines have been laid with a thick cement paint or paste. The colors used in the paste are blacks, crushed mulberry, reds, and yellows for the design slabs; and the lines are not flat upon the surface of the cement, but raised in the manner of highly "impressionistic" oil paintings. The pigments are mineral, and the secret of their successful use lies more in the skillful mixing with cement than in any formula. There is no effort to arrive at "natural stone" colors, for colors natural to stone, don't seem to look natural for cement.

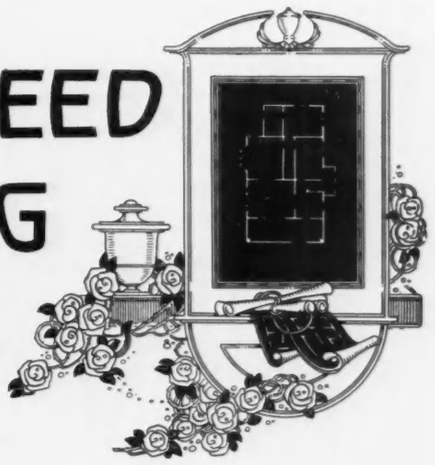
A Pictorial Cement Slab over Doorway.



A Modern Living Room Designed and Finished in the Best Taste. Woodwork is White Enameled, Except the Window Sills which are Mahogany. The Furniture is all Mahogany which Makes a Very Strong, Agreeable Contrast. The Fireplace Mantel is a Simple, Rich Design of Redish Brown, Unglazed Tile, with Wooden Shelf and Side Columns. On Each Side of the Fireplace are Double, French Windows Opening Onto a Screened Porch. Open Book Shelves are Built-In at the Corner of the Room.



# GUARANTEED BUILDING PLANS

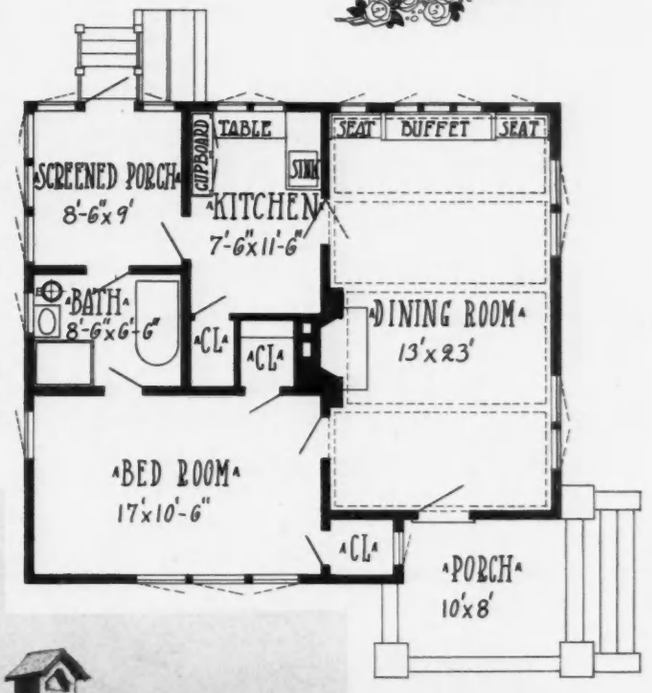


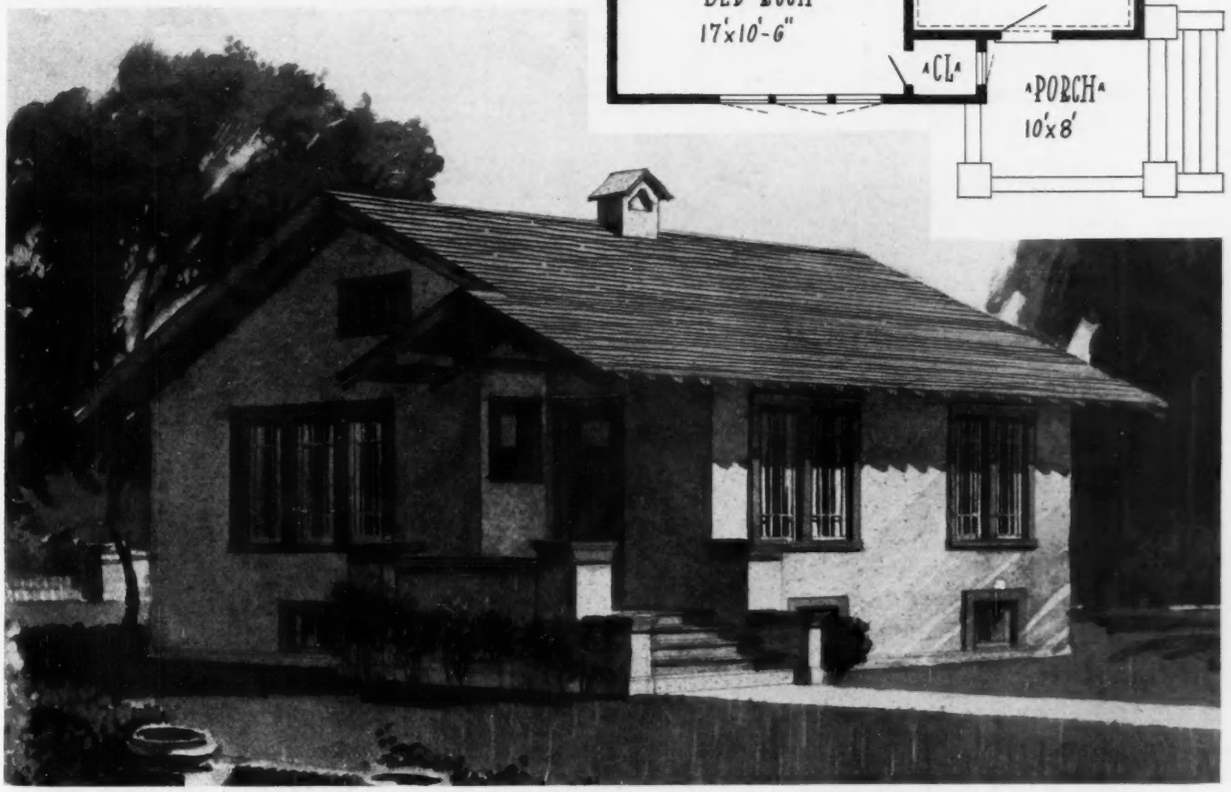
## Three-Room Honeymoon Cottage

A dandy little home is represented in this design. It contains everything necessary for comfort for a small family, together with facilities for entertaining guests in the evening or afternoon.

A splendid feature about this design is the large combined dining room and living room, 13 feet by 23 feet, with plenty of windows and a very attractive fire place. A room like this is appreciated in any house.

The kitchen, 7 feet 6 inches by 11 feet 6 inches, with a table in front of the window and a good cupboard opposite the sink, makes an easy kitchen to work in for the housewife. Another feature is the screened porch, which is also intended as an outdoor dining room.



A Modern Living Room Designed and Finished in the Best Taste. Woodwork is White Enameled, Except the Window Sills which are Mahogany. The Furniture is all Mahogany which Makes a Very Strong, Agreeable Contrast. The Fireplace Mantel is a Simple, Rich Design of Redish Brown, Unglazed Tile, with Wooden Shelf and Side Columns On Each Side of the Fireplace are Double, French Windows Opening Onto a Screened Porch. Open Book Shelves are Built-In at the Corner of the Room.

**Three-room stucco bungalow. Size 31 feet 6 inches by 28 feet. We can furnish complete set of blue-printed working plans and typewritten specifications for only $5.00 per set. Blue-prints consist of basement plan; roof plan; floor plan; front, rear, two side elevations; wall sections; and all necessary interior details. Specifications consist of twenty-two pages of typewritten matter. When ordering, ask for Design No. 6610.**

## California Bungalow

California is the home of the bungalow. Cool evenings and cold mornings, green winters and brown summers characterize the climate from south to north and from the Sierras to the coast range.

A little fire in the grate feels comfortable once or twice a day in spring and fall and a little heat is absolutely necessary to a tenderfoot in winter.

But about this particular bungalow design—there is no law against building it in any other state and that is why we have planned a cellar the full size of the house.

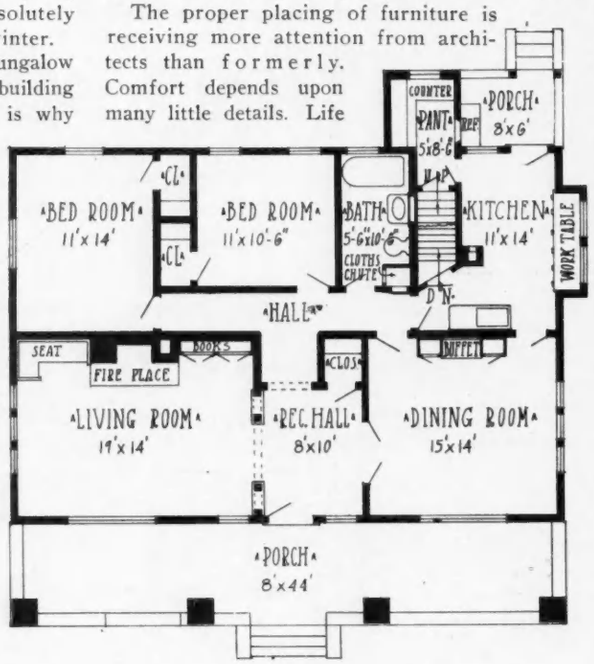
In California the natives are too proud to admit that they need a cellar, but sensible fellows in other states build after this plan and take great pains to make the cellar a very important feature.

The plans call for 7½ feet of head room in the cellar, to give the proper depth for a warm air furnace, which is usually placed about in the center of the plan, some 10 feet from the kitchen chimney; so the shortest and most direct heating pipes will lead to the large living room and to the dining room.

This big living room is a very attractive feature. In size it is 19 by 14 feet, with plenty of light and with a nook for books and a cozy corner in which to read them; both placed conveniently at the sides of the fireplace.

A triple casement window is built high enough in the exposed wall to place a fine big davenport under it and still have room in the outside corner for a large easy chair.

The proper placing of furniture is receiving more attention from architects than formerly. Comfort depends upon many little details. Life is made up of little things which in the aggregate amount to more than the big things, because there are so many of them.




**Arrangement of Bungalow, Size 44 by 29 feet.**

The front door opens into a rather large, comfortable reception hall which really is an adjunct to the living room and is in very close connection with the dining room.

The rear porch with its cove to hold an ice box, also the large pantry, would be appreciated by every housekeeper.

There is a box window built on the side of the kitchen that adds a great deal to the pleasure of doing kitchen work. It is seldom that a kitchen table is treated to the luxury of having sufficient light. A lemon pie always goes together in the proper proportions when the ingredients are mixed together in a nook like this.

A real bungalow requires a lot of veranda room; and this plan supplies it in abundance. Any good housekeeper would take great delight in furnishing a good bungalow veranda as an outdoor reception room. The many inventions in porch and loggia furniture offer materials sufficient for many interesting dreams of such summer parlors.

**A Typical California Bungalow Design. It is 44 by 29 feet in size, having five rooms and a bath room, with a good cellar and a stairway to the attic. We can furnish complete set of blue-printed working plans and typewritten specifications for only $7.00 per set. Blue-prints consist of basement plan; roof plan; first and second floor plans; front, rear, two side elevations; wall sections; and all necessary interior details. Specifications consist of twenty-two pages of typewritten matter. When ordering, ask for Dsign No. 6607.**

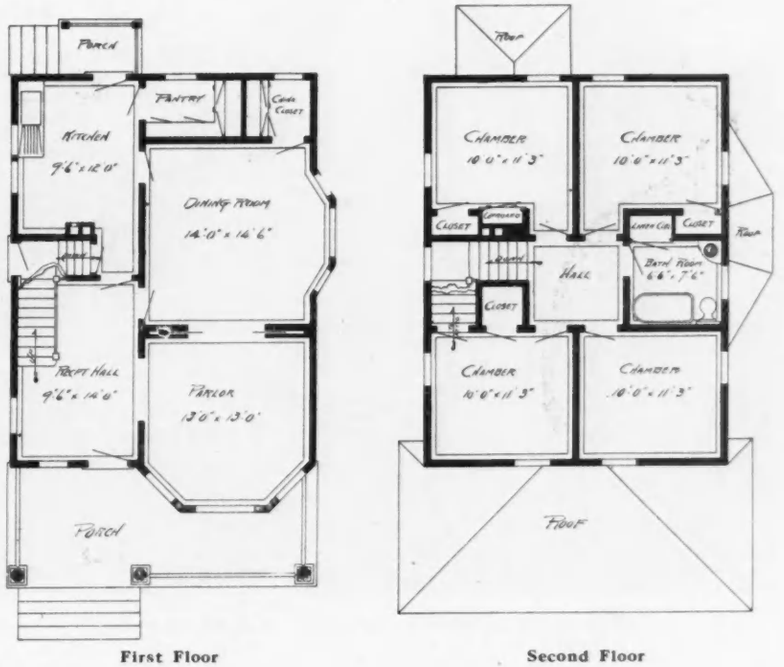
**Interesting seven-room house containing many modern conveniences. Size, 24 feet by 30 feet 6 inches. We can furnish complete set of blue-printed working plans and typewritten specifications for $8.00 per set. Blue-prints consist of basement plan; roof plan; first and second floor plans; front, rear, two side elevations; wall sections; and all necessary interior details. Specifications consist of twenty-two pages of typewritten matter. When ordering, ask for Design No. 6578.**

## Convenient Seven Room House

There are three special features in this house design that will appeal to every good housekeeper. They are the outside entrance to the cellar, the linen closet in the bath room, and the splendid attic for storage purposes.

The manner of building the stair gives an opportunity to utilize space to the best possible advantage. All stair landings are so placed that they are convenient to the different floors. Each flight is well lighted and there is very little room taken up in hallways. In fact, the upper hall is just big enough to make room for the doorways and the stair landing. The stairway is lighted by a glass door at the bottom, a central window and a dormer window in the attic. A stairway that is thoroughly well lighted is a great comfort.

It will be noticed that all rooms in this house are commodious, well lighted and well arranged. Each bed room has wall space sufficient to accommodate bed room furniture without appearing awkward or seeming crowded.




First Floor Second Floor

**Arrangement of house, size 24 by 30 feet 6 inches.**

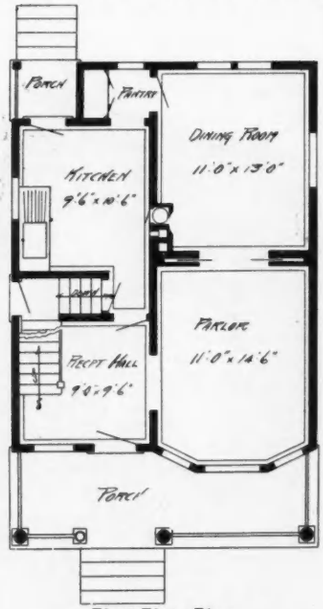
## Neat Six-Room Story-and-a-half Cottage

A pleasant little dwelling that will go nicely on a narrow lot is illustrated. It is just about as simple and free from complicated features, that run up the cost, as any house could well be. Its rooms are all pleasant and convenient and there is no waste space.

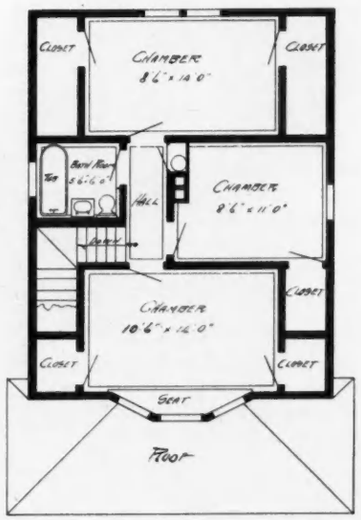
A house of this kind is inexpensive to build and can be rented or sold at a reasonable price and still give a margin of profit to the owner or builder. As the width is only 22 feet, it will go on a narrow lot very nicely. A narrow lot usually means houses crowded in rather close together; and so in this design the principal lighting is from the front and rear.

The outside appearance of this little dwelling is very attractive; a frame house, with wide clapboard siding, resting on a cement foundation.

The front porch is generous in size and has neat porch rail and three turned columns. Entrance is into a square reception and stair hall; from this one can pass into the parlor, through a cased opening to the right, or directly back into the kitchen. The dining room is just back of the parlor.




First Floor Plan.




Second Floor Plan.

**Arrangement of six-room house. Size, 22 by 28 feet.**

**Six-room, story-and-a-half, frame dwelling. Size, 22 by 28 feet. A cozy, substantial home. We can furnish complete set of blue-printed working plans and typewritten specifications for only $6.00 per set. Blue-prints consist of basement plan; roof plan; first and second floor plans; front, rear, two side elevations; wall sections and all necessary interior details. Specifications consist of twenty-two pages of typewritten matter. When ordering, ask for Design No. 6584.**

**Six room house with good cellar and very pleasing front veranda. Size 26 feet by 30 feet. We can furnish complete set of blue-printed working plans and typewritten specifications for only $6.00 per set. Blue-prints consist of basement plan; roof plan; first and second floor plans; front, rear, two side elevations; wall sections; and all necessary interior details. Specifications consist of twenty-two pages of typewritten matter. When ordering, ask for Design No. 6580.**

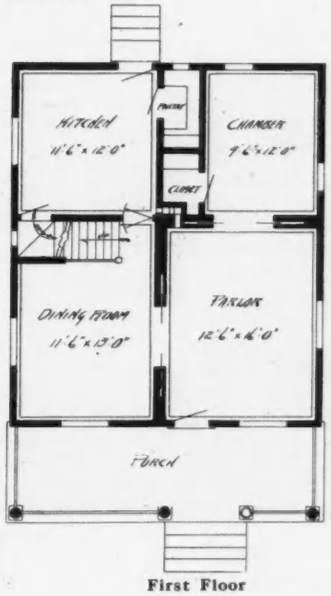
## Low Cost Village House

Conditions sometimes are such that a house must be built for a stipulated price. That price must come within the means of the builder. This design is intended to offer as much house for the money as possible. For this reason, the house is plain and straight and all the carpenter work is square and straight forward, so that every cut of the saw and every blow of the hammer shall count in the building.

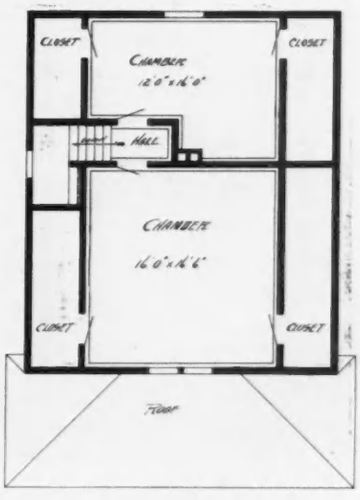
A good solid wall under a house is an economy; so this design calls for a good cellar as a proper support for a plain house. In front a good veranda adds very much to the appearance as well as comfort. It is quite possible to embellish a low cost house with a veranda in such a way as to add several hundred dollars to the value of the property.

Sometimes when there are old persons in the house, a bed room on the first floor is a great convenience. Besides this lower bed room, there is a good kitchen, a fair sized dining room and a pleasant, comfortable parlor. Up-stairs, the plan shows two large bed rooms with any amount of closet room. Where there is no attic extra large storage closets like these are appreciated.

A person can build a house like this and screen the front porch with climbing vines, plant shrubbery along the sides and give it a neat, attractive appearance such as many expensive houses do not possess.




First Floor




Second Floor

**Arrangement of house, size 26 by 30 feet.**

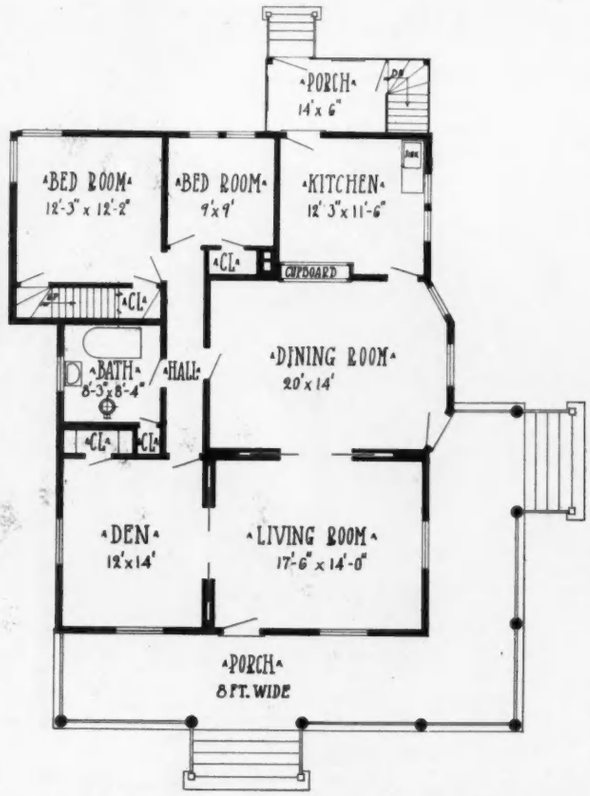
## Six-Room Bungalow

A six room cottage with a good attic is illustrated in this design. The size is 37 feet 6 inches by 42 feet.

Owing to the shape, it divides nicely into six very comfortable rooms. About half of the floor space is thrown into the living room and dining room with sliding doors between. When these doors are wide open, these two rooms are like one, but there are times when comfort requires that the doors shall be closed.

The dining room, 14 by 20 feet, is unusual except in country houses, where there is plenty of ground space. Added to this, the living room, 14 by 17 feet 6 inches, gives an idea of the commodious planning of this attractive cottage home.

A very comfortable feature both in appearance and utility is the long veranda, 8 feet wide, reaching clear across the front of the house and half way down the side. On the first floor there are three bed rooms and a den, which is intended for a bed room when necessary. For extra occasions there are two gables in the attic which may be worked into sleeping rooms. The cottage however is supposed to be complete without using the attic except for storage purposes. For this reason the stairway is placed pretty well to the rear.




**Floor Plan of Bungalow, size 37 feet 6 inches by 42 feet.**

Especial attention is called to the bath room, with its large window and linen closet. Modern civilization requires more bathroom facilities than ever before. Modern plumbing is better and cheaper than it was ten years ago, so that every new house may have modern plumbing conveniences at very little additional cost.

It is a country style house and it requires plenty of room. The words "country comfort" are spread all over this design and look out from each window with an invitation for a more intimate acquaintance.

**Country bungalow containing six rooms and a splendid attic. Size 37 feet 6 inches by 42 feet. We can furnish complete set of blue-printed working plans and typewritten specifications for only $7.00 per set. Blue-prints consists of basement plan; roof plan; floor plan; front, rear, two side elevations; wall sections; and all necessary interior details. Specifications consist of twenty-two pages of typewritten matter. When ordering, ask for Design No. 6609.**

**Hip roof, six-room house. A splendid design, showing the arrangement of rooms in a two story house, 27 feet by 31 feet on the ground. We can furnish complete set of blue-printed working plans and typewritten specifications for only $10.00 per set. Blue-prints consist of basement plan; roof plan; first and second floor plans; front, rear, two side elevations; wall sections; and all necessary interior details. Specifications consist of twenty-two pages of typewritten matter. When ordering, ask for Design No. 6582.**

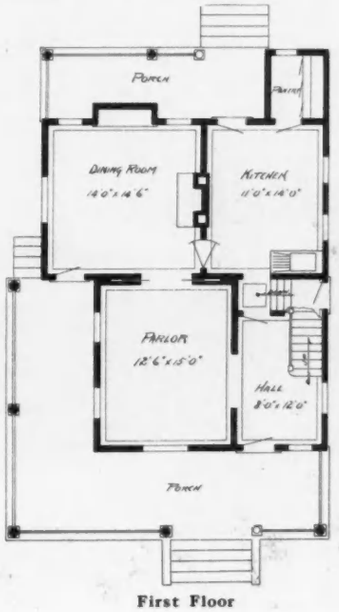
## Hip Roof Six-Room House

A very pleasing design has been worked out for this interesting little six-room house. The demand for six-room houses has resulted in the production of many splendid plans. The one here illustrated contains many desirable features.

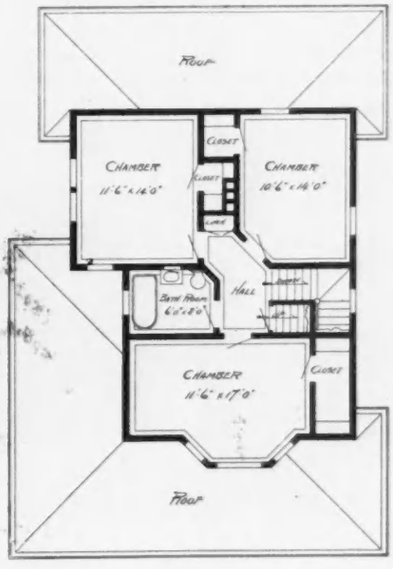
In the first place, it is pleasing in appearance; which effect is enhanced by standing the house up well above ground on a concrete cellar wall. The hip roof designed with the "L" shaped extension gives an opportunity to vary the roof design in this respect. The main outside feature is the front veranda, which gives considerable rom for porch furniture, as well as an extra entrance to the house through the dining room.

This dining room, by the way, is designed for a very comfortable living room. It is here the open fire is lighted when the evenings become cool in the fall and the front veranda is deserted. There is a hominess about a fire place in a room a little back from the front of the house which is impossible to get in the front parlor. This room is intended to be used, while parlors are too often kept nice just to look at.

The arrangement down-stairs of the parlor, dining room and kitchen, with a very comfortable reception hall is all that could be desired in a house of this size. There is a doorway at the back of the hall to close off the entrance to the cellar stairway. Placing it here gives more room in the kitchen, and the hall is plenty large. This plan also provides a grade entrance to the cellar and to the kitchen, but the back porch is not used much except for the family. Grocery parcels are delivered at the side door.




First Floor

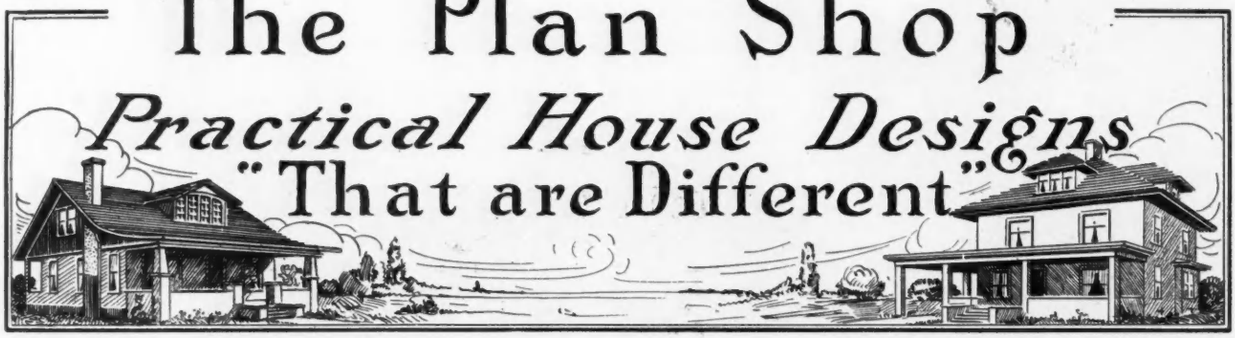



Second Floor

**Arrangement of House, Size 27 by 31 feet.**

# The Plan Shop

## *Practical House Designs* "That are Different"



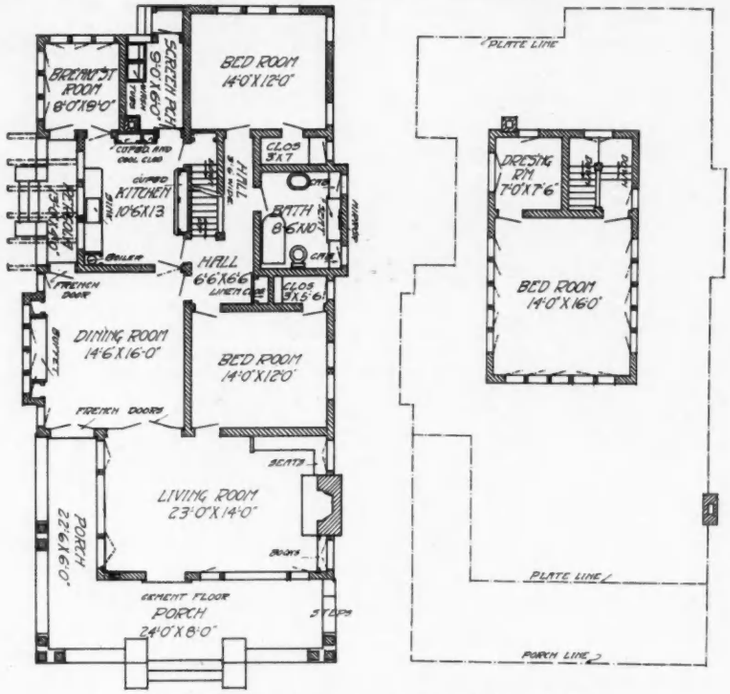
### Well Planned House for a Narrow Lot

**By Charles Alma Byers**

It is often more or less difficult to satisfactorily plan a house for a narrow lot. Nevertheless, it is a problem which architects are frequently called upon to solve. The house here shown was especially designed to meet such restrictions, and the interior arrangement, in the opinion of the writer, is particularly good. It should at least offer many valuable suggestions to others confronted by this problem. The lot, in this case, is forty by one hundred and twenty feet in its dimensions, and the house has a frontage of but thirty feet. This naturally leaves ten feet to be divided for the space at each side of the house, and it will therefore be seen that, when compulsory, the same plan could be used for a still narrower plot.

This house has recently been built in Los Angeles, California, and was designed by Henry L. Wilson, a well-known architect of that city. It is strongly and warmly constructed, being suitable for duplication in almost any locality, and, complete with furnace and other modern equipments, represents a total expenditure of but approximately $3,800.

In style of architecture it is somewhat along the lines of the modern California bungalow. It possesses such characteristics of the type as irregular roof lines, roofs with comparatively little pitch, wide overhangs in the eaves and gables, and unsurfaced framing and finishing timbers, as well as a sort of general appearance of rusticity. It has six rooms, besides the bath room, on the first floor, and but a single sleeping room, with a small dressing room in connection therewith, on the second floor. This upstair arrangement not




**First and Second Floor Plans of Los Angeles Bungalow.**

**Seven-Room Bungalow with Novel Roof Bed Room, Built at Los Angeles, Calif., for $3,800. Architect, Henry S. Wilson.**

only provides an ideal bed room which may be opened on three sides, but also prevents the house from seeming unattractively low and rambling in its structural lines.

An admirable feature of the outside is the porch or veranda, shaped like the letter L, which extends across the entire front and for a considerable distance along one side. The front portion is eight feet wide and the side portion six feet wide, and the combined length is forty-six feet six inches. The main entrance leads from this porch directly into the living room, but from the rear end of the side portion French doors provide direct access to the dining room. The foundation, walls and pedestals are of well-selected cobblestones, coped with concrete, and the flooring is likewise of concrete. The construction of this flooring, as well as of all walks and steps, consists of concrete three inches thick, surfaced with cement one-half inch thick.

There is a small pergola, four by thirteen feet in its dimensions, on one side, which is of similar construction, and on the opposite side, but nearer the front, is an outside chimney, of massive proportions, surfaced with cobblestones. This chimney is for the living-room fireplace. Another chimney, on the inside, is located near the back of the house, which serves as a flue for both the kitchen and the basement furnace. The former is eight by twelve inches on the inside and the latter eight by eight inches, and both are plastered on the inside. The one in the back part of the house is constructed of brick.

The foundation of the house is of concrete, the mixture for which consisted of six parts of clean, sharp, coarse sand and gravel to one part of best Portland cement. The ingredients of the cement used for surfacing the walks, steps and porch flooring consisted of two parts of screened sand to one part of Portland cement.

### Sizes of Timbers Used

The dimensions of some of the principal timbers in the construction are as follows: Mud sills, 2 by 6 inches; girders, 4 by 4 inches; floor joists, 2 by 6 inches; second floor joists, 2 by 10 inches; floor joists over basement, 2 by 10 inches; ceiling joists, 2 by 4 inches; rafters, 2 by 4 inches; collar ties, 2 by 3 inches; ridge poles, 1 by 6 inches; plates, 2 by 4 inches; studs, 2 by 4 inches; underpins on piers, 4 by 4 inches; underpins on outer walls, 2 by 4 inches; shingle lath, 1 by 3 inches. All of these are of Oregon pine, except the mud sills, which are of California redwood. The siding consists of sawed redwood shakes, laid with fourteen inches of their length to the weather.

The color scheme of the house is very effective, being composed of greens and grays. The siding and all exposed framing timbers of the first story are stained a soft green color, and the second story is done in gray, which harmonizes with the roofing and the masonry work. The trim around the doors and windows is painted a still darker shade of green.

### Details of Interior Finish

While the outside of the house is of good style, it is in the interior that one is apt to find the more commendable points. The accompanying floor plans, for this reason, will merit close inspection. There is a large number of admirable built-in features, and the arrangement of the rooms is particularly convenient. The rooms are also comfortably large, and the large number of windows not only create very charming interiors but make possible the admission of plenty of sunlight and fresh air.

The living room possesses windows on three sides, and between it and the dining room intervene folding glass doors, which aid still further in making it light and airy. A large fireplace, in one end, with a built-in book case on one side and an L-shaped seat on the other, is a prominent feature of this room. The mantel of this fireplace is of clinker brick, and its hearth is of three by six inch tile brick. The book case has removable shelves and leaded-glass doors, and the tops of the seats are hinged so that the space underneath may be used for fuel or other purposes. The book case reaches only to a height of about five feet, and above it, corresponding with a similar one on the other side of the mantel, is a small window.

The dining room contains an excellent buffet, with cupboards and drawers—the former possessing leaded-glass doors. Above its counter shelf is set a broad plate mirror, and above the entire feature are four tiny windows. The walls of this room are wainscoted to a height of four feet six inches, above which runs a grooved plate shelf. This wainscoting is of seven-eights by twelve inch boards, rabbetted and stripped. A French door leads from this room into the little side pergola, and other doors connect it with the kitchen and a small hall.

The kitchen contains the usual sink and cupboards, as well as a draught cooler and boiler. Back of the kitchen are the screened porch, with its stationary wash tubs, and a small breakfast room. The latter has two of its walls entirely taken up by casement windows, and a door from it leads into the pergola.

There are two bed rooms on this floor, each with a roomy closet, between which intervenes the bath room. The bath room is particularly interesting for the reason that it contains, besides its customary fixtures, two small corner cabinets and a built-in seat. Above each of the cabinets is a small window, and above the seat is a plate mirror. These rooms are all connected by the hall, already mentioned, from which ascends the stairway to the second floor and descends the steps to the basement. This hall also contains a small linen closet.

All rooms on the first floor, except the living room and dining room, have three-eights by two-inch clear white maple flooring. The flooring in the living room and dining room is of quarter-sawed oak, of the same dimensions. The kitchen is plastered with hardwood plaster, finished smooth, and the walls of the bath room, to a height of five feet, are similarly plastered, except that they are ruled into three by six inch blocks to imitate white tile. The woodwork in the living room and dining room, which is of slash-grain Oregon pine, is stained to represent weathered oak, in the breakfast room it is stained a soft light green color, and in all of the other rooms it is enameled white.

### Out-Door Sleeping "On the Roof"

The second-floor sleeping room is ideal for its purpose. Having a total of fifteen casement windows on the three exposed sides, it may be easily converted into virtually an open-air room, becoming the equal if not superior to the ordinary sleeping porch. The little dressing room is also an admirable feature, and provides the desired privacy.

Of course, should one want only a one-story house this second-floor arrangement, while it is especially interesting, could be easily omitted without changing the first-floor plan in any detail. In fact, this would constitute a complete and very satisfactory little home without this feature. Even the small breakfast room on the main floor might be eliminated if desired, or it might be converted into a very cozy den, probably with built-in book cases and other features. When it comes to alterations, however, there are any number of possibilities, and this is a feature of the plan which makes this house so interesting.

The basement beneath the house is fourteen by sixteen feet in its dimensions, and is therefore large enough to not only house the furnace but to be used as a convenient storage place. The flooring and walls are of concrete, the former surfaced with cement one-half inch thick.

A Beautiful, Inexpensive Dining Room, Finished with Wall Board Paneling from Base to Plate Rail. The Room is Lighted with a Group of Three Casement Windows.

# Revolving Damper Solves Ventilating Problem

SIMPLE SYSTEM IN WHICH FOUL AIR IS EXHAUSTED FROM CEILING IN HOT WEATHER AND FROM FLOOR IN COLD

By Harold L. Alt

ONE of the most debated questions of ventilation is the point of air entrance and point of exit from the room. Numerous good and substantial arguments can be advanced as to why the fresh air should be put in from high registers and drawn out from low points, either in or near the floor.

Other authorities are equally strong in advocating the supply of fresh air from below and the removal of foul air from the ceiling or at other high points. Arguments without number can be found in favor of either method, and it is largely a matter of personal preference as to which scheme is employed.

It is fair to assume, however, that if hot air at a temperature of 100 degrees Fahr. is put into a room, say at 70 degrees Fahr. it will naturally seek the higher portions of the room until its temperature has cooled down sufficiently to drop the air toward the floor. This movement goes on gradually as the air temperature continues to lower, and it is easy to understand from this that when the supply of fresh air is put in at a temperature higher than the room temperature its natural course will be downward.

On the other hand, suppose outside conditions in warm weather raise the room above 70 degrees Fahr., then the air supply should be cooler than the room, owing to its constantly increasing temperature.

Good ventilation always follows the natural movement of air unless certain imperative reasons require otherwise.

Therefore, during cold weather, it is better to supply hot air at the top of the room and draw the cooler foul air off at the bottom, but in the summer time the cool supply should be at the bottom and the hot, foul air removed from the top. Yet we cannot change our ventilation ducts with the season.

There is a method whereby it is possible to do this very thing so easily, conveniently and satisfactorily that it is surprising that a greater number of buildings are not so equipped. This scheme is illustrated in Figs. 1 and 2, the desired end being accomplished by the revolving damper. Fig. 1 shows the damper set in what is often called the normal position. This is so as to supply air at the top of the room or auditorium and to draw it off from the bottom.

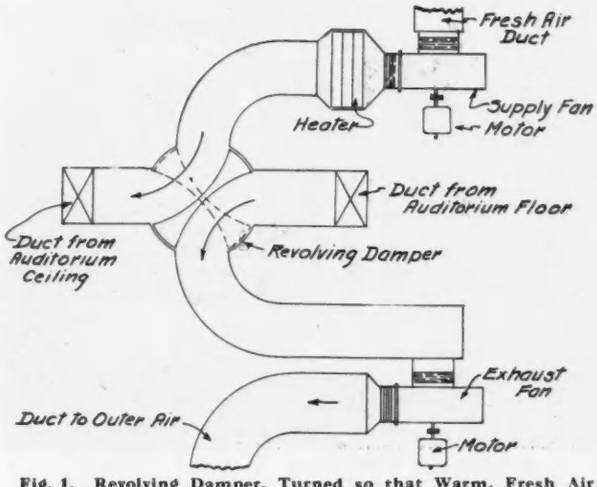



Fig. 1. Revolving Damper, Turned so that Warm, Fresh Air comes in at Ceiling; Foul Air Exhausted from Floor.

The fresh air enters the supply fan, passes across the heater, is warmed, and then goes through the revolving damper to the duct leading to all the registers in the upper portion of the ventilated space. The exhaust from all the low registers is carried to the revolving damper and then to the exhaust fan, which discharges it to the outer air.

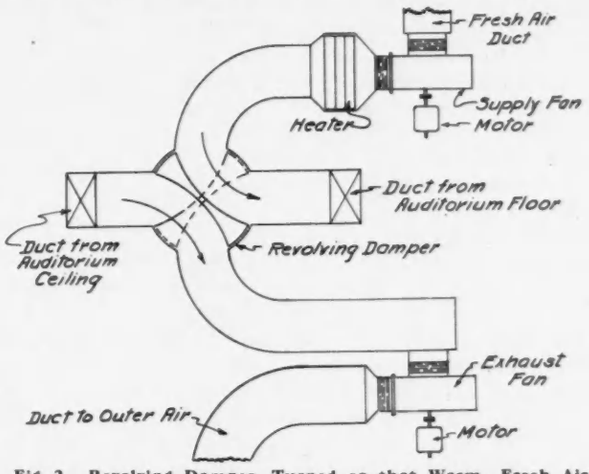



Fig. 2. Revolving Damper, Turned so that Warm, Fresh Air comes in from Floor; Foul Air Exhausted from Ceiling.

In Fig. 2 the revolving damper is shown reversed, resulting in the supply air being directed into the duct leading to the lower registers and the duct from the upper registers directed into the exhaust fan, thus making the high registers exhaust and the low registers supply.

With this scheme, top and bottom supply can be had at will by the simple turn of a single damper.

**SPEAKING ABOUT CHRISTMAS.** I have often thought of the number of odd and useful things a wood-turner can make for presents, such as rolling pins, potato masher, baseball bats, croquet sets, drum sticks, gavels, spinning tops, turned cups and saucers, jewel cases, napkin rings, candle sticks, puzzles, Indian clubs, dumb bells, police clubs, canes, checkers, pincushions, cups, pipes, spindle waste baskets, comb racks, and many other scores of things, I cannot think of just now. I have made many of the above and then some.

WM. C. JASBURY.

# Acoustics of Auditoriums

**HOW THE EXTREMELY POOR ACOUSTICAL PROPERTIES OF THE AUDITORIUM AT THE UNIVERSITY OF ILLINOIS WERE ANALYSED AND IMPROVED**

**By F. R. Watson**
Asst. Prof. of Physics

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MUCH concern has arisen in late years in the minds of architects because of the faulty acoustics that exist in many auditoriums. The prevalence of echoes and reverberations with the consequent difficulty in hearing and understanding on the part of the auditor defeats the purpose of the auditorium and diminishes its value.

The Auditorium at the University of Illinois presents such a case. The building is shaped nearly like a hemisphere, with several large arches and recesses to break up the regularity of its inner surface. The original plans of the architect were curtailed because of insufficient money appropriated for the construction. The interior of the hall, therefore, was built absolutely plain with almost no breaking up of the large, smooth wall surfaces; and, at first, there were no furnishings execpt the seats and the cocoa matting in the aisles. The acoustical properties proved to be very unsatisfactory. A reverberation or undue prolongation of the sound existed, and in addition, because of the large size of the room and the form and position of the walls, echoes were set up.

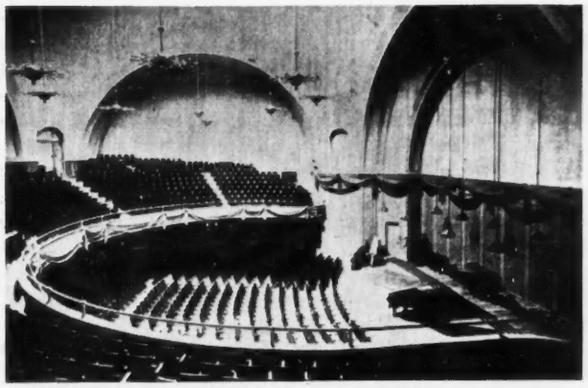
If an observer stood on the platform and clapped his hands, a veritable chaos of sound resulted. Echoes were heard from every direction and reverberations continued for a number of seconds before all was still again. Speakers found their utterances thrown back at them, and auditors all over the house experienced difficulty in understanding what was said. On one occasion the University band played a piece which featured a xylophone solo with accompaniment by the other instruments. It so happened that the leader heard the echo more strongly than the direct sound and beat time with it. Players near the xylophone kept time to the direct sound, while those farther away followed the echo. The confusion may well be imagined.

Thus it seemed that the Auditorium was doomed to be an acoustical horror; that speakers and singers would avoid it, and that auditors would attend entertainments in it only under protest. But the apparent misfortune was in one way a benefit since it provided an opportunity to study defective acoustics under exceptionally good conditions and led to conclusions that not only allowed the Auditorium to be improved, but also indicate some of the pitfalls to be avoided in future construction of other halls.

An investigation of the acoustical properties of the Auditorium was begun in 1908 and has continued for six years. It was decided at the outset not to use "cut and try" methods of cure, but to attack the problem systematically so that general principles could be found, if possible, that would apply not only to the case being investigated, but to auditoriums in general. This plan of procedure delayed the solution of the problem, since it became necessary to study the theory of sound and carry out laboratory investigations at the same time that the complex conditions in the Auditorium were being considered. The author spent one year of the six abroad studying the theory of acoustics and inspecting various auditoriums.

The main echoes in the Auditorium were located by means of a new method of tracing the path of sound, the time of reverberation was determined by Sabine's method, and a general diagnosis of the acoustical defects was made. Hangings and curtains were installed in accordance with the results of the study so that finally the acoustical properties were improved.

**The Auditorium at the University of Illinois, a Magnificient Architectural Monument but an Absolute Failure in regard to Acoustics. How this Acoustical Problem has been Studied Out and Solved is Clearly Explained by the Author.**



**Interior View of Auditorium at the University of Illinois.**

### Behavior of Sound Waves in a Room

When a speaker addresses an audience, the sounds he utters proceed in ever widening spherical waves until they strike the boundaries of the room. Here the sound is partly reflected, partly transmitted, and the rest absorbed. The amounts of reflection, absorption and transmission depend on the character of the walls. A hard, smooth wall reflects most of the sound so that but little is transmitted or absorbed. In the case of a porous wall or a yielding wall, the absorption and transmission are greater, and the reflection is less. After striking a number of reflecting surfaces, the energy is used up and the sound dies out.

The reflection of sound produces certain advantages and disadvantages for the acoustics. When it is considered that sound travels about 1,100 feet a second, it may be seen that a room of ordinary size is almost immediately filled with sound because of the many reflections. In a room 40 feet square, for instance, the number of reflections per second between opposite walls is $1{,}100 \div 40$, or approximately *27*. The number is really greater than this, since the sound that goes into the corners is reflected much more frequently than out in the middle where the distances between walls are greater. The result is that the sound mixes thoroughly in all parts of the room so as to give the same average intensity; that is, the sound is of the same average *loudness* for all auditors, even for those in the remotest corners.

Though the reflection of sound has the advantage of fulfilling the conditions for loudness, it introduces at the same time possibilities for setting up defective acoustics. For insistance, when the walls of the room are hard and smooth very little energy is lost at each impact of the sound and many reflections take place before it finally dies out. This slow decadence of the sound, or *reverberation*, as it is called, is the most common defect in auditoriums.

If a speaker talks in such a hall the auditors have difficulty in understanding. Each sound, instead of dying out quickly, persists for some time so that the succeeding words blend with their predecessors and set up a mixture of sounds which produces confusion. The cure for the trouble is brought about by the introduction of materials, such as carpets, tapestries, and the like, which act as absorbers of sound and reduce the time of reverberation.

When music is played in an auditorium with a prolonged reverberation, the tones following one another blend and produce the same effect as that of a piano when played with the loud pedal in use. A reverberation is more advantageous for music than for speech, since the prolongation and blending of the musical tones is desired, but the mixing of the words in a speech is a distinct disadvantage. When curing this defect for halls used for both music and speaking, a middle course must be steered, so that the reverberation is made somewhat long for speaking and somewhat short for music, yet fairly satisfactory for both.

### Curved Wall Always a Menace

Going back to the consideration of the reflection of sound, it is found that another defect may be produced, namely, an *echo*. This is the case when a wall at some distance reflects the sound to the position of the auditor. He hears the sound first from the speaker, then later by reflection from the wall. The time interval between the direct and reflected sound must be great enough to allow two distinct impressions to be made. This time is about 1/15 of a second, but varies with the acuteness of the observer. The farther off the wall is, the greater is the time interval and the more pronounced is the echo. If the wall is not very distant, the time interval is too short to allow two distinct impressions to be made, and the effect on the auditor is then much the same as if his neighbor at his side speaks the words of the discourse in his ear at the same time that he gets them directly from the speaker. In case the reflecting wall is curved so as to focus the sound the echoes are much more pronounced. A curved wall wherever it may be placed in an auditorium is thus always a menace to good acoustics.

There are other actions of the sound that may result in acoustical defects. The phenomena of *resonance*, for instance, may cause trouble. Suppose that the waves of sound impinge on an elastic wall, not too rigid. If these waves are timed right they set the wall in vibration in the same way that the bell ringer causes a bell to ring by a succession of properly timed pulls on the bell rope. The wall of the room will then vibrate under the action of this sound with which it is in tune and will reinforce it. Now suppose a band is playing in a room. Certain tones are reinforced, while the others are not affected. The original sound is then distorted. The action is the same on the voice of the speaker. The sounds he utters are complex and as they reach the walls certain components are reinforced and the quality of the sound is changed. This action of resonance may also be caused by the air in a room. Each room has a definite pitch to which it responds, the smaller the volume of the room the higher being the pitch. A large auditorium would respond to the very low pitch of the bass drum. In small rooms and alcoves the response is made to higher pitched tones, as may be observed by singing the different notes of the scale until a resonance is obtained.

Another action of sound causes the *interference* of waves. Thus the reflected waves may meet the oncoming ones and set up concentrations of sound in certain positions and a dearth of sound in others.

Summing up, it is seen that the effects of sound which may exist in a room are *loudness, reverberation, echoes, resonance,* and *interference,* and that the most common defects are reverberation and echoes. We now turn to the discussion of the methods of cure.

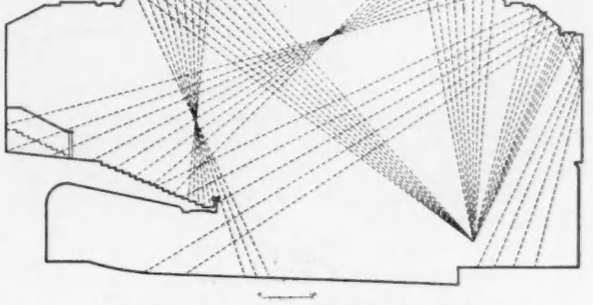


**Fig. 1. Longitudinal Section Showing the Chief Concentrations of Sound, the Diffraction Effects Being Disregarded.**

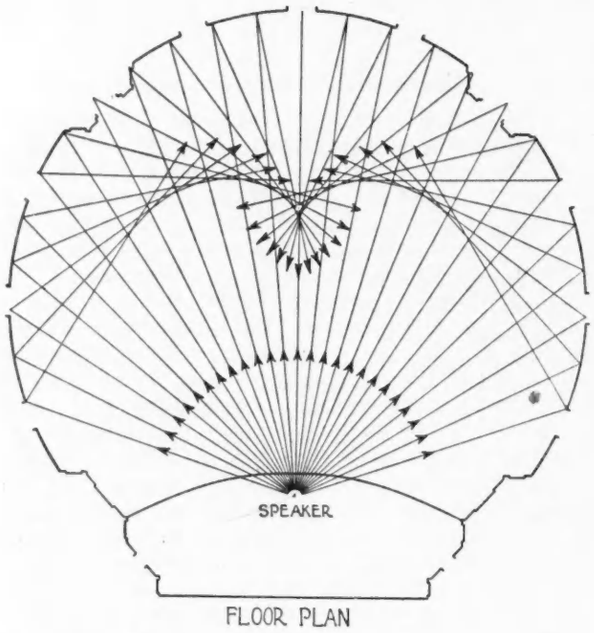



**Fig. 2. Plan of Auditorium Showing Concentration of Sound by the Rear Wall.**

## Methods of Improving Faulty Acoustics

### A. REVERBERATION AND ITS CURE

Everyone has doubtless observed that the hollow reverberations in an empty house disappear when the house is furnished. So, in an auditorium, the reverberation is lessened when curtains, tapestries, and the like are installed in sufficient numbers. The reason for this action is found when we inquire what ultimately becomes of the sound.

Sound is a form of energy and energy can not be destroyed. When it finally dies out, the sound must be changed to some other form of energy. In the case of the walls of a room, for instance, it has been shown in a preceding paragraph that the sound may be changed into mechanical energy in setting these walls in vibration. Again, some of the sound may pass out through open windows and thus disappear. The rest of the sound, according to Lord Rayleigh, is transformed by friction into heat. Thus a high pitched sound, such as a hiss, before it travels any great distance is killed out by the friction of the air. Lower pitched sounds, on reaching a wall, set up friction in the process of reflection between the air particles and the wall so that some of the energy is converted into heat. The amount of sound energy thus lost is small if the walls are hard and smooth. The case is much different, however, if the walls are rough and porous, since it appears that the friction in the pores dissipates the sound energy into heat.

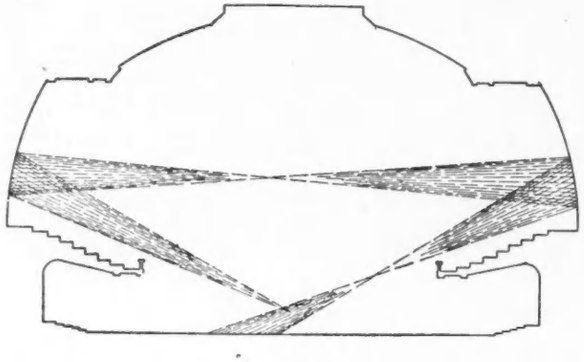


**Fig. 3. Transverse Section Showing How Most Pronounced Echoes Are Set Up by the Two Concave Surfaces.**

It should be pointed out in this connection that any mechanical breaking up of the sound by relief work on the walls or by obstacles in the room will not primarily diminish the energy of the sound. These may break up the regular reflection and eliminate echoes, but the sound energy as such disappears only when friction is set up.

The following quotations from Rayleigh emphasizes these conclusions: "In large spaces, bounded by non-porous walls, roof, and floor, and with few windows, a prolonged resonance seems inevitable. The mitigating influence of thick carpets in such cases is well known. The application of similar material to the walls and roof appears to offer the best chance of further improvement."

*Experimental Work on Cure of Reverberation.*—The most important experimental work in applying this principle of the absorbing power of carpets, curtains, etc., has been done by Professor Wallace C. Sabine of Harvard University. In a set of interesting experiments lasting over a period of four years, he was able to deduce a general relation between $t$, the time of reverberation, $V$, the volume of the room, and $a$ the absorbing power of the different materials present. Thus:

$$t = 0.164\ V \div a \qquad (1)$$

For good acoustical conditions, that is, for a short time of reverberation, the volume $V$ should be small and the absorbing materials, represented by $a$, large. This is the case in a small room with plenty of curtains and rugs and furniture. If, however, the volume of the room is great, as in the case of an auditorium, and the amount of absorbing materials small, a troublesome reverberation will result.

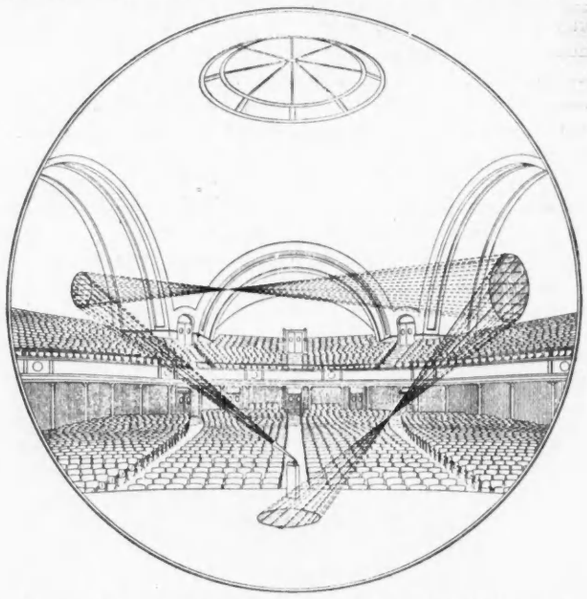


**Fig. 4. Perspective Section Showing how an Echo Is Formed on the Stage by Two Reflections. Diffraction Effects Are Not Considered in this Drawing.**

Professor Sabine determined the absorbing powers of a number of different materials. Calling an open window a perfect absorber of sound, the results obtained may be written approximately as follows:

| | |
|---|---|
| One square meter of open window space | 1.000 |
| One square meter of glass, plaster, or brick | .025 |
| One square meter of heavy rugs, curtains, etc | .25 |
| One square meter of hair felt, 1 inch thick | .75 |
| One square meter of audience | .96 |

These values, together with the formula, allow a calculation to be made in advance of construction for the time of reverberation. This pioneer work cleared the subject of architectural acoustics from the fog of mystery that hung over it and allowed the essential principles to be seen in the light of scientific experiment.

In a later investigation Sabine showed that the reverberation depended also on the pitch of sound. As a concrete example, the high notes of a violin might be less reverberant with a large audience than the lower tones of the bass viol, although both might have the same reverberation in the room with no audience. Again, the voice of a man with notes of low pitch might give satisfactory results in an auditorium while the voice of a woman with higher pitched notes would be unsatisfactory.

These considerations show that the acoustics in an auditorium vary with other factors than the volume of the room and the amount of absorbing material present. The audience may be large or small, the speaker's voice high or low, the entertainment a musical number or an address. The best arrangement for good acoustics is then a compromise where the average conditions are satisfied. The solution offered by Professor Sabine is such an average one, and has proved satisfactory in practice.

### B. ECHOES AND THEIR REMEDY

An echo is set up by a reflecting wall. If an observer stands some distance from the front of a cliff and claps his hands, or shouts, he finds that the sound is returned to him from the cliff as an echo. So, in an auditorium, an auditor near the speaker gets the sound first directly from the speaker, then, an instant later, a strong repetition of the sound by reflection from a distant wall. This echo is more pronounced if the wall is curved and the auditor is at the point where the sound is focused.

To cure such an echo, two methods may be considered. One method consists in changing the form of the wall so that the reflected sound no longer sets up the echo. That is, either change the angle of the wall, so that the reflected sound is sent in a new direction where it may be absorbed or where it may reinforce the direct sound without producing any echoes, or else modify the surface of the wall by relief work or by panels of absorbing material, so that the strong reflected wave is broken up and the sound is scattered. The second method is to make the reflecting wall a "perfect" absorber, so that the incident sound is swallowed up and little or none reflected. These methods have been designated as "surgical" and "medicinal" respectively. Each method has its disadvantages. Changing the form of the walls in an auditorium is likely to do violence to the architectural design. On the other hand, there are no perfect absorbers, except open windows, and these can seldom be applied. The cure in each case is, then, a matter of study of the special conditions of the auditorium. Usually a combination of the surgical and the medicinal cures is adopted. For instance, coffering a wall so that panels of absorbing material may be introduced has been found to work well in bettering the acoustics, and also, in many cases, it fits in with the architectural features.

### C. POPULAR CONCEPTION OF CURES.—USE OF WIRES AND SOUNDING BOARDS

A few words should be written concerning the popular notion that wires and sounding boards are effective in curing faulty acoustics. Experiments and observations show that wires are of practically no benefit, and sounding boards can be used only in special cases. Wires stretched in a room scarcely affect the sound, since they present too small a surface to disturb the waves. They have much the same effect on sound waves that a fish line in the water has on water waves. The idea has, perhaps, grown into prominence because of the action of a piano in responding to the notes of a singer. The piano has every advantage over a wire in an auditorium. It has a large number of strings tuned to different pitches so that it responds to any note sung. It also has a sounding board that reinforces strongly the sound of the strings. Finally, the singer is usually near the piano. The wire in the auditorium responds to only one tone of the many likely to be present, it has no sounding board, and the singer is some distance away. But little effect, therefore, is to be expected.

The author has visited a number of halls where wires have been installed, and has yet to find a case where pronounced improvement has resulted. Sabine cites a case where five miles of wire were stretched in a hall without helping the acoustical conditions. It is curious that so erroneous a conception has grown up in the public mind with so little experimental basis to support it.

*Sounding Boards.*—Sounding boards or, more properly, reflecting boards, have value in special cases. Some experiments have been made where pronounced effects were obtained. The sounding board should be of special design to fit the conditions under which it is to be used.

*Modeling New Auditoriums after Old Ones with Good Acoustics.*—Another suggestion often made is for architects to model auditoriums after those already built that have good acoustical properties. It does not follow that halls so modeled will be successful, since the materials used in construction are not the same year after year. For instance, a few years ago it was the usual custom to put lime plaster on wooden lath; now it is frequently the practice to put gypsum plaster on metal lath, which forms an entirely different kind of a surface. This latter arrangement makes hard, non-porous

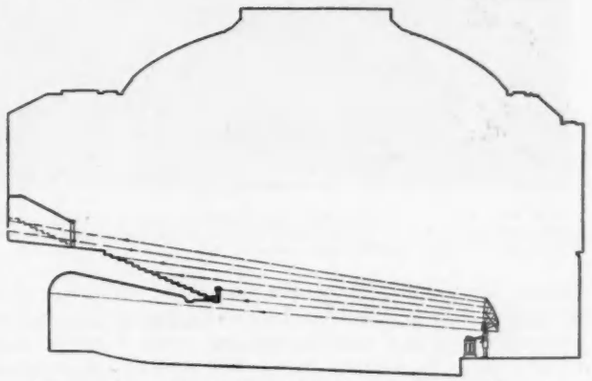


**Fig. 5. Parabolic Reflector Showing its Action on Sound.**

walls which absorb but little sound, and thus aggravate the reverberation. Further, a new hall usually is changed somewhat in form from the old one, to suit the ideas of the architect, and it is very likely that the changes will affect the acoustics.

(Note: The author here gives a detailed report of the acoustical investigation in the auditorium at the University of Illinois, including the tracing of echoes.—Ed.)

### Conclusion Drawn from the Acoustical Survey

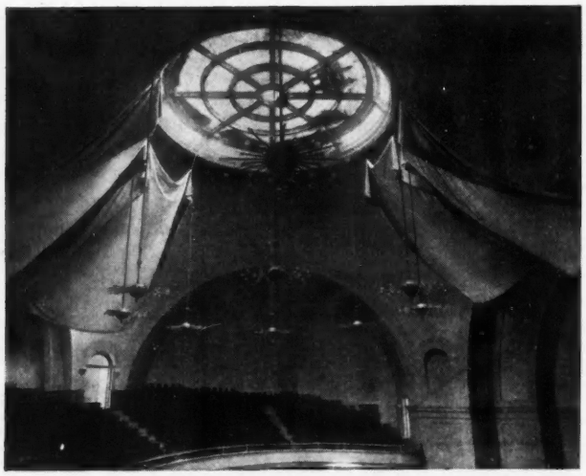
The results of the survey show that curved walls are largely responsible for the formation of echoes because they concentrate the reflected sound. It seems desirable, therefore, to emphasize the danger of using such walls unless their action is annulled by absorbing materials or relief work. Large halls with curved walls are almost sure to have acoustical defects.

### Methods Employed to Improve the Acoustics

*Reflecting Boards.*—The provisional cure was brought about gradually by trying different devices suggested by the diagnosis. In one set of experiments sounding boards of various shapes and sizes were used. A flat board about five feet square placed at an incline over the position of the speaker produced little effect. A large canvas surface, about 12 by 20 feet, was not much better. A parabolic reflector, how-

ever, gave a pronounced effect. This reflector was mounted over a pulpit at one end of the stage and served to intercept much of the sound that otherwise would have gone to the dome and produced echoes. The path of the reflected sound was parallel to the axis of the paraboloid of which the reflector was a quarter section. There was no difficulty in tracing out the reflected sound. Auditors in the path of the reflected rays reported an echo, but auditors in other parts of the Auditorium were remarkably free from the usual troubles. The device was not used permanently, since many speakers objected to the raised platform. Moreover, it was not a complete cure, since it was not suited for band concerts and other events, where the entire stage was used.

*Sabine's Method.*—The time of reverberation was determined by Sabine's method. An organ pipe making approx-



**It was Found that these Huge Curtains Hung in the Dome Eliminate the Echoes. Absorbing Materials have also been Hung Under the Arches, Against the walls.**

imately 526 vibrations a second was blown for about three seconds and then stopped. An auditor listened to the decreasing sound, and when it died out made a record electrically on a chronograph drum. The time of reverberation was found to be 5.90 seconds, this being the mean of 19 sets of measurements, each of about 20 observations. The reverberation was found also by calculation from Sabine's equation, taking the volume of the Auditorium as 11,800 cubic meters and calculating the absorbing power of all the surfaces in the room. This calculation gave 6.4 seconds. The agreement between the two results is as close as could be expected, since neither the intensity of the sound nor the pitch used by the author was the same as those used by Professor Sabine, and both of these factors affect the time of reverberation.

Later the time of reverberation was again determined after certain changes had been made. A thick carpet had been placed on the stage, heavy velour curtains 18 by 32 feet in area hung on the wall at the rear of the stage, a large canvas painting 400 square feet in area was installed, and the glass removed from the skylight in the ceiling. The time of reverberation was reduced to 4.8 seconds. With an audience present this value was reduced still more, and when the hall was crowded at commencement time the reverberation was not troublesome.

*Method of Eliminating Echoes.*—Although the time of reverberation was reduced to be fairly satisfactory, as just explained, the echoes still persisted, and were very annoying. Attempts were made to reduce individual echoes by hanging cotton flannel on the walls at critical points. Thus the shaded areas in Fig. 4 were covered and also the entire rear wall in the balcony. Pronounced echoes still remained, and it was evident that some drastic action was necessary to alleviate this condition. Four large canvases were then hung in the dome in position suggested by the results of the diagnosis. A very decided improvement followed. For the first time the echoes were reduced to a marked degree and speakers on the stage could talk without the usual annoyance. This arrangement eliminated the echoes not only on the stage, but generally all over the house. A number of minor echoes were still left, but the conditions were much improved, especially when a large audience was present to reduce the reverberation.

*Proposed Final Cure.*—The state of affairs just described is the condition at the time of writing. Two propositions were considered in planning the final cure. One proposition involved a complete remodeling of the interior of the Auditorium. Plans of an interior were drawn in accordance with the results of the experimental work that would probably give satisfactory acoustics. This proposition was not carried out because of the expense and because it was thought desirable to attempt a cure without changing the shape of the room. The latter plan is one now being followed. It is proposed to replace the present unsightly curtains with materials which will conform to the architectural features of the Auditorium and which will have a pleasing color scheme. At the same time, it will be necessary to hold to the features which have improved the acoustics.

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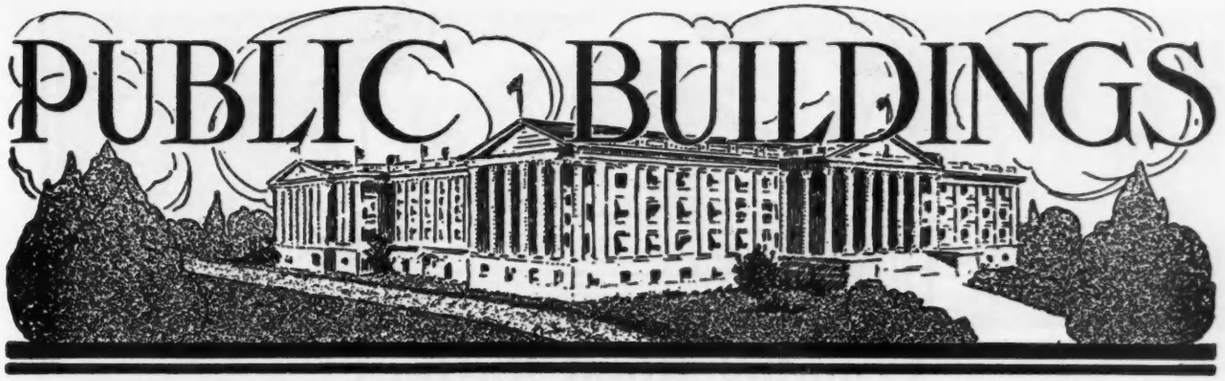
## Significant Work in Trade School Education

**IOWA STATE COLLEGE HOLDS FIRST STATE-CONDUCTED COURSE IN TRADE TRAINING IN THE UNITED STATES**

From January 6th to 10th, occurred one of the most unique movements of recent years toward a sane education in the trades. The newly organized Department of Engineering Extension of the Iowa State College conducted a very successful Short Course for Painters and Decorators, given in co-operation with the Master Painters' Association of Iowa. In spite of the incomplete announcement to the painters of the State, fifty-eight students registered for the course outlined, which included instruction in graining and sign painting and in blending and stenciling. The students registered, were eager for this kind of instruction. The apprenticeship system is no longer applicable to the painting craft, the time of a high priced mechanic cannot be spent in instructing an apprentice, nor can the job be risked in his hands for practice. The need of some other agency to equip competent journeymen, is everywhere apparent. Ten million dollars is spent annually in Iowa on interior painting and decorating. It reaches every corner of the State, in both public and private buildings. There are over nine thousand painters in the State and on account of the fact that most of them live in the smaller towns, a much great versatility is demanded of them. They are called on to do all kinds of work and, conversely, the grade and variety of work in the decorating field which finds its way into any community is largely the same as that which the local decorator can do. Hence the need for a greater breadth of training.

The instruction in graining was given by Mr. J. W. Luthe of Cleveland, and the stenciling and blending by Mr. Chas. Mollendorf of Chicago, both men of wide experience in their line. That the need for this kind of instruction is pressing, was the uniform testimony of the students in attendance, who ranged from the beginner who had scarcely had a brush in his hand before, to the seasoned mechanic and master painter employing from one to twenty workmen. One veteran mechanic of sixty-six years, enrolled. The average was above thirty years. The painting and decorating trade appears to be mostly "tricks of the trade" and there seems to be no "standard practice." To standardize this practice and make it available to every workman in Iowa, is a task of no small magnitude and of no small service as well.—*Brush and Pail.*

# PUBLIC BUILDINGS

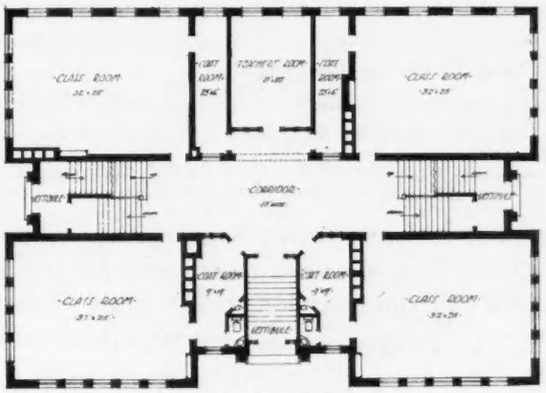


## Modern School at Benton, Ill.

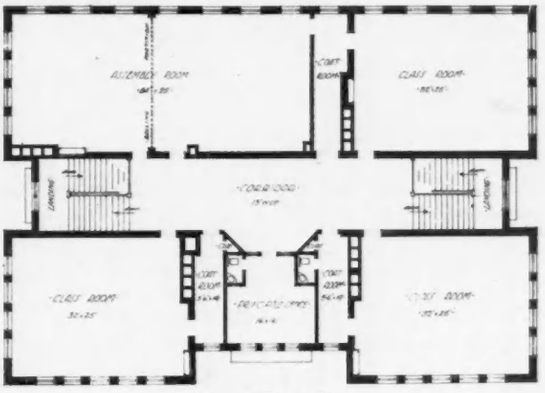
A model of modern school house planning and construction is the new Benton School at Benton, Ill. It is in the form of a standard 10-room school building, but on the second floor two of the class rooms are made into one double size room for general assembly. A rolling partition divides this large room when required.

The main entrance of the building is handled in the classical style, constructed of white limestone. The balance of the exterior trim is white enamel terra cotta, which contrasts effectively with the dark brown brick work.

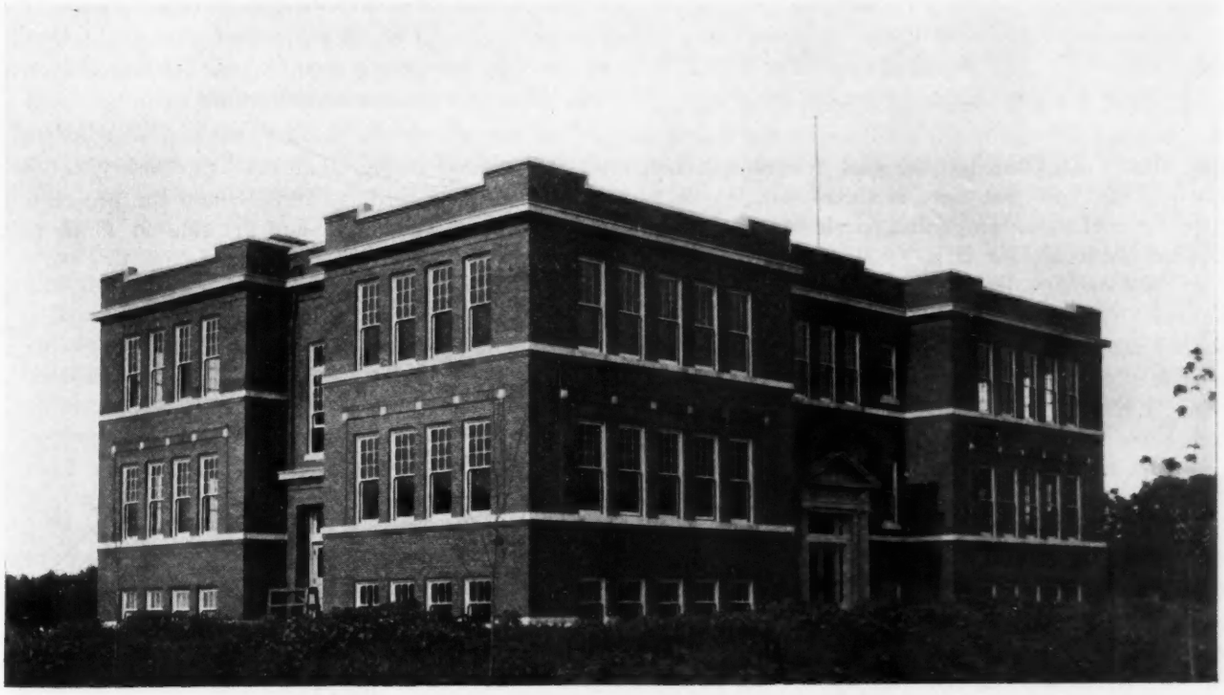
The building is typical of modern efficiency in school building work—neat and dignified, but not at all fussy or over-ornamented.



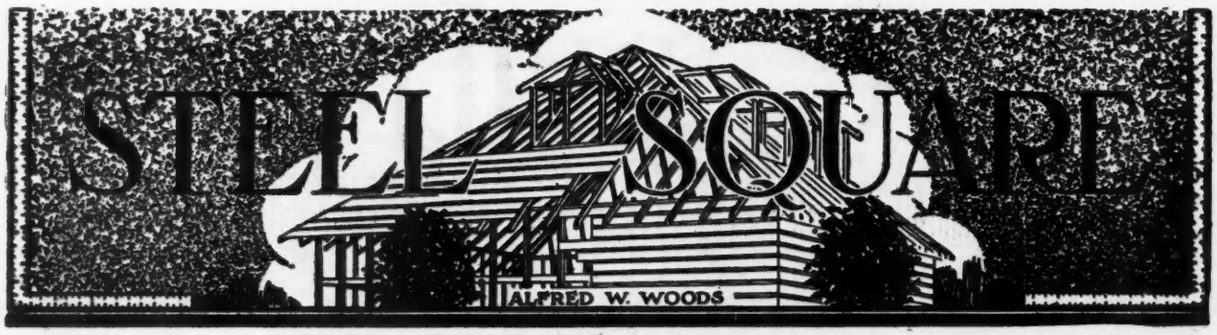
First Floor Plan.



Second Floor Plan.



New Benton School at Benton, Ill., Designed by G. W. Ashby, Architect, Chicago.




# Framing Hood Rafters

**HOW TO FIND THE CUTS FOR THE HOOD RAFTER TO SET WITH EITHER PLUMB OR RAKE SIDES—THE STEEL SQUARE CLEARLY EXPLAINED FOR THIS WORK**

**By A. W. Woods**

WE are going to take the hood rafter for our subject this month, though on several occasions we have answered questions on it, or rather *tried* to diagnose the subject. Others have tried to do the same thing and we dare say did equally as good a job at it as we accomplished, or rather thought

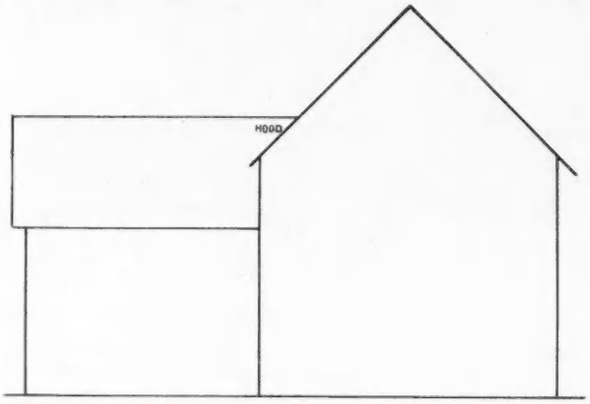



FIG. 1

**Two Straight Gables coming together at Right Angles require a Set of Hood Rafters.**

we did; and it would seem that after so much has been said on the subject, any one who has been a reader of this family magazine for the past few years, could not help but know all there is about it.

It is one of those things that puzzles when it should not puzzle at all, for if a man knows how to frame a hip and valley roof, he should not experience any trouble at all; for we claim when it is properly built, it is a part of the roof, as shown in Fig. 1.

Here is a building joining onto a larger one, or in other words, the roof of the smaller building laps upon the roof of the taller building, and if the intersections of the roofs are formed by valley rafters, they stand in the same position as would be required for the hood rafters; consequently the cuts must be the same, with the exception of the seat cut, which is not used in this case, as there would be a plumb and side cut at each end,—the side cuts being right and left; and to make the hood rafter properly member onto the side of the common rafter, it would have to be backed on both top and bottom.

This, of course, should be one way only; but this may be readily found by setting off on the plumb cut the amount of the rise the roof has in the length of the side cut taken on a level line.

But custom seems to have settled on another way, and that is, to just make a miter cut on the foot of the hood rafter to fit against the side of the common rafter. This brings the top of the hood rafter in the plane of the roof, without any backing whatever and the lower end cut of the jacks for the hood is simply a square cut; but where the real trouble comes in, is in making the cut at the top or peak end of the hood, so that they will exactly member onto the ridge. Now, this is the part that we want to make clear.

If it was simply membering two pieces on a level plane, as shown in Fig. 2, all that is necessary to take is half of the spread, as at A B, and the projection as at C B, on the square; and the side on which the

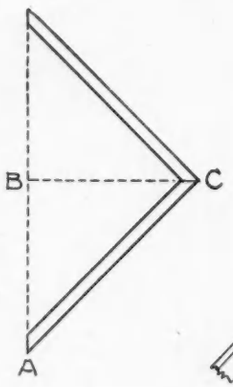



FIG. 2.

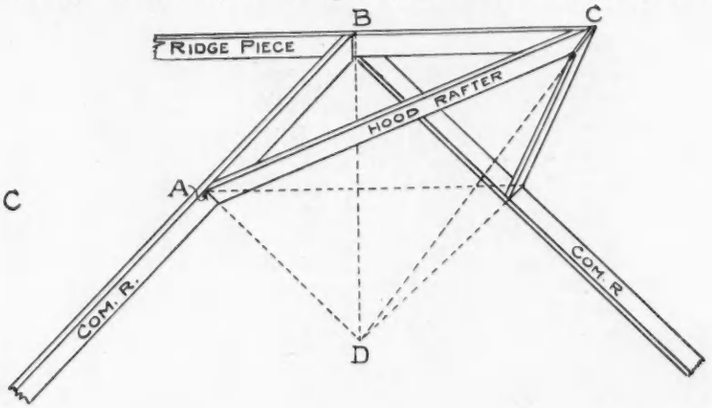



FIG. 3.

**The Framing of Hood Rafters Explained.**

latter is taken will give the angle, no difference what the angle formed by the two pieces may be.

The same principal holds good when there is a pitch given the two pieces, as in the case of the hood rafter. A B then represents the distance from the foot of the hood along the edge of the common rafter to the center of the ridge and C B, the projection as before, will give the required angle across the back of the hood. But in addition to this, there must be another angle across its side, and this is what puzzles, because it runs off into space and is therefore not so readily grasped. But to obtain correct results, it must be reckoned from just the same as the civil engineer lays off his railroad curves for his road bed, from a given center—which may be off in a corn field, in a lake or in the heart of a mountain,—it does not make any difference. There is an unseen point somewhere, and it must be reckoned from. In the case of the hood rafter, it is at D, as shown in Fig. 3, and is established by an extended line from the foot of the hood to a point intersecting a plumb line from the ridge at B. Thus forming A D as one of the parts to take on the square, while the other part is found by taking a line from D to the end of the projection as at C. D C then is the other part to take, and the side of the square on which the latter is taken, will give the cut.

The length of the hood rafter is found from its run and rise in the usual way, as that for the hip or valley.

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## The Crooked Line Shaft

**By J. Crow Taylor**

A man had a nice little gasoline engine, and a group of nice little machines, and the shaft was crooked, which made the whole thing look bad and run clumsily. It was quite a long shaft, though light, and had been made from two lengths with a coupling. It was evident that some effort had been made to set the shaft straight in the beginning, but the journals were flimsily supported and had pulled out of shape till one could see by a glance along the line that one end had pulled over a couple of inches. It was supported by stubs driven in the ground, and these had pulled over with the strain of the belts.

Now, it makes no difference if this was just a temporary set, it should have been worth while to put that shaft down straight and fasten it firmly enough to hold and stay straight. One not only wastes power in unnecessary friction when a shaft is crooked, but it is hard on the shaft itself, and enough of it will result in permanently springing the shafting.

Make your shafting straight and level, and see that the bearings are firmly enough supported that they will stay where you put them. Take more pains when it is a permanent setting in the shop, but even if it is a temporary set-up on some job, it is better to see that the shafting and machines are firmly fixed, and the shaft straight.


## By a Foreman Shaver

I once had a crew of men working on a building. In laying the sheathing, one of the men dropped back in his row until he was about 6 feet behind the other men. When the sub-foreman of the crew called his attention to his work, he replied that a man got as much for working slowly as he did for working rapidly. "That is true," said the foreman, "but it sometimes is the cause of a man's pay being stopped." That was a prophetic remark, for the pay of that man was stopped that night. Indeed, there was no other course to be taken, for the retention of a man who avowed such principles was an open incentive to "soldiering" on the part of the balance of the crew. Of such men is the kingdom of no-accounts.

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I had the misfortune at one time to work for a man who could not give the simplest order in an intelligible manner, his reason being that he "was h—l on working, himself, but a poor hand at trying to put brains into other people's heads." There is a good deal in the remark that has a bearing on the success or failure of a man in the position of foreman. Here is where the oft-quoted quality of tact is called into play; for to give intelligent directions to a workman and at the same time avoid too much minuteness of detail requires the exercise of all the resources of the best of foremen. True, there are some men who can get a lot of work of a certain kind out of men by the liberal use of words and bluster, but these men and methods are not to be considered as applying to the handling of skilled or semi-skilled labor. Getting ill-tempered over explanations does not help matters any, and is sure means of losing the respect and good-will of a crew of men.

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The most expensive man I have in my crew is the one who gets things done the quickest. The efficiency which gets work done the quickest way to get good results had been drilled out of him on rough work so that he will do a piece of good work as hurriedly as he would nail up a hole in a barn-yard fence. That kind of efficiency results in poor work when the quality point is not kept in view. H. C. Haner.


# Kinks, or a Few Tricks of the Carpenter's Trade Learned by Experience

By Peter Hedstrom
Architect, Billings, Mont.

ANYONE who follows a trade for any length of time learns a few tricks which make the work easier and better, and while the following may not be new to the old "chips," it perhaps, will prove of some use to the younger ones.

**NAILING WITHOUT SPLITTING.** Nailing is a very simple operation, but even in that there are a few tricks which come in handy once in a while. In driving brads or nails in small mouldings or wherever there is danger of their splitting the wood, and one is not prepared to drill for them, cut off the point of the nail with a side-cutting plier or by hammering it against the sharp edge of the back of the hatchet. This gives the nail a chisel point which, if driven so as to cut the grain, will prevent any splitting. To drive a nail where one cannot reach to start it, drive the nail through a stick or lath and very near the end; holding the stick in the left hand, one can place the nail and drive it wherever one can reach with the hammer. When the nail is solid, pull the stick away and drive the nail home. When toe-nailing thin stuff, if the point of the nail is bent slightly in the direction it is wanted to go it will not come out on the back side. Yellow laundry soap or beeswax are great helps in driving nails and screws in hard wood, and for driving the larger sizes of screws there is nothing to beat a screwdriver bit in a brace.

**DEPTH GAUGE FOR SAW.** A home-made depth gauge for the ordinary saw can be made very easily as shown in Fig. 1. Saw to the approximate depth with the body of the saw and finish to the exact depth with the point.

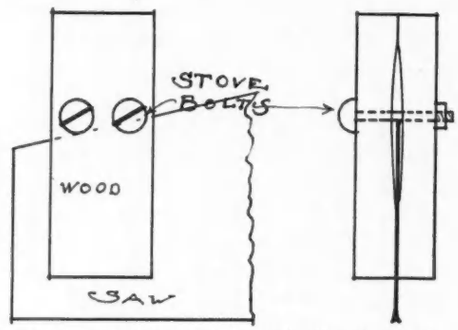


Fig. 1. A Simple Gauge for Sawing the Depth.

**SAWING TRIM TO LENGTH.** In cutting up random-length stuff for casings or jambs, it should be cut with as little waste as possible. To do this quickly, put a 12-inch plank or board on a couple of "horses" and drive nails into it, as shown in Fig. 2, so that from each nail to the end is a proper distance for some piece of stock. Place the end of the piece against the nail which will give the proper length and saw off at the end of the plank. These lengths should be a little longer than the finished piece is required to be. Place another "horse" a little to the right to support the other end of the piece, so as not to break it when sawing.

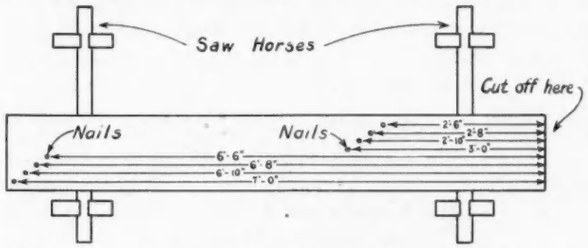


Fig. 2. Drive Nails into Board the Distance from Cut-off End You Wish the Trim Pieces to be Cut.

**MORTISING DOOR FRAMES FOR HINGES.** It is twice as quick and a lot easier to cut the mortise for the hinges on the jambs and transom bars on the bench before the frames are nailed together than to do it after they are set. It also shows exactly where to place the backing for the hinges when setting the frames. With the plans to work from, it is not difficult to get them correct for right and left-hand doors. If frames are made 3/32 inch wider than the size of the door it will save a lot of planning when fitting the doors.

**NEAT CORNER JOINT FOR MOULDINGS.** In putting down base which has no moulding, but

simply a rounded edge, coping does not make a very good job. The following way is better: The first board should be cut off square and of length to fit snugly against the plaster, and nailed in place. The next board should be 1 inch longer than the exact length required. Set this piece in place as near its permanent position as possible and scribe with a pencil set at 7/8 inch. Cut off on this line to within 3/8 inch of the top and then finish the cut at an angle of 45 degrees. Put board in place with the projecting piece resting on top of the board already in place, push tightly against the wall and mark along the bevel. Remove board, and with a chisel cut along the mark and about 1/2 inch deep. Put plaster end of the board in place first and then shove the fitted end into place, allowing the projecting piece to rest on top of the board until it is tight against the wall, then drive it down into the place cut out. This makes a mitered joint for 3/8 inch at the top and the rest of it is a butt joint. If made well, this makes an excellent joint and one that looks well. This method can be used for round edge chair rail with equal success.

**LAYING OUT STAIR WINDERS.** In building stairs with three winders, the following is a good and easy way to divide the wind into three equal parts: Lay out the full size plan of the stairs on the floor directly beneath the stairs, or if not convenient there, some other place where there is plenty of room. Draw the lines for the wall and the front stringer and locate the newel and the risers, A and B, as shown in Fig. 3. With the point C as a center and any convenient radius, draw the arc, DE. With the same radius and D as a center locate the point F, and with the same radius and E as a center locate the point G. Draw lines from C through the points G and F. These lines divide the wind into three equal parts, and each represents the face of a riser. If a newel is used at the angle, the point C should be inside the face of the newel a distance equal to or greater than the distance the treads project in front of the riser. If the stairway is entirely enclosed the point may be farther out, depending on the amount of room and the desired width of the winding treads. The line of travel is about 16 inches from the rail and the winders at this point should be of the same width as the rest of the treads. From this layout the exact size and shape of the winders can be gotten.

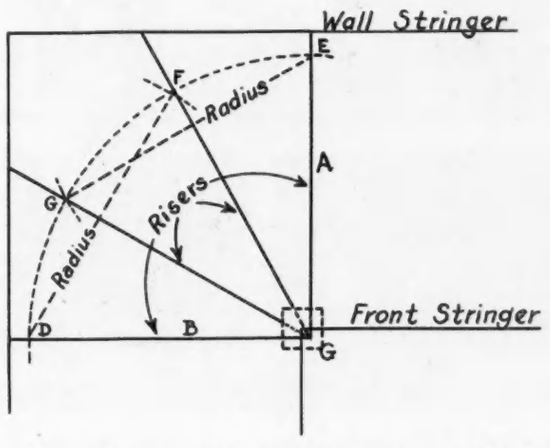


Fig. 3. Each Winder Tread is a side of an Equilateral Triangle.

**NAILING GUIDES ON STAIR STRINGERS.** While housing stair stringers, drive a nail through the stringer, from the housed side, in the center of the tread and near the front edge and in the center of the riser and near the top. Pull the nail out and the hole will mark the centers of the treads and risers on the back of the stringer and be good guides for nailing when putting the stairs together.

**A GOOD TRICK.** A brick mason had drawn on the floor of a full size elevation of a segmental arch and asked the carpenter to cut a center for it. Now, to some it might be a puzzle how to get the lines on the floor transferred to the board used for the center; but it was easy for this one. He took a handful of shingle nails and carefully placed them with the head on the line, at right angles to it, and about an inch apart. He then placed the board on the nails without disturbing them and jumped on it. On taking it up, the board had a line of marks corresponding exactly with the line on the floor and it was a simple matter to saw out the center.

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## A Plea for Thoroughness

**By J. Crow Taylor**

A business man who has for years made a pretty close study of woodworking said recently, while the subject of the modern idea in efficiency was under discussion: "The one common weakness in the workman of today, and the one common fault that I feel more like complaining of than anything else, is lack of thoroughness. The minds of today have been so centered on finding the easiest and quickest way, on reducing the cost, increasing the turnout, and finding ways and means to do the same work with less effort, that we have lost sight and touch of the old sense of thoroughness." Then he entered a strong plea, a plea that should be listened to, for more thoroughness.

He said that people as a rule are stronger for quality in work today than they ever were and are cheerfully willing to pay the price for work that is done in a thorough manner. And when we come to look at this matter right there is more lasting efficiency in doing work better than there is in doing more of it.

Moreover, the writer enjoys the acquaintance of a builder whose best asset in trade is this same quality of thoroughness. He is so strong headed for it that he will lose his profits on a job rather than turn it over in any skimpy or unsatisfactory shape—and it must satisfy his own critical judgment and not merely that of the man it is done for. The result is that every customer becomes a friend and warm advocate and he gets the preference on lots of work at figures above others, and gets many jobs without competition in figures.


# Terra Cotta for Modern Store Fronts

**FOUR STRIKING EXAMPES OF EFFECTIVE USE OF TERRA COTTA FOR BUSINESS BUILDINGS**

THE best income producing store properties present an immaculate, spick and span appearance—all shiny plate glass and clean vitrified tile.

There is advertising value in the bright, attractive appearance of a store building. The very looks of the place draws trade and inspires confidence.

The American house wife, who according to statistics purchases 80 per cent of all goods sold at retail, is a great stickler for cleanliness and sanitation. She likes to trade where everything looks clean and fresh.

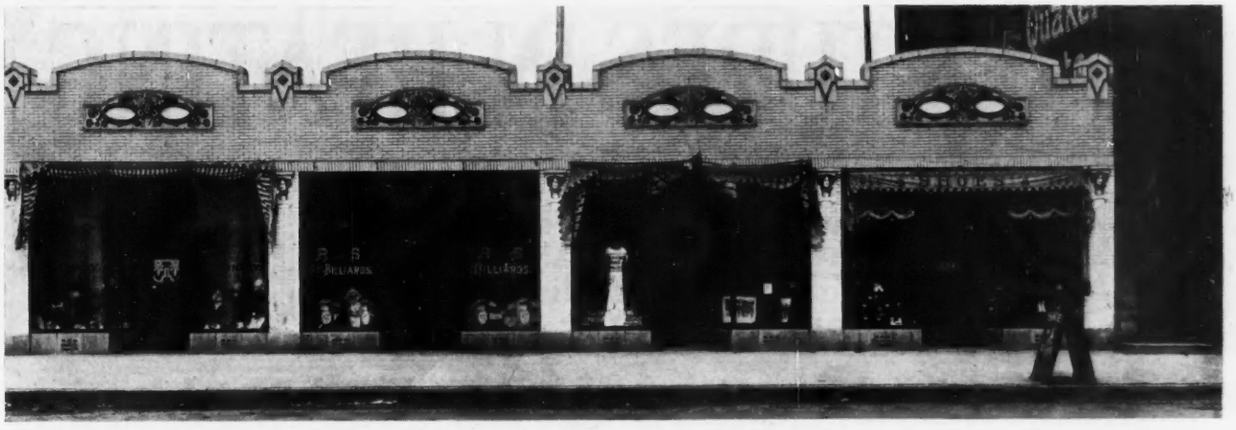
All of this means white enameled terra cotta. Practically all new store buildings are being built with it and old buildings are being remodeled and turned into paying properties via the Terra Cotta Route.

The photographs show four typical Chicago suburban store buildings; one from each of the four quarters of the city. The designs are good, at the same time, simple and inexpensive. Anyone can build business blocks like these anywhere, as the materials were all selected from stock patterns.

The first photograph shows a remarkably attractive two-story building, the front made up entirely of white terra cotta. Both the ornamental work and plain surface pieces are of this material. The window frames are painted dark green to give contrast. The second photograph shows a popular combination of white enamel brick and white terra cotta trim. The third photograph is of a conservative business building. The front is constructed of dark rough texture brick, and there is just enough white terra cotta work to give a contrast. The fourth picture is one of probably a thousand similar buildings now under construction in Chicago—a very popular type, because recent experience has proved it a money-making improvement.

If there is any store building to be done this year in your town, get around and recommend terra cotta. It will mean more business and satisfied customers for you.

**Group of Three Stores on an Inside Lot; a Two-Story Building; Front is Entirely White Enameled Terra Cotta; a Combination of Plain and Ornamental Pieces.**



One-Story Group of Stores Combining Ornamental Terra Cotta and White Enameled Brick in a Very Decorative Design.


An Attractive Business Place—One-Story High on an Inside Lot; Front Composed of Dark Rough Texture Brick with White Enameled Terra Cotta Trim.


A Corner Business Block Two-Stories High; Constructed of Brown Vitrified Brick and White Enameled Terra Cotta Trim. Photograph Taken During Construction.


# Heating and Ventilating a School Building

**HOW I PLANNED AND INSTALLED A WARM AIR SYSTEM WITH GRAVITY VENTILATION AT A SAVING IN EXPENSE**

**By Cecil F. Herington**

"MY next adventure in heating," laughed the Old Builder, "was an adventure in building as well. You see I had obtained the contract for a small school house in which the local board had specified that a ventilating system which supplied not less than 20 cubic feet per minute per pupil should be installed. I did some careful figuring but kept my scheme to myself. After I was awarded the contract I found that while the other contractors had been spending their time obtaining prices on fans, heaters, steam boilers, piping, etc., I had gone right ahead and had determined a price which was enough less to make me safe on the lowest figure. In order to understand how I did this, I will have to explain something about the building.

"In the first place the building consisted of two wings, as shown in Fig. 1, each wing being divided into two school rooms, the idea being to keep the classes of boys and girls separate. On the second floor were located, as shown in Fig. 2, a study hall and an assembly hall which might or might not be used at the same time when the school was in session on the first floor. It was thought by the school board that the entire building should have an apparatus capable of heating it all at one time and not figuring that the assembly hall would require heating only when the first floor rooms were cut off.

Each room was estimated to seat thirty-five pupils and a teacher, making a total of thirty-six occupants who, at 20 cubic feet of air per minute, required 720 cubic feet per minute. In the assembly hall it was estimated that possibly as many as eighty-five could be accommodated so that the air supply for the second floor was about 82 by 20, or 1640 cubic feet per minute. The heat loss for each first floor school room approximated 28,400 B.T.U., while that for the assembly hall was 64,600, and for the entrance hall 8,500. This gives us a schedule as follows:

| Room— | Heat Loss B. T. U. | Air Supplied Cu. Ft. Per Hr. |
|---|---|---|
| School Room No. 1 | 28,400 | 43,320 |
| School Room No. 2 | 28,400 | 43,320 |
| Hall | 8,500 | ..... |
| Assembly Hall | 64,600 | 98,400 |

"We see from these figures that if I had put in an ordinary furnace, supplying air at 120 degrees, it would require only about 1 cubic foot for each B.T.U. of heat loss; or in other words while our furnace would heat, it would not ventilate sufficiently to come up to the school board standards. If we subtract the 28,400 cubic feet of air required to actually heat either school

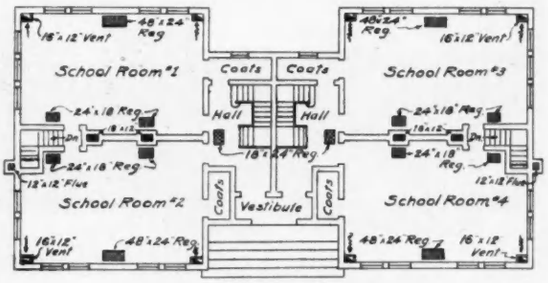



Fig. 1. Ground Floor Plan.

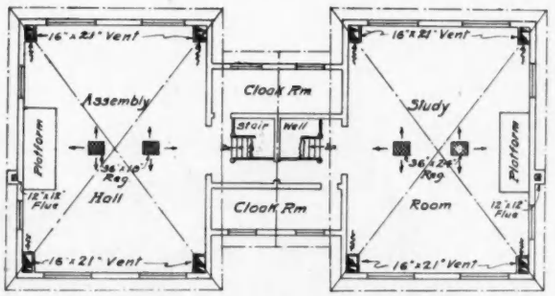



Fig. 2. Second Floor Plan.

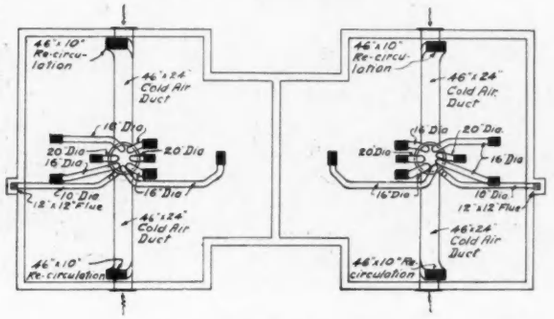


Fig. 3. Basement Floor Plan.

room from the 43,320 actually required for ventilation purposes we have a balance of 14,920 cubic feet per hour, or an addition of about 53 per cent. Similarly subtracting the 64,600 cubic feet feet per hour required to heat the assembly hall from the 98,400 supplied for ventilation we have a difference of 33,800, which is also an excess of approximately 53 per cent. In the hall there is no ventilation required so that we will be perfectly safe in increasing our air supply throughout 53 per cent, and thus covering all the ventilation requirements. This gives us a schedule of:

| Room— | Cu. Ft. Req. for Heating | 53% | Totals |
|---|---|---|---|
| School Room | 28,400 | 14,900 | 43,320 |
| Hall | 8,500 | 4,505 | 13,005 |
| Assembly Hall | 64,600 | 34,320 | 98,920 |

"It is usually customary on entrances and halls with outside doors to double the actual heat loss on account of draughts from open doors, so that I called the air supplied to the hall about 26,000 cubic feet per hour, or 433 cubic feet per minute. Dividing this by 260, velocity for first floor registers, we get 1.66 square feet required for the pipe area to the hall, which approximates a 16-inch diameter pipe. For the school rooms I divided the 43,320 cubic feet supplied per hour by 60, which gives approximately 720 cubic feet per minute; this, at the velocity of 260 per minute, requires a pipe area of 2.8 square feet. A 16-inch pipe which has an area of 1.4 square feet, will supply just about one-half the room, so that I placed two of these connections in each school room. For the assembly hall, I divided the 98,920 cubic feet per hour by 60, which gave me about 1,650 cubic feet per minute which, at 380, is approximately 4.4 square feet, so that a 20-inch pipe will supply about half the total quantity required. Therefore, I ran two 20-inch pipes to each of the 12 by 24-inch flues to the second floor assembly hall, using the 12 by 24-inch flues in the walls through the first floor. From these amounts we have the following total air supply:

| | Cu. Ft. Per Hr. |
|---|---|
| Two School Rooms at 43,300 equal | 86,640 |
| One Hall at 13,005 doubled equals | 26,010 |
| Assembly Hall, 98,920, equals | 98,920 |
| Or a total of | 211,570 |

"In order to obtain the grate area of the furnace, I next figured out what the temperature of the air would be when this quantity of air was supplied to the room. This is done by taking the 28,420 cubic feet required for a school room for example when the air is at 120 or 50 degrees higher than the room temperature. If we supply 43,320 cubic feet instead, the temperature rise need only $28{,}420 \div 43{,}320 \times 50$ degrees, or 33 degrees rise. This gives the temperature of the incoming air as $70 + 33$ degrees, or 103 degrees. Therefore, the total number of B.T.U. required for one-half the building, is $211{,}570 \times 103 \div 50 = 435{,}834$ B.T.U.

"At 8,000 B.T.U. efficiency per pound of coal it will require 54 pounds of coal per hour and burning 6 pounds every square foot of grate this means a grate surface of 54, divided by 6 or 9 square feet.

"For the economical operation of this system in warming up the school room I arranged a recirculation scheme, as shown in the basement plan, Fig. 3, taking the cold air from the floor of the school rooms near the windows and putting it into the cold air boxes so as to use this air rather than outside air when ventilation was not required. I made the connection with a 46 by 10-inch duct which has an area of 460 square inches. This is approximately twice the area of a 16-inch diameter pipe, so that the air coming into the school rooms through two 16-inch diameter pipes would have no trouble in drawing an equal quantity of air out of the room through the circulation connection.

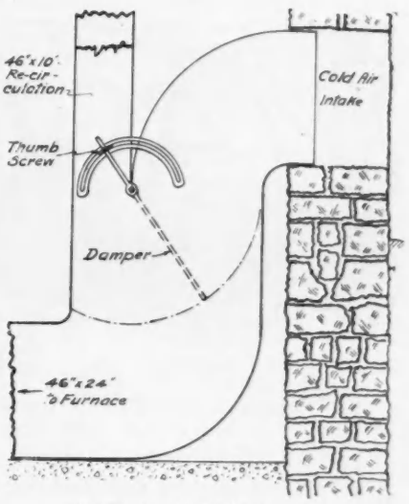


Fig. 4. Detail of Air Supply.

"The cold air intakes were run to opposite sides of the building with flap valves so as to take air from the windy side in every case, these flap valves being similar to those about which I previously told you.

"Where the recirculation joined the cold air box, a two-way damper as shown in Fig. 4 was placed so that either outside or inside air could be used or any desired proportion of each.

"Before I was through, however, I had to arrange to get rid of the superfluous air by some scheme of vents. It is, of course, safe to figure one complete air change per hour, finding its way through the windows and natural leakage. In the school rooms which had a cubic content of 9,400 cubic feet, this left $43{,}000 - 9{,}400$, or 33,600 cubic feet per hour, to be taken care of by venting. At a velocity of 250 feet per minute in the vent flue this would require $\frac{33{,}600}{60 \times 250} = 2.3$ square feet of vent for each school room. I used two 12 by 16-inch vents which equal 2.6 square feet.

"For the assembly hall which had a cubic contents amount of 17,000 cubic feet, I had to take care of $98{,}920 - 17{,}000$, or 81,920 cubic feet per hour with the vents. At 150 feet per minute velocity this means a vent area of $\frac{81{,}920}{60 \times 150} = 9$ square feet. I used for 16 by 21-inch vents which equal $\frac{4 \times 16 \times 21}{144}$, which equal approximately 9 square feet.

"On the roof I placed common ventilators so as to have a combined area over each half of the building equal to my total vent areas, or approximately 14 square feet.

"The vents all had dampers so that they could be closed off when desired, which is a very good stunt to do, so that the building will not get cooled down during the night when the fires are low. I am glad to say that this system has worked well and been very satisfactory, although no gravity system of ventilation can obtain the positiveness of action which comes with the use of a fan. On the other hand, no mechanical ability or power was required for this school, and this was a most important factor in the country district where it was located."

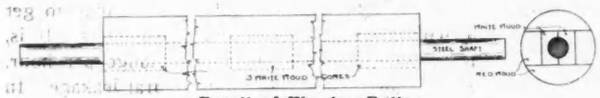

# More Shop Kinks

**HELPFUL IDEAS AND SUGGESTIONS FOR CARPENTERS, CABINET MAKERS AND MACHINE WORKERS**

**By Wm. C. Jasbury**

SOME time ago I was sent out from the shop to get instructions on some rollers wanted by a concern manufacturing waterproof fabrics. The rollers are made with a poplar core and California Redwood shell. The manager of the plant informed me the only roller that would stand up and make good, was as above; he had tried kiln-dried white pine and other woods and construction. The intense heat these rollers were subject to and their speed, was indeed a severe test. The steel shaft that passed through these rollers was 2 inches in diameter and 8 feet long. The core pieces were fastened on the shaft by grip only, same as a split pulley.

Why California Redwood is so well adapted for



**Detail of Wooden Roller.**

this special and peculiar condition is, I think, it can be dried nearly to breakfast-food, contains an asbestos substance that defies excessive heat and can be had in large and clear pieces. This concern has a plant, the like of which I have never seen before; their working is so far from the ordinary routine of the shops I am used to; it seemed as though I had visited one of the other planets. But, as that may be, they must use the woodworkers' product in the shape of many rollers and other traps. The rollers I speak that only will stand the strain of their particular need are constructed as shown in sketch. These rollers make 300 revolutions per minute in a temperature of 110 degrees.

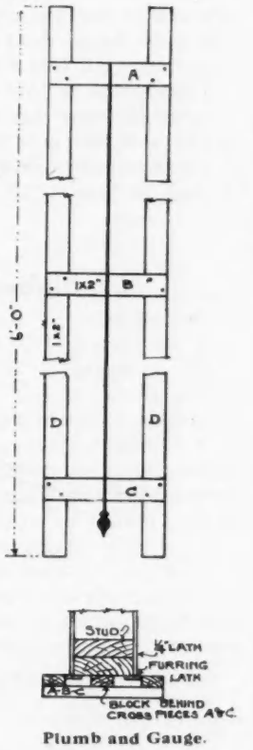
**WHAT KIND OF WOOD IS THIS?** We have oftimes in a big shop some nice juicy arguments regarding the different kinds of woods. Some one will get hold of an odd piece and start the ball rolling. The wind-up is usually a few bets and send the accused sample to the U. S. Forestry Investigation Plant, at Madison, Wisconsin. Those gentlemen are very kind in sending back the answer, which is always final. So you see, if we do not have the knowledge, we know where to get it.

**SPEAKING ABOUT WOODWORKING,** the mechanic of today, to be classed as front seat, has to have a knowledge of reading plans and details. Take, for instance, the blue prints of a modern house where the electric wiring, plumbing and heating, and all that, make so many lines it looks like a bushel basket full of overgrown spider webs, mixed with New Orleans molasses and the notes, wording, names of various new-fangled parts and kinds, for instance—where they read Mezzanine floors, Callamine doors, Kopalio base, Cain floor, Alberene stone, Pantasote covered doors and many other hieroglyphics off the monument. Years ago the carpenter boss was an old chap with whiskers that had seen the Presidents back as far as John Adams, a pair of spectacles that were made from port-holes of the Santa Maria, etc But today the foreman carpenter is a smooth-shaven male, with a white collar, a steel square and a scale rule. It only goes to show that we (I say we, because I have both—smooth shave and steel square) are living in an electric, gasoline age, where everything is in high gear and voltage of go-aheadness. Thanks to the printing presses and such.

We hear so much new stuff in the building trade nowdays, it is enough to make old man Webster come back to the old U. S. A. and have a few bay windows built on his dictionary. Some of the more velvety terms I have heard of late on architecture are frozen music. A skyscraper of today's construction is practically a bridge built on end; a hothouse conservatory is a season revolutionist; a garage is where the odor of gasoline and rubber is kept; a bathroom is a place used for the removal of scale from God's noblest animals. An ice house is a place where fresh water lakes are kept in chunks; a barn is a place where man keeps the earth's whiskers (hay) and the runabouts that eat such. A railroad station is a comma in the story of a railroad trip. A church is a building with a roof pointing in the direction of the manager's theme; a school house is a place where the coming generation spends about seven hours of the day listening to such tales

as the Burning of Rome and the Destruction of Reno. A City Hall is a place that uses iron bars in the foundation, placed so close together the lower elements of the city complain of the spacing of such; a tenement house is a box-like affair, thickly infested with foreigners and their pets. A hotel is where many homeless people are deprived of the privilege of putting their feet under their own table; an office is an instrument used to keep grandsons from baseball games. So you see, if it were not for the new buildings and new parts of buildings, our line would soon be a victim of fungus growth. I shall now get a period ready to place, but would like to say, that "He who has written something worthy to be read, has conferred upon mankind a greater blessing than the man who invented perspiration."

DOOR TRIMMING DEVICE. I recently had an occasion to visit a new building under construction. While there, I chanced to notice carpenters putting on furring-lath, or nailing lath on the door studding, for the masons to plaster to. There are so many different ways of doing this job; but on that particular job, Mr. Carpenter took two straight shingle ribs, 1 by 2-inch, about 6 feet long, and three pieces of 1 by 2-inch cross pieces. This material was nailed together in a sort of frame. This he stood up, or tacked against the door stud, a plumb line dropped from the top cross piece to below the bottom cross piece. The pieces were centered, or equally divided between the two long uprights. When the plumb line coincided with the center lines and the plumb-bob stood still, he tacked the top and bottom cross pieces to the door stud, then he put ordinary plastering lath on the door stud, projecting over the present lath ½ inch. The lath was ¼ inch thick, the furring lath and plaster at the finish, ¾ inch, which seems to be the standard the country over. The reason this implement, or similar ones, are used, is to be sure to keep the wall at the doors the same thickness, so that the finished jambs will come same width, and the plumb-bob is to keep the jambs plumb, so that the door will hang properly. Everyone has seen doors that would not stay shut, or open, on account of being hung out of plumb; then again it gives the mason lines to plaster to.



Plumb and Gauge.

**EVERY LOCALITY HAS ITS STYLES.** While I am collecting my thoughts as to woodworking stunts, of which this article will consist, ultimately allow me a few moments of your valuable time to get some of the incidents and such out of my system. Will try to confine myself to woodworking and building. Some years ago, to be correct, 1893, I toured Europe, my first landing being at Southampton, England. I saw no wooden buildings, no wood fences, etc., in fact, I visited one farm in Ireland of which there was 300 acres and only one tree. One would naturally look upon a carpenter in such places as the Lost Chord. When I returned to the United States, having gotten used to the stone age, it looked to me as it did to the regular immigrant, everything built of wood, these people are only going to stay here a few weeks. Later years, I was in Denver, where shingles are only seen in museums, slate being the house covers. While standing on Market Street, San Francisco, before the earthquake and fire, I counted 336 octagon bay windows on the Palace Hotel. While in Mexico, the number of adobe houses would certainly convince you that they had no place for an architect to hang up his hat; and so it goes; everywhere the conditions in the building business seem to have been changed to suit the large or small fancies and pocketbooks of those living thereabouts.

**SOME STICKER.** Recently I heard a bunch of cabinet makers discussing various topics at some length. The odd part of it was they could not speak to each other very well in their own tongue; they were getting it out in alleged English. The question, or part of the epidemic that I caught was the word they used for dowel, ordinary dowel pins, such as mill work is sometimes put together with.

The German man called it *Deible.*
The Italian man called it *Keno.*
The Saxonian man called it *Dovetail.*
The Hungarian man called it *Minden.*
The Jewish man called it *Fleckal.*

Can you wonder the saloons do such a good business? And some of these mushrats will get rich while I am still trying to (like the old lady) mop up the tide.

**HOW IS THIS?** I have often heard mechanics argue on the odd tricks of the trade, such as a 1 inch plug will not enter a 1-inch hole. There must be some slight difference. While I am not yet a scientist, or professor in the higher geometry, I cannot explain this as would one of a finer mental texture, but my answer to the question would be, there must be some difference in the size of the plug, or holes, because if they were both the exact size, they would be as though a pair of compasses were taken to draw a very fine line, enclosing a 1-inch diameter circle; this of course, would represent the plug and hole, as they actually appear when the plug is in place, but to extract the imaginary plug would mean there would be a certain amount (very minute) of air space between plug and opening, therefore they are not the exact size.

# CORRESPONDENCE

## Questions Answered and Ideas Exchanged.

**Our Readers Are Requested and Urged to Make Free Use of These Columns for the Discussion of all Questions of Interest to Carpenters and Builders.**

### Keeps Copies on Drafting Table

To the Editor: Coquille, Ore.

I have just closed a fine contract for a nice little bungalow 46 by 51; cost, $3,000. I made all my own plans and specifications and can give the AMERICAN CARPENTER AND BUILDER credit for most of my knowledge in this line. I have been a subscriber to your magazine for some time and have them all on my drafting table and refer to them very often.

F. A. CHILD.

✣

### Which is Right?

To the Editor: Clarksville, Tenn.

Am sending you an outline of an argument to settle. It concerns the header over a window on a brick wall. I contend that No. 2 is the best, while the other party thinks different. No. 2 has a 6-inch bearing on the wall and the other has nothing except the ends of the two joist that support the header, which is connected by nails. All joist, except the two that support his header, hang on the header also; they cannot have the support and strength that No. 2 can. Which is more practical and best? Which would the modern

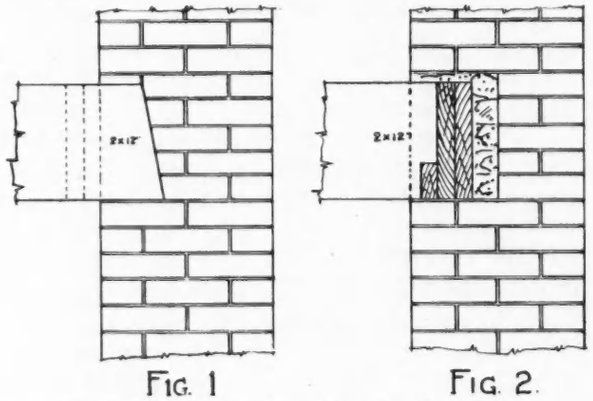



FIG. 1 FIG. 2.

**Two Ways of Seating Floor Joists in a Brick Wall.**

carpenter framer use? It is only a matter of strength, not looks.

I say that the framing which will be dry always, will be as good and remain so as long as the brick work. He says it will decay, and it is best to build brick on brick, which is why he says to shift the header off the wall.

I am tearing down a brick structure built in 1841 and the wooden blocks in the brick wall are as sound now as they were the day they were put in, and it is all that way, except where it was exposed to an almost continual flow or drip.

Please settle this for us.

JACK H. AYRES.

*Answer*—If the decision were left to us, we feel that we would have to decide in favor of the other fellow, as being the best job, from a mechanical standpoint. However, others may think differently and we are willing to leave the subject open for further decision higher up.

Our objection to No. 2 is that it cuts out too much of the wall, thus weakening it. Take a 17-inch wall for instance, nearly one-half of the wall is cut away by the header when resting on the wall, and might as well be counted one-half as there is a two inch space left that can only be filled in with bats and mortar and often times not even that,—unless the boss is on the job to so direct. Then again, the brick do not always come out even with the top, thereby leaving more bats and mortar to be built on top to bring the courses right. Whereas the other way, brick is built on brick the full width of the wall with only the ends of the trimmers resting on the wall and the header being so close the bearing cannot weaken the joist for all ordinary purposes.

A. W. WOODS.

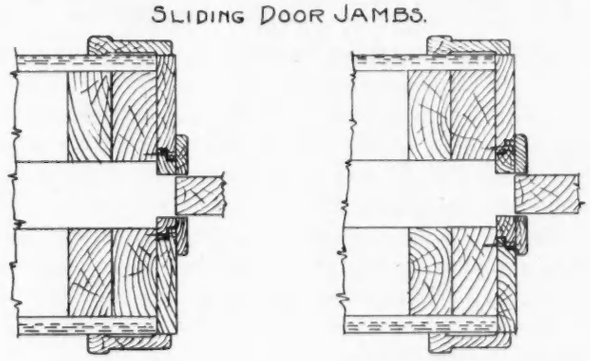
✣

### Sliding Door Jambs

To the Editor: Fullerton, Pa.

In the May issue of the "A. C. & B." there appears an article on page 47, "How to Frame and Hang a Double Sliding Door," by E. J. G. Phillips, which will undoubtedly be of good service to many carpenters who have to do sliding door hanging. However, according to the sections shown, of the method of rabbetting the jambs, I would respectfully suggest to Mr. Phillips that according to my experience those jambs are made up wrong.

As may be readily corroborated by brother carpenters, it would be a rather difficult proposition to remove these self-same jambs after the doors were once hung. This may readily be verified by taking note of the way the rabbet is made. I am of the opinion that it should be made as shown




**Cross Section through Sliding Parlor Door Jambs.**

in the accompanying sketch, in order to be easily removable. I have invariably made them as shown and with satisfactory results.

Perhaps Mr. Phillips simply made a mistake in making his drawings; at any rate, I cannot see the advantage of making the sliding door jambs as he shows them.

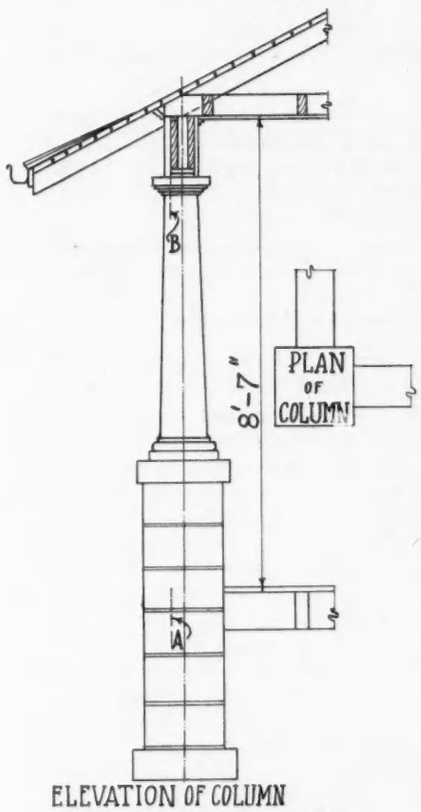
JOHN WAVREK, JR.

✣

## Something About Porch Building

To the Editor: Omaha, Neb.

My sketch shows the plan of porch column and rail and the elevation. What I wish to show more than anything else in this is how to lay out the framing so that the porch beam will be properly centered on the column when they are set in position. There are porches built by the hundreds all over the country where the porch beam does not center with the column. In some cases the amount that the beam is off the center may be small and not very noticeable except to a trained eye. In other cases the difference is so great that most anyone can see it. When this is the case it makes the work look bad. For the work to look right the center of the beam should center the column exactly.




ELEVATION OF COLUMN
**Center Line Should be Straight.**

In the sketch, A represents the outside of the bottom frame work and B the outside of the top frame work. In this case the top beam lines up with the bottom frame work, but there are many cases where the top frame work has to be set back an inch or more to make it center with the column. This depends upon the size of the columns and how they are set at the bottom. See the central line of the column in the sketch, measure from this line out to the face of the frame work both at bottom and at top, and you will be able to see readily if the top frame has to be set back any to make the work balance up right. I have seen many porches with the columns an inch or more off the center of the beam. I have even seen columns set out of plumb in an effort to overcome a portion of the amount beam was out of center.

These little troubles in porch building happen most to the carpenters who build without plans and details, but with a little care in laying off the frame work all trouble of this kind can be readily avoided and it is easy to have the work come out just right and the appearance more than pays for all the time spent in making careful measurements.

I. P. HICKS, Architect, builder and Estimator.

## Troubled with Sweating Plaster

To the Editor: St. Louis, Mo.

Will you kindly advise through your correspondence column a satisfactory method of treating moisture from plastered walls caused by reason of adding salt in freezing weather in the plaster before applying. We had a cottage plastered two years ago during freezing weather, and the contractor added a considerable quantity of salt before applying. We are troubled with sweating of the walls during each rain storm or during damp weather.

J. F. MCKELVEY.

✣

## Is Serious About Bungalow Finishing

To the Editor: Maywood, Neb.

I am of the opinion that W. E. B., who asked advice concerning the casing of bungalows, must have received great benefit from that very intellectual (?) letter written by Mr. Noel Hogg.

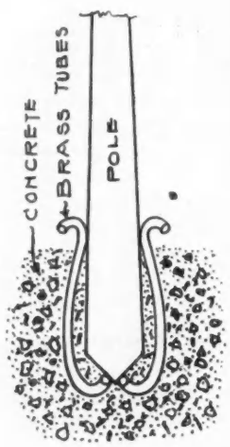
I am personally acquainted with a carpenter (?) who practices just such artistic ideas with regard to anything new or up-to-date as this man's letter would indicate; he is now building 8 by 12-feet garages for farms, and small shacks; while the more wide-awake and up-to-date men are doing all the work of consequence.

We would like Mr. Hogg to inform us where good workmanship (or poor) will show up with better credit to the builder than on the low roofed, quaint, all-on-one-floor handy home of today.

Anybody that has the proper respect for the trade will not make a botch of it and then try to cover his mistake with black paint and by assuring a "meant to do it" air; and if the citizens of Sterling, Colo., will fall for such horse play they are a less advanced community than the world believes them to be.

In regard to the cupboard doors, Mr. W. E. B., I will say the right hand door facing the cupboard should lap over on the rabbet. As to the finishing inside, I prefer Colonial for myself, or Mission. C. L. MARSHALL

**THE BOSS CARPENTER**
**Harry D. Forsyth, Bay City, Michigan can be proud of this young Builder. He's a chip off the old block and Harry says he is already the boss.**




## To Save the Flag Pole

To the Editor: Chicago, Ill.

In removing flag poles, I have found that they decay at the bottom when set in concrete. My idea with ¼-inch brass tubes to let in air, will dry out the moisture that otherwise would accumulate at the base. I would set the tubes, as shown by the accompanying sketch, and I think it would give the base of pole more life.

EDMOND VON KAENEL.

✣

## Trouble with Leaky Hinged Windows

To the Editor: Kansas City, Mo.

I have a problem I would like a little help on. In building sleeping porches it is often desirable to have windows that will open inward, hinged from the top; they hook up. I would like a detail of this kind of a window showing how the frame is made and the trim put on. Any other plan that might be suggested to take the place of a hinged window would also be appreciated. Windows for a sleeping porch must be very specially made or they will develop leaks and cause trouble below. B. B. D.

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## Handy Estimating for Brick Work

To the Editor: Clyde, Ohio.

Here is a table I have prepared for convenience and quick reckoning in estimating on chimney work.

BAYARD S. GRAVES.

COMMON EVERY DAY BRICK CHIMNEY TABLE—*By Bayard Graves.*

| Column No.7 | | | No. 5 | | No. 6 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Outside dimension of chimney in inches | Inside dimensions of chimney | Area of flue in sq. inches | No. of bricks in one course | No. of bricks in one ft. high | No. of feet in height of chimney | No. of brick in chimney of any No. of ft., from 1 to 40. | | | | | Top line giving No. of brick in one ft. as per columns 1 and 5. | | | | | No. of ft. in height of chimney found in column No. 6. | | | | |
| 12 by 12 | 4 by 4 | 16 | 4 | 20 | 1 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | | | | | |
| 12 by 16 | 4 by 8 | 32 | 5 | 25 | 2 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | | | | | |
| 12 by 20 | 4 by 12 | 48 | 6 | 30 | 3 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 | 195 | 210 | | | | | |
| 12 by 24 | 4 by 16 | 64 | 7 | 35 | 4 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | | | | | |
| 12 by 28 | 4 by 20 | 80 | 8 | 40 | 5 | 100 | 125 | 150 | 175 | 200 | 225 | 250 | 275 | 300 | 325 | 350 | | | | | |
| 12 by 32 | 4 by 24 | 96 | 9 | 45 | 6 | 120 | 150 | 180 | 210 | 240 | 270 | 300 | 330 | 360 | 390 | 420 | | | | | |
| 16 by 16 | 8 by 8 | 64 | 6 | 30 | 7 | 140 | 175 | 210 | 245 | 280 | 315 | 350 | 385 | 420 | 455 | 490 | | | | | |
| 16 by 20 | 8 by 12 | 96 | 7 | 35 | 8 | 160 | 200 | 240 | 280 | 320 | 360 | 400 | 440 | 480 | 520 | 560 | | | | | |
| 16 by 24 | 8 by 16 | 128 | 8 | 40 | 9 | 180 | 225 | 270 | 315 | 360 | 405 | 450 | 495 | 540 | 585 | 680 | | | | | |
| 16 by 28 | 8 by 20 | 160 | 9 | 45 | 10 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 | | | | | |
| 16 by 32 | 8 by 24 | 192 | 10 | 50 | 11 | 220 | 275 | 330 | 385 | 440 | 495 | 550 | 605 | 660 | 715 | 770 | | | | | |
| 20 by 20 | 12 by 12 | 144 | 8 | 40 | 12 | 240 | 300 | 360 | 420 | 480 | 540 | 600 | 660 | 720 | 780 | 840 | | | | | |
| 20 by 24 | 12 by 16 | 192 | 9 | 45 | 13 | 260 | 325 | 390 | 455 | 520 | 585 | 650 | 715 | 780 | 845 | 910 | | | | | |
| 20 by 28 | 12 by 20 | 240 | 10 | 50 | 14 | 280 | 350 | 420 | 490 | 560 | 630 | 700 | 770 | 840 | 910 | 980 | | | | | |
| 20 by 32 | 12 by 24 | 288 | 11 | 55 | 15 | 300 | 375 | 450 | 525 | 600 | 675 | 750 | 825 | 900 | 975 | 1050 | | | | | |
| 24 by 24 | 16 by 16 | 256 | 10 | 50 | 16 | 320 | 400 | 480 | 560 | 640 | 720 | 800 | 880 | 960 | 1040 | 1120 | | | | | |
| 24 by 28 | 16 by 20 | 320 | 11 | 55 | 17 | 340 | 425 | 510 | 595 | 680 | 765 | 850 | 935 | 1020 | 1105 | 1190 | | | | | |
| 24 by 32 | 16 by 24 | 384 | 12 | 60 | 18 | 360 | 450 | 540 | 630 | 720 | 810 | 900 | 990 | 1080 | 1170 | 1260 | | | | | |
| 28 by 28 | 20 by 20 | 400 | 12 | 60 | 19 | 380 | 475 | 570 | 665 | 760 | 855 | 950 | 1045 | 1140 | 1235 | 1330 | | | | | |
| 28 by 32 | 20 by 24 | 480 | 13 | 65 | 20 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | | | | | |
| 28 by 36 | 20 by 28 | 560 | 14 | 70 | 21 | 420 | 525 | 630 | 735 | 840 | 945 | 1050 | 1155 | 1260 | 1365 | 1470 | | | | | |
| 32 by 32 | 24 by 24 | 576 | 14 | 70 | 22 | 440 | 550 | 660 | 770 | 880 | 990 | 1100 | 1210 | 1320 | 1430 | 1540 | | | | | |
| | | | | | 23 | 460 | 575 | 690 | 805 | 920 | 1035 | 1150 | 1265 | 1380 | 1495 | 1610 | | | | | |
| | | | | | 24 | 480 | 600 | 720 | 840 | 960 | 1080 | 1200 | 1320 | 1440 | 1560 | 1680 | | | | | |
| | | | | | 25 | 500 | 625 | 750 | 875 | 1000 | 1125 | 1250 | 1375 | 1500 | 1625 | 1750 | | | | | |
| | | | | | 26 | 520 | 650 | 780 | 910 | 1040 | 1170 | 1300 | 1430 | 1560 | 1690 | 1820 | | | | | |
| | | | | | 27 | 540 | 675 | 810 | 945 | 1080 | 1215 | 1350 | 1485 | 1620 | 1755 | 1890 | | | | | |
| | | | | | 28 | 560 | 700 | 840 | 980 | 1120 | 1260 | 1400 | 1540 | 1680 | 1820 | 1960 | | | | | |
| | | | | | 29 | 580 | 725 | 870 | 1015 | 1160 | 1305 | 1450 | 1595 | 1740 | 1885 | 2030 | | | | | |
| | | | | | 30 | 600 | 750 | 900 | 1050 | 1200 | 1350 | 1500 | 1650 | 1800 | 1950 | 2100 | | | | | |
| | | | | | 31 | 620 | 775 | 930 | 1085 | 1240 | 1395 | 1550 | 1705 | 1860 | 2015 | 2170 | | | | | |
| | | | | | 32 | 640 | 800 | 960 | 1120 | 1280 | 1440 | 1600 | 1760 | 1920 | 2080 | 2240 | | | | | |
| | | | | | 33 | 660 | 825 | 990 | 1185 | 1320 | 1485 | 1650 | 1805 | 1980 | 2145 | 2310 | | | | | |
| | | | | | 34 | 680 | 850 | 1020 | 1190 | 1360 | 1530 | 1700 | 1870 | 2040 | 2210 | 2380 | | | | | |
| | | | | | 35 | 700 | 875 | 1050 | 1225 | 1400 | 1575 | 1750 | 1925 | 2100 | 2275 | 2450 | | | | | |
| | | | | | 36 | 720 | 900 | 1080 | 1260 | 1440 | 1620 | 1800 | 1980 | 2160 | 2340 | 2520 | | | | | |
| | | | | | 37 | 740 | 925 | 1110 | 1295 | 1480 | 1665 | 1850 | 2035 | 2220 | 2405 | 2590 | | | | | |
| | | | | | 38 | 760 | 950 | 1140 | 1330 | 1520 | 1710 | 1900 | 2090 | 2280 | 2470 | 2660 | | | | | |
| | | | | | 39 | 780 | 975 | 1170 | 1365 | 1560 | 1755 | 1950 | 2145 | 2340 | 2535 | 2730 | | | | | |
| | | | | | 40 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | 2000 | 2000 | 2400 | 2600 | 2800 | | | | | |

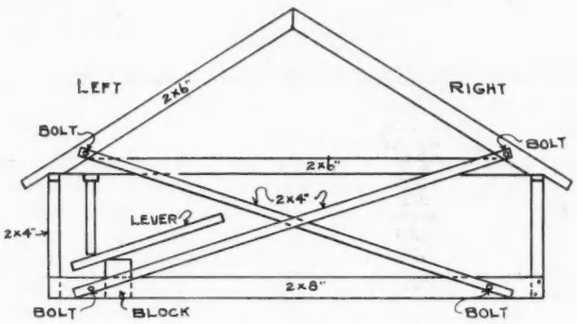
The above Table is based on ordinary work, which usually over runs a little, as a chimney having an 8-in. flue, outside measurement is near 17x17 inches but is called a 16x16-in. chimney Five courses is usually called 1 ft. high, but over runs a little, allowing for cutting and waste.

## A Novel Plan for Raising a Roof

To the Editor: North East, Pa.

Am very much interested in the inquiry of Mr. Brunner in regard to Roof Raising, as I have had a great deal of experience in that line.

I usually raise with a level, using four men; two men each have a lever and two to keep the blocking in. We take four pieces of 2 by 4 and brace from ceiling to floor and bolt them on with half-inch bolts. Then take four pieces of 2 by 4 and put at each corner and brace the way the ridge




**Novel Method of Raising a Roof.**

goes; then spike the top end of brace to a rafter and leave the lower end loose. As the roof goes up the lower end will drag along. Spike end to keep the brace from sliding back on the floor. The cross braces that are bolted on ceiling joist and lower joist act as a hinge and also a brace. When the right side of building is raised, take out the lower left side bolt and the brace will straighten. Then raise one side about two feet and bore holes in lower joist at the end of brace and bolt together. Put a 2 by 4 from plate to floor, brace it and you are ready for other side.

In this way I have raised a roof 18 by 26 by 9 feet high and put studs in in two days with four men. The sketch shows how to put in cross braces and position of lever.

I am very much interested in reading as to how each man has a different way and think every carpenter that reads the AMERICAN CARPENTER AND BUILDER should give his advice; it makes the book more interesting.

I have worked at the building trade for 32 years, beginning when I was 17 years old. Have taken a great many mechanical journals, but the "A. C. & B." is far superior to any I have ever taken. LOUIE N. ADAMS,

Carpenter and Builder.

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## Metal Roofs and Lightning

To the Editor: East Liverpool, Ohio.

Please discuss more definitely the risk or advisability of steel roofing as regards lightning. I have heard it said that a steel roof wired to the ground is as good as a system of lightning rods.

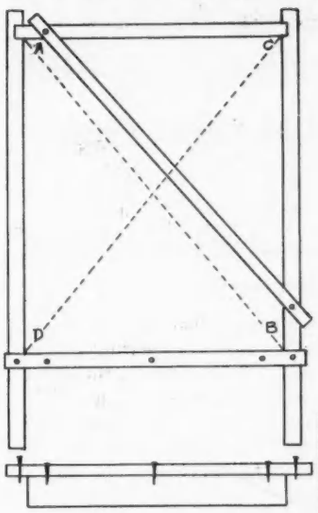
L. B. D.

## More Light From Bro. Gonne

To the Editor: Highland, Mich.

Brother A. G. Brown described my method of setting door frames in the June number of THE AMERICAN CARPENTER AND BUILDER, as far as he went, but there is more to it, as I go at it. After framing my jambs, I put them together exactly even at the top and make a mark square across the edges of both, about 16 inches above the bottom. Exactly to this mark I nail my spreader, which I make by nailing a strip on the edge of a board about the width of the jambs. This board should be straight and just the right length to fit between the jambs. I always square my frames by making the distance between A and BM and C and D exactly equal; then I put the side casings on and set frames and I can do the work faster and more accurately than setting jambs alone.

The cupboard door shown here is made of ceiling and will not sag as quickly as one with cleats on the back. I used the beaded edge of the same material or run a bead on some strips, if I have them, and nail them with 8d. finishing nails across the ends of the ceiling board after they have been clamped up and cut square about 1¾ inch shorter than the opening. The strips should be about 1 inch wide, of pieces that will not split easily; and the nails should be staggered and set deep enough to allow fitting the door to the opening.

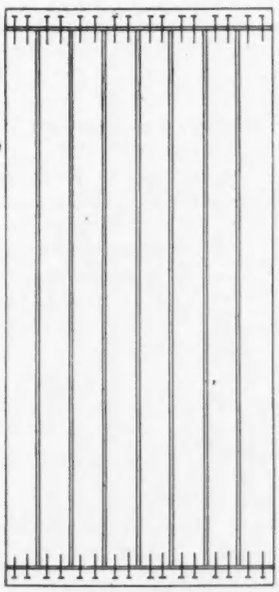



SPREADER FOR DOOR FRAMES

The sketches shown in April number, with "Karpenter Kinks," were not reproduced as I made them and I am anxious to have them shown as they should have been. I have been actively engaged in building for almost 30 years, and, like Brother L. R. House, "I have built 'em and therefore I know." In fact, I have not written an article about any line of work that I have not done myself and that many times. If Mr. House had read the "Kinks" carefully, he could have seen that the sketches and reading matter did not correspond.

I am reminded of the story I once heard of the man who could not read. He thought there had been a great storm at sea, as the pictures of the ships were all bottom side up. He simply had his paper wrong end up. He said my bridge cutting was a joke. I think the joke is on him.

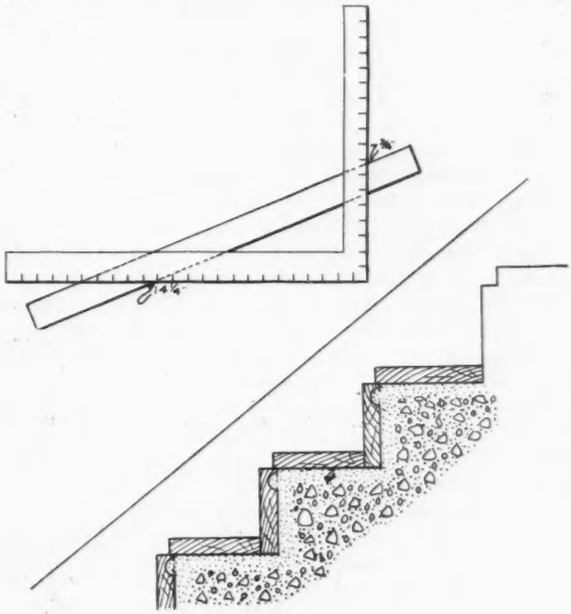
ALBERT GONNE.



CUPBOARD DOOR

NOTE: As the sketches referred to, were made from rough pencil sketches, submitted by the writer, it is impossible to say now whether the drawings as reproduced were exact copies of the originals, or not.

But there is one thing sure, if the writers would only send us half-way decent sketches we will guarantee to get them out in presentable shape. We pride ourselves on being pretty good in deciphering puzzles, but there are times we have to throw up our hands and make a wild stab, and guess at the rest. EDITOR.



**Wood Forms for Concrete Stairs.**

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## Old Time Woodwork

To the Editor:

The interior trim and wood finish of today, although more elaborate and put up with better or more modern tools, does not stand the test like the jobs of yore, and I am going to appoint myself a committee of one to discuss this state of affairs. There may be many readers of the AMERICAN CARPENTER AND BUILDER that will try to explain where I should have thrown in an adjective, or canned a few adverbs, etc., but this article is as the current strikes me. So listen to the band!

The woodwork in and outside of the George Washington homestead, Mt. Vernon, Va., is today in the finest state of preservation; joints are up, very little shrinkage, rarely a piece of rot, etc. The old "Tennant Church," Freehold, N. J., where the same George Washington sheltered his faithful men when he was doing a marathon across this state in pursuit of Mr. J. Bull's representatives, have the very same shingles on today that were on then. They are of cypress wood. The same benches, or pews, until recent years, had the blood stains still visible. And many other buildings that I have been in and inspected, show the woodwork in good condition.

Now comes the reason—*my* reason (mind you). When these houses were put up, the material was cut at the proper time of year; the seasoning was taken care of by those close to nature; the trees or logs that were healthy and worthy of such work were the only ones used. The work was put up by men who did not have to tear and jerk with a square-headed foreman over them. They were after quality, not quantity; buildings were made to live in in those days, not built to sell. The modern, or up-to-date methods of treating lumber, is to get the stuff out on the job as soon as possible.

Some concerns handle such bum material, they have to use an auto delivery so that it will not rot before it gets to the job. The grade of material of today has gone so far down and the price so far up, they look as though they had never met. It is getting so, nowadays, people are paying for Irish mahogany (hemlock), as much as they paid for No. 1 white pine thirty years ago, and to buy 1-inch lumber, the Western or Southern mills are planing to ¾ inch thick, also all other thicknesses, reduced so that a fellow has to have a rule that closes up like a telescope. I am inclined to believe one of the causes of the warping and shrinking of interior woods of today is the excessive heat in the homes. Whether or not the large manufacturing concerns making people, put as much blood in them as they used to, or whether they are using an inferior material, the twentieth century congregation do not seem to be contended unless they have a hot bath before supper, hot towels, hot-water heat, hotbed-sash for out in the yard, hot tamales for lunch, a hottentot for a servant. We are simply developing into a race of hot-house plants. What has become of the tough, old-fashioned folks? For instance, the old guy that could take a drink of water without removing his quid. That *quid* may spell *cud*, but it never looked good to me; quid sounds too much like the Back Bay dialect. (Been in Boston?)

But speaking about the old times, when they used to get their whiskers frozen in the wash basin out on the back porch and have to go in behind the stove with the hound-dog until they thawed out and when they had to go out in the A. M. and break the ice on a swill barrel before they could feed the pigs, "those were the good old days." The farmers of years ago, and perhaps some of the modern ones, put their oak and hickory that they want to season for wagon and farm implement work, in the hay-mow, claiming the odor of hay assists in curing or seasoning the wood with an extra amount of toughness. Air-dried lumber is superior to kiln-dried lumber, because the natural ingredients are not killed, or solidified by excessive heat. The air-dried variety is closer to nature. Take cypress, for instance; in a square 5 by 5 feet, or any other size, to cut off a piece from the end, you will find the center wet; to me it looks like a round of beef in a butcher shop immediately after Mr. Butcher cuts off a steak.

The reason cypress always seems wet inside, is this: It grows in the low or swampy ground, consequently water is its chief beverage. Then, when it is being dried, or seasoned, the peculiar part of cypress is, it contains a resinous substance. This resinous substance solidifies by being attacked by the air or heat, that makes the exterior or dry part impervious to the heat or air; consequently the water stays where it is, or in other words, stands pat. In the old houses where fireplaces and stoves supply the heat, you will find the woodwork in a much better condition than where hot air, steam or hot water is now used. The furniture of today will not stand up with that of yore, for the above mentioned reasons.

Now, this is, as I said early in my ravings, "my opinion" and idea; others may differ and contradict. Help yourself. Take the trim put up in a house that has just been plastered; of course, there are many barrels of water in the wall yet to evaporate; well, then, if the trim is kiln dried and put up against these seemingly dry but still wet walls, the drier part or trim will absorb the dampness like a blotter will take up ink. This swells the wood and when the heat we have been talking about dries out the trim, it shrinks again and there you have some open joints. Every practical carpenter seems to have an answer to this wood-drying and shrinking question; it could be carried on; in fact, Mr. Bryan could lecture on it, only he would not confine himself to oak, hickory and cypress, but would throw in a few grape vine pieces.

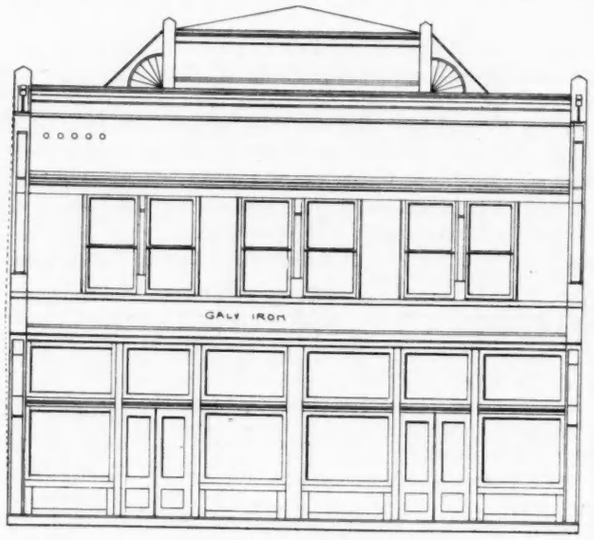
WM. C. JASBURY.

## What is the Best Thing to Do?

To the Editor: Winchester, Ohio.

As I see so much good information passing on to others in direct reply to their troubles through the Correspondence columns, I want to come forward with a query of my own; but first allow me to say, that while that information is passing through these columns,—volumes of it,—do not think I let it all pass. I try to glean some of it for my own use and profit by the experience of others, given for the benefit of others.

Now, for the information I want. Am enclosing a rough sketch of a two-story brick building, 13-inch wall, with galvanized iron front, which stands at the present time about 5 inches out of plumb, or sprung in the center, as clearly indicated by the dotted lines, which represent its present condition. There is a center wall through the building,




**Store with Sprung Walls.**

dividing same into two rooms below and two above. Upper rooms unoccupied and the building stands apparently as level as when first erected, which was several years past, without any cracks in the walls, or settling of same.

What I would like to have, is the opinion of some of the craft as to what would be the best remedy. It has been viewed by an authority on building, and he says that to take the old foundation out (which, by the way, is no good) and replace with a new one will stop the creeling of building; but I cannot see it that way. It looks to me as though the only way to remedy it with any degree of satisfaction, would be to tear down and rebuild. He thinks the creeling is caused by settling of foundation, but it seems to me if such were the case, there would be some cracks in the wall, or some other visible signs of settling; but there are none noticeable. The whole building just seems to be gradually springing sideways at the second-story line, as shown by the dotted lines.

Would like the opinion of some of the readers for my own benefit, or any comments they may feel disposed to offer.

Will say further, that I am one of the Charter members of THE AMERICAN CARPENTER AND BUILDER and have every copy of same handy for referencce; and it has been seldom that I have ever consulted them in vain for any problem for which I needed assistance. I am not much of a correspondent but think I will be back some of these times in reply to one of the correspondents who thought our "calling" was something that it was necessary to "steer clear of." I cannot agree with him.

A. C. STIVERS,
Carpenter and Builder.

## Shingled Gothic Church

To the Editor: Clinton, Conn.

Some of the readers may be interested in the accompanying photograph of the new Catholic church I recently completed here. Whiton and McMahan, of Hartford, Conn., prepared the plans. It is a shingled building designed in the Gothic style. It shows several good features for an inexpensive church building.

I want to say that I am a charter subscriber to the AMERICAN CARPENTER AND BUILDER and like it very much. I find it extremely valuable in my work; think it is better now than ever.

ALVA H. PIERSON,
Builder and Joiner.

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## A Simple Bookkeeping System

To the Editor: Council Bluffs, Iowa.

The Fred Tucker time slip shown in the July number is not a new one, but is a good one just the same. I not only keep time this way, but keep books as well; and one book is all I need. I use a fold over check book which has stub same size as check. On each stub there is room to state briefly what the check was given for. From my stub book I post into a separate ledger, which has headings similar to Fred Tucker's time book, as for instance Jones job, Opera House job, Incidental jobs, etc. I separate my household expenses in the same way, as for instance, Music, Coal, Shoes, Taxes, Club, Papers and Magazines, etc.; all at the top of page just like in the Tucker time book. My check book is posted once a day into this book, which keeps all the accounts separate. There can be as many of these as you please.

I also have a credit page for money received. I make original entry of money received right onto the backs of stubs in my check book, so that it is really the only book I have to carry.

I recommend this as a satisfactory system for an up-to-date small contractor. Just try it.

GEO. F. HUGHES,
General Contractor of Building and Public Works.

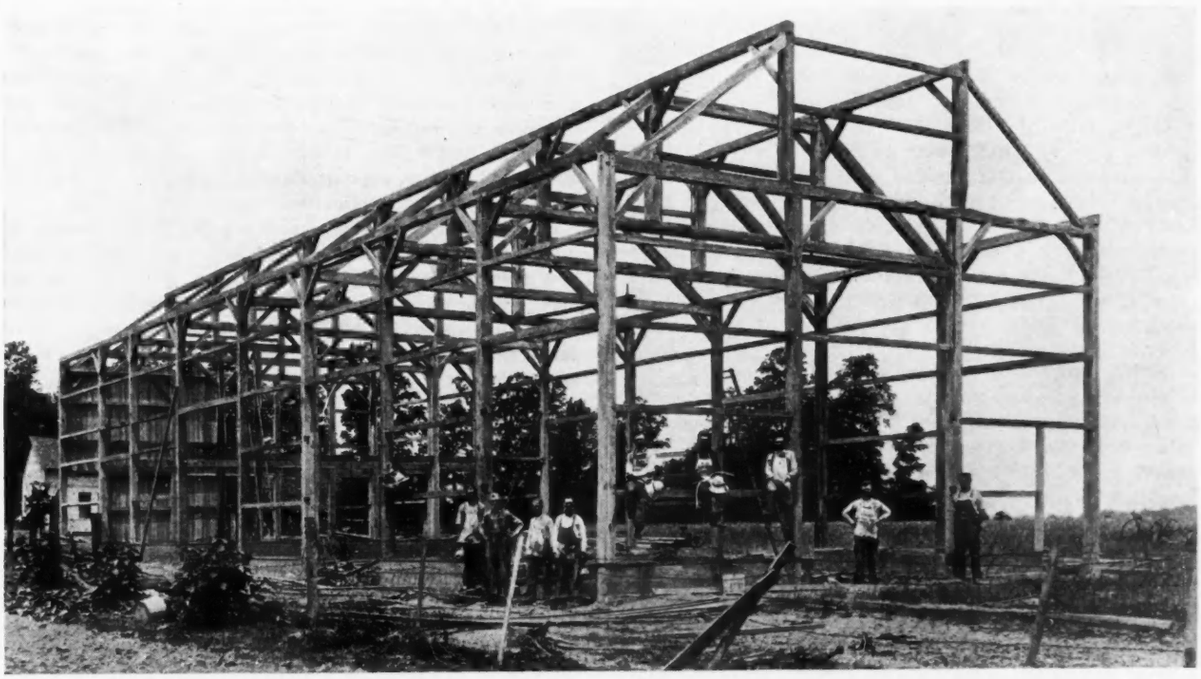
✣

## Large Tobacco Barn

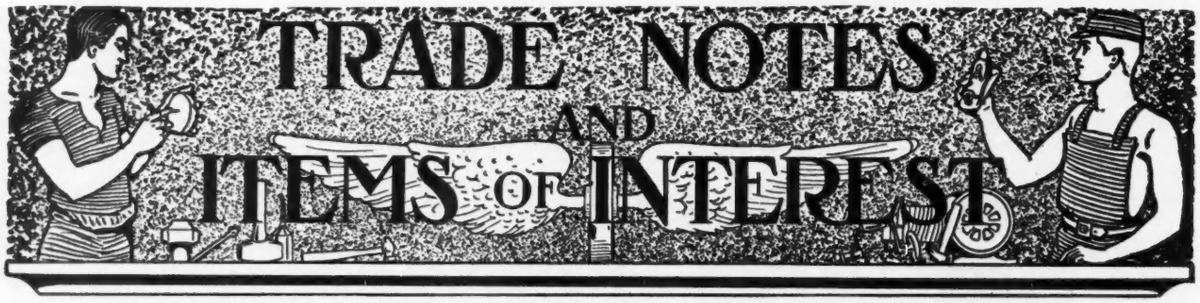
To the Editor: Gettysburg, Ohio.

Here is a photo of a barn I have just raised. It is 36 by 100 feet and 20 feet high to the square. Sixty-two feet is arranged to hang tobacco in. The remainder is to be fitted up for a modern barn and stabling room. It is to have an asbestos shingle roof.

W. R. INMAN,
Contractor and Builder.



**Contractor W. R. Inman and His Gang at Work on a Heavy Timber Barn 36x100 feet, at Gettysburg, Ohio.**




**Through this department the editors aim to keep builders, contractors, carpenters and architects in touch with what their friends, the manufacturers, are doing for them in new or improved tools and machinery methods and materials—pertaining to building. Items for these columns must have real news value; they are offered here as interesting information for our readers; they are not advertising. No matter will be printed here simply because some advertiser wishes it. Likewise, no matter will be excluded simply because the article described is not advertized in this magazine. Suggestions for the betterment of this department are requested of our readers.**

# Birch for Interior Finish

**By R. S. Kellogg**

BIRCH trees are common in the Northern woods from Maine to Minnesota, and wherever found they are among the most striking and beautiful inhabitants of the forest. The Yellow Birch, which is the chief source of Birch lumber, reaches its perfection in Wisconsin and Michigan, and more than one-half of the total cut of Birch is manufactured in these two states. It is a well known fact that the individuals of a species attain their best development in the regions where that species is most abundant. For this reason the Birch lumber from Wisconsin and Michigan is of the highest quality. The trees are large, symmetrical, clear, and sound. A height of 80 feet and a diameter of 30 inches is not uncommon. Timber of this sort yields a finishing wood which has no superiors, and few competitors. The city dweller of today prizes Birch woodwork in his home as much as Hiawatha did a Birch bark canoe. Both are evidence of good judgment in the selection of materials.

The wood of Birch is close-grained, and heavy. In bending and crushing strength, stiffness, toughness, and hardness, it ranks above many hardwoods and stands with beech, hard maple, and oak—woods whose qualities in these respects are universally appreciated. It is the close, interwoven structure of Birch that gives this wood its strength, density, wear-resisting, and stain-holding qualities.

The sapwood of Yellow Birch is yellowish, the heartwood light to dark reddish brown. It is the heartwood of Birch that furnishes the beautiful Red Birch, which has no superior even in Mahogany. Both sapwood and heartwood take a brilliant, satiny polish. The figure of curly Birch is especially attractive, while the sparkling lustre of the finished wood gives a richness of tone such as is usually looked for only in the costliest imported woods.

### Uses of Birch

Birch is one of the most widely useful woods. A recent tabulation of factory reports shows that Birch is used for nearly 200 distinct purposes, ranging from automobiles to zither bodies, and covering such diverse articles as barber chairs, billiar tables, wagon bottoms, cheese boxes, butter moulds, electrotype bases, wagon hubs, piano cases, refrigerators, shoe pegs, spools, farm implements, and interior finish.

More than half of the total output of Birch is used in the manufacture of furniture and fixtures, and for mill-work. The latter includes all kinds of interior finish, veneered doors and high grade flooring. In fact, it is in the field of interior finish that Birch finds its highest and most appropriate use. Employed originally as a substitute for Mahogany, Birch is now appreciated for many sterling qualities of its own, some of which are not possessed by Mahogany.

There are many styles of Birch trim as there are designers who wish to produce an unusual or particularly appropriate effect. In my office, I have 24 kinds of Birch moulding, casing and base, that are only a few examples along this line, while in the field of grille and stair-work the variety is even greater. My own preference is for the simpler styles which offer the fewest possible angles and corners to collect dust and at the same time give the largest uninterrupted surface to display the figure and sheen of the wood itself. For the same reason, my choice is for the softer hued stains, which bring out the qualities of the wood in harmonious fashion, rather than for more brilliant colors, or paints which completely obscure the natural beauty of the wood. We paint iron and brick for protective reasons as well as to give a more pleasing effect. When we work with wood it should be our purpose to enhance and not obscure its characteristics of figure, color and grain.

The perfecting of veneering processes, and especially of rotary cut veneer, enables us to get at a reasonable price a combination of large sizes and beautiful figures in panels that would be altogether impossible were we restricted to solid lumber. Moreover, the well built up panel is stronger and much less likely to warp or check than is a solid piece of wood of the same or even much greater thickness. Veneered panels may be obtained in almost any size desired, and where appropriate they provide a wonderfully effective means of interior finishing.

Recent years have seen a great advance in the manufacture of artistic doors, which are at the same time simple in design and reasonable in price. Here again, progress has been made by the use of veneer. There are many styles of doors to choose from. One of the most pleasing to me is a single panel Birch door stained silver gray, but other styles have many admirers.

### Hardwood Flooring

Among the most useful developments of modern lumber manufacturing is the production of high grade hardwood flooring. This flooring is manufactured to exact sizes from selected, thoroughly seasoned stock, and is as carefully handled as is interior finish. In fact, a beautiful and durable hardwood floor is an important part of the inside of a building, now that carpets have been replaced by rugs.

Hardwood flooring is made from kiln-dried stock, is stored in dry sheds and shipped in closed cars to prevent the absorption of moisture, and the user should see that it is carefully handled, correctly laid, and properly finished. Some of

# GORDON-VAN TINE

## *Fall Challenge Prices*

## *To 10,000 Shrewd Buying Contractors*

**5,000 BARGAINS**
**For Building and Remodeling**
**SHIPPED ANYWHERE**

**QUICK DELIVERY**
**Subject to Approval on Inspection**

## *Highest "Graded Up" Quality*

**Surfaced Lumber—Not Rough. Even Widths—Not Uneven. Graded Up—Not Down. Highest Grade—Not Knotty or Crooked.**

**"Guaranteed Right" Cost Estimates FREE**
**Prices Low and Quality the Very Highest**

### Jap-a-Top Roofing

Beautiful—Durable. Surfaced with genuine Slate. 2 colors—Red and Grayish Green.

**$2.25 per roll of 108 Square Feet**

**Jap-a-Top Shingles**
Price per sq. of 424 Shingles $4.75

**Also Other Quality Roofing**
as low per roll of 108 sq. feet, 90c.

### Wallboard Bargains

Wallboard is The Great Modern Substitute for Lath and Plaster. Also fine for partitions to finish off rooms, attics, etc. Comes in sheets ready for use. Goes on dry. Cold-proof, vermin-proof, handsome, durable. **Beats Plaster. Costs Less.** Wallboard costs 50% less to lay. Lasts as long as the building.

### Quality Wallboard

1000 Square Feet, **$22**
See Special Wallboard Offers in Grand Free Catalog.

### Prompt Service Anywhere You Live--On Any Size Order--Write Today


### LUMBER in Car Lots

**Save $100 to $300** Our special Latest Lumber List and FREE Book above offer choice to you of millions of feet of clear, dry, clean, seasoned lumber at Wholesale Prices. Dimension, heavy Joists and Timbers, Drop Siding, Beveled Siding, Ceiling, Partition, Wainscoting, Finishing Lumber, Laths, Shingles, Boards, Posts, Poles, Battens, etc. All lumber graded in accordance with rules of the Lumbermen's Association. All Millwork of High Quality Standards, established by the Northwestern Sash, Door and Blind Mfrs. Ass'n. Every stick guaranteed up to standard quality. Estimates furnished FREE on guaranteed costs to you. BARGAINS in Moulding and Finish. Many special designs. All latest new stock. See big Reductions in 1914-1915 Grand Free Millwork Catalog, just out.

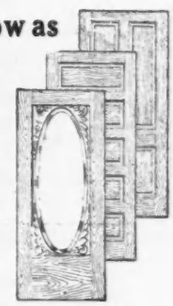
**We ship promptly to anywhere you live by Fast Freight—Safe Delivery, Quality and Satisfaction Guaranteed or Money Back.**

### 5,000 Bargain Catalog FREE

Our Grand 5,000 Building Materials Catalog has been the marvel of the building world year after year for years. 10,000 shrewd Carpenters and Contractors get it every year. Latests, biggest yet, "value-judging" and "quality-price-making" 1914-1915 Edition **just out.** YOUR COPY waiting only for your name and address. Writing for it does not obligate you in any way. Invaluable as a price record, idea suggester and economical building and remodeling authority in every home. GET YOURS. WRITE TODAY. Postal gets it by return mail quickly—**FREE.**

### Doors as Low as 77 Cents

**All Styles and Sizes**
**Quality Guaranteed**



Hundreds of special designs—glazed and unglazed Oak, White and Yellow Pine, Cypress, Fir, Oak Veneer, solid Yellow Pine and Front Doors.

### Shingles

Extra "Star A Star" 6 to 2 in., Washington Red Cedar Shingles, Price per thousand $3.10. Special prices on Bevel Siding or Clap Boards, Red Cedar Siding, White Pine Siding, etc.

### Windows and Glass

Check Rail windows, 74c. up. Plain rail, glazed, 66c. up. Transoms, 40c each. 8x10 window glass, 3½c per light Any size, large or small, at equally low prices. Safe Delivery Guaranteed. See Grand Catalog. Dealers charge from five to ten times our prices on glass.

### Builder's Hardware

Everything in Builder's Hardware direct to you at wholesale—hinges, locks doorsets, window sets, etc.

### Storm Sash and Doors

Anticipate for winter NOW. All sizes. All styles for every window or door, house or any building. Also builder's hardware, hinges, knobs, locks, catches, buttons, etc. Serviceable Storm Doors and Windows of "A" Quality and Painted.

**All White Pine STORM SASH as low as 72c. STORM DOORS as low as $1.43.**

### See Big Catalog Bargains

## GORDON-VAN TINE COMPANY, 716 FEDERAL ST., DAVENPORT, IOWA

**Business Originally Established 1863—49 Years**

**Experience in Service and Square Dealing : : : : Everything always sold at wholesale prices direct to you**

the points to bear in mind are to avoid unloading the flooring in damp weather; not to store it in open sheds or in newly plastered buildings; nor to lay it until the building is thoroughly dried out. When an under-floor is used, as is advisable with the thinner sizes, the flooring should be laid diagonally across the sub-floor, and the latter should be dressed to even thickness. The best practice indicates the use of steel cut nails for hardwood flooring. The nails are manufactured especially for this purpose and should be driven at an angle of 45 degrees.

Wherever a particularly rich effect is desired to harmonize with finish and furnishing, nothing is superior to a selected Red Birch floor. It is as strong as maple, sufficiently hard to stand service, and of unusual beauty of figure and color. Such a floor finished natural is not out of place in the most palatial structure.

Birch flooring is manufactured and graded under the rules of the Maple Flooring Manufacturers Association, and it is a high class standard product in respect to widths, thickness, and quality. .

The demand for conveniences and economy of space has resulted in a wide variety of built-in work all the way from kitchen to bed room. Built-in book cases, china closets, side-boards and ward-robes are considered among the necessities of the modern residence. For them no wood is superior to Birch. In addition to its desirable qualities of figure and color, Birch looks well and fulfills every requirement of a high-grade cabinet wood. We have all seen beautiful examples of built-in work that harmonize perfectly with finish and furniture which are also the ultimate of convenience and utility. Large quantities of Birch have for many years gone into furniture factories to emerge as Mahogany. The only fault we have to find with this is that Birch has not received the popular approval it would if the furniture had been generally known to be Birch. Perhaps we are getting to the time when we consider it more important to purchase useful democratic material under whatever name it comes than to have an imitation of an aristocrat. At least I hope so, for Birch has the qualities required of the best furniture woods. More Birch is used for parlor furniture frames than is any other wood. Every argument in favor of Birch for interior finish applies equally well to Birch for furniture and there is the added one of harmony between finish and furnishing.

### Stains

At the risk of being somewhat tedious, I want to go into the subject of stains in some detail. I have seen so many cases in which good wood has been spoiled by poor stains that I feel this is justified. When we have gone to the expense of getting the best wood there is for our interior finish, we should take care to see that it is properly and appropriately stained.

Reliable stains of nearly any shade desired may be purchased in shape for applying. Samples and color schemes are freely supplied by the manufacturers. Care should be exercised, however, to make sure that the stains selected are of tested quality. Care should also be exercised to have the wood thoroughly seasoned, surfaced and cleaned before applying the stain. Since Birch is a close-grained wood, a paste filler is not necessary. Birch is just the right density and texture to form a superior base for white enamel, and it is largely used for this purpose.

Stains are designated as spirit, oil, or water stains, according as the medium in which the color is held in solution is alcohol, oil, or acid. Spirit stains are not recommended for Birch since the alcohol evaporates so rapidly that it is difficult to apply uniformly. Oil stains give splendid effects, but not as clear and transparent colors as are produced with water stains. Water or acid stains are evenly and quickly applied and permit any method of finishing over them. The

# UNIVERNISH

## The Universal Varnish

*A Personal Statement*

For a full generation, we devoted our energies to the development of Specialty Varnishes.

We have dozens of them which are practically ideal—each perfectly adapted to *one* purpose.

Several years ago, we began experimenting toward the production of *ONE VARNISH FOR ALL PURPOSES.*

We soon made it universally adaptable.

Then we perfected its various qualities.

**UNIVERNISH**

*A Trade Name for*

**Universal Varnish**

*Pale-Hard-Durable*

*Waterproof*

*for Use Outdoors or In*

*Prepared only by*

**Murphy Varnish Company**

*Newark U.S.A. Chicago*

We made it *proof* against turning white, either by wetting or scratching.

We made it *proof* against hot water and steam and hot dishes and salt water.

We made it *proof* against alkali soap, and against alcohol and ammonia.

*Then,* we gave it the easy-working quality and we gave it the weather-resisting power, and we gave it the property by which it would not clog brushes nor thicken in the can.

It avoids the bother and waste incident to the use of two or three varnishes on the same job.

It is an especial boon to house painters and boat finishers and furniture manufacturers.

## Quality Is Economy

objection that water stains sometimes raise the grain of the wood is averted by sponging the wood with clear water and sanding it smooth before applying the stain.

Varnish magnifies the natural appearance of the wood, hence defects as well as natural beauty are also magnified. This makes it especially important to have the surface smooth and free from defect, dirt, and dust before the varnish is put on. Varnish works best at a temperature of about 70 degrees and in a dry atmosphere.

Rubbed, or rubbed and polished finishes give the best results with Birch. I recently saw an excellent silver gray produced on Birch by one coat of acid stain followed by sand papering, finished with one coat each of white shellac and wax and then rubbed. There are also some flat finishes that are satisfactory for certain purposes. The user of Birch should always remember, however, that he is handling a high-class, hard wood whose peculiar richness of tone and figure is worthy of his most painstaking efforts.

### Where to Use Birch

Having thus outlined the qualities of Birch, the next question is, where shall we use it? My natural inclination is to reply, everywhere in the interior of your building. It is of proven worth for such hard service as store counters, show cases, and fixtures, while its merits make it just as appropriate for the trim of the finest of residences, apartments, offices and hotels. Moreover, the reasonable cost of Birch places it easily within the reach of the builder of the modest cottage or bungalow. The colonial hall and stairway in white enamel, the living room in silver gray, the dining room in one of the many shades of brown, the bed-room in white enamel or natural, the den to suit the owner's particular fancy—all offer suitable opportunities for the use of Birch. Among the stains which I like best on Birch are silver gray, walnut, fumed oak, natural and mission brown. These are colors which harmonize well with general schemes of decoration, and are not likely to get on anybody's nerves. However, I have no quarrel with the user of Birch who prefers an entirely different selection. The wood will take and hold permanently any stain of the right kind that is properly applied. So good an authority as Keith says that: "Birch is the ideal high light for a scheme of coloring in browns with notes of blue and orange" also that silver gray is beautiful in a room with walls of dull old hue and a ceiling of silver gray on which are frescoed pink old roses—but not being a professional decorator I shall have to go carefully here.

One of the best features of Birch is that it combines so well with other woods. I have seen excellent combinations of maple or oak floors with Birch trim, and of Birch veneered doors with a trim of other woods or white enamel. Your own observation will furnish a multitude of instances of this sort.

(Delivered before the National Association of Building Owners and Managers, Duluth, Minn., July 14, 1914.)

✣

## New Edition "The Door Beautiful"

The Morgan Company, Oshkosh, Wis., have just issued the seventh revised edition of their beautiful book of Morgan doors entitled, "The Door Beautiful." This edition is more attractive and will prove more useful than any of the former editions, attractive and valuable as they invariably were. A feature of special note in this new book is a large double page insert, in colors, showing exactly twenty-four of the Morgan styles of finish. An explanatory key tells what the wood and finish are in each case; also the specification used by the company in producing the finish. The woods used in Morgan doors are plain, rotary cut, and quarter-sawed oak; birch; ash; and mahogany. The grain and coloring of these

# "Take My Advice And Install An Underfeed" Says The Architect Who Knows

FOR fourteen years and in 25,000 buildings, Williamson Underfeed furnaces and boilers have been saving one-half to two-thirds of the usual coal bills, besides delivering ***more*** even, sanitary heat than any other heating system in existence. The United States Government ***specifies*** Williamson Underfeed furnaces wherever possible. It ***knows*** that such statements as, "Coal bill $16.22 for 7 rooms;" "$5.40 to heat 4 rooms;" "Reduced coal bills from $109 to $53;" "Underfeed reduces coal bill 60 per cent;" "A great fuel saver;" "Have cut coal bill $70 each winter for 9 years;" "Saved $122 a season;" "I have divided my coal bill by five;" "Even temperature with no smoke or dirt;" ***are absolutely true.***

## Get Our Latest Improvements

by installing a Williamson ***New-Feed*** Underfeed for either warm air, steam or hot water heating. The Williamson ***New-Feed*** Underfeed now requires ***less*** coal, less attention and less effort than ever. The attention of a 12-year-old boy ***once*** every 24 hours for firing and ***once*** every week for removal of ashes is all that is required.

**WILLIAMSON NEW-FEED UNDERFEED Furnaces and Boilers**

**Cut Coal Bills ½ to ⅔**

**Cut-Out View of Underfeed Furnace**

An Underfeed in the basement means ***clean, even, economical*** heat in the home.

With the Underfeed, coal is fed from ***below.*** All the fire is on top. Smoke and gases, are burned up, making more heat with ***on*** smoke, soot, clinkers, smell and dirt, and but few ashes. No other furnace or boiler does this. Soon pays for itself in any home, store, church, hall and other buildings. Adds to renting and selling value of building. If you are contemplating building a home see that an Underfeed is installed. When an Underfeed goes in real heating comfort stays in.

## A Startling Saving Guarantee

With every Williamson ***New-Feed*** Underfeed furnace or boiler, when properly installed and operated, we guarantee a saving of at least 50% in your coal bills. No other manufacturer dares to make such a guarantee. We have saved millions of dollars in coal bills for others. Why not save your share? The coupon to the right brings our great book. "From Overfed to Underfeed". This book is for every individual who wants to reduce his coal bills. Do you? Address

**The Williamson Heater Company**

**(Formerly The Peck-Williamson Company)**

**293 Fifth Street CINCINNATI, OHIO**

## For The Full Facts, Mail This

**THE WILLIAMSON HEATER COMPANY**
**293 Fifth Avenue, Cincinnati Ohio.** (29)

I would like to know *how* to cut my coal bills from ½ to ⅔ with a Williamson *New-Feed* Underfeed.

Warm Air.....Steam or Hot Water.....
(Mark an X after system interested in)

*Name*.....

*Address*.....

*My dealer's Name is*.....

*My Business is*.....

woods are exactly reproduced in these color plates. In all, it is a feature that adds immensely to the sales strength of the book.

As in former editions of "The Door Beautiful," all of the doors are illustrated just as they appear in the modern home. The architectural details have been carefully considered in every case, and we hazard a guess that builders, architects, and home owners will find quite as many worth while suggestions in these full page illustrations aside from the doors, as they do in the doors themselves. The character of the illustrations serves to show the importance of harmony between the doors and the balance of the woodwork in a modern home.

Copies of this book will be sent free of charge to any of our readers who will write the Morgan Company, Oshkosh, Wis., requesting same.

✣

## Self-Setting Planes

In offering their self-setting plane the Gage Tool Company, Vineland, N. J., bring out the fact that considerable time is wasted in setting planes that could easily be saved. They say that the self-setting plane saves this time and also the temper of the workmen trying to set their planes right. The Gage plane has an adjustable iron throat extending through the stock. The cutting iron moves up and down without moving the cap. They say that the cutting iron and cap can be removed and reset in five seconds. The plane is equipped with two screws to change the thickness of shavings, one for a heavy cut and one for a light.

The Gage Tool Company are so confident of the special merits of their plane that they are offering it on a 30 days' trial plan, guaranteeing that the plane can be returned after 30 days' trial and purchase price refunded if it is not in every way satisfactory.

## All Steel Pry Chisel

One of the most recent additions to the Diamond Edge line of tools by the Shapleigh Hardware Co. of Saint Louis is, their all steel prying chisel made in widths from ½ to 1½ inches, and lengths from 9½ to 11½ inches.

The round knurled handle gives a positive grip so necessary in a tool of this kind.

Forged from the highest grade crucible tool steel, oil tempered, highly polished blade especially adapted for prying or ripping.

"Diamond Edge" Steel Pry Chisel.

Carpenters and plumbers will find the Diamond Edge a very good and useful tool.

The quality of this tool is as high as the best obtainable. This item will be found quick selling and profitable.

✣

## Stopping the Water Waste

"It is astonishing," said an engineer who had been investigating water consumption statistics, "that there is such a remarkable difference between the gallons per capita used in various cities. What do you think the maximum and minimum gallons per head per day are?"

The man questioned admitted that his ideas were rather vague.

"The maximum," continued the engineer, "is 398 gallons, the average 121, the minimum 26. This illustrates the tremendous wastage, especially in locations where meters are not used. It has been found that by far the greatest per cent of loss is due to leaky faucets."

In this connection, it is interesting to note the appearance on the market of a new washerless faucet which puts an end to leakage. This device is fitted with a conical valve bearing directly on a spherical seat. This gives a line of contact which makes a tight joint, so it is not necessary to jam the handle in an endeavor to stop leakage. This new faucet should be of decided interest to owners of hotels, factories or large establishments where the water bill is a considerable item.

Householders also will find it a boon, as a leaky faucet not only means plumbers' bills, but also the disfigurement of bowls and tubs with an unsightly yellow stain.

This washerless faucet is in extensive use abroad and has been authorized by the London Water Board. The manufacturers, the H. W. Johns-Manville Company, New York, state that the American sales are mounting fast and making new records each month.

✣

## "Simonds Guide for Carpenters"

The 1914 issue of "Simonds Guide for Carpenters" is now being distributed. It is a vest pocket size booklet containing 64 pages. The first 38 pages are devoted to valuable information for carpenters. This is in condensed form and just the way carpenters like to have it.

Some of the points covered are rafter framing, stair building, safe loads for common size timbers, painters' department, first aid to the injured, etc. That part regarding the setting and filing of hand saws is especially good for the young carpenter who wants to learn this necessary part of the work.

The latter part of the booklet features a view of the most popular styles of Simonds hand saws.

Our readers will find this a valuable booklet to own. A copy will be sent free to any carpenter writing the Simond Manufacturing Co., Fitchburg, Mass. In writing, please mention this offer in the AMERICAN CARPENTER AND BUILDER.

✣

## Gypsum Industry Prosperous

**VALUE OF OUTPUT IN 1913 REPORTED BY GEOLOGICAL SURVEY AT SIX AND THREE-FOURTHS MILLION DOLLARS**

Gypsum, the rock that makes plaster of Paris, was mined in the United States in 1913 to the extent of 2,599,508 short tons, an increase of 98,751 tons over the production of 1912, according to R. W. Stone, of the United States Geological Survey. The total value of gypsum and gypsum products produced in 1913 was $6,774,822, compared with $6,563,908 in 1912, an increase of $210,914. Gypsum sold crude without calcining and used principally as an ingredient in Portland cement and paint and as land plaster amounted to 463,136 short tons, valued at $697,066, which is a good increase over the business of 1912. About 85 per cent of the gypsum sold crude in 1913 was used for Portland cement at an average value of $1.49 a ton. The quantity sold for this purpose is steadily increasing. The quantity of gypsum sold crude for land plaster has remained nearly stationary for four years, but the average price dropped in 1913 from $2.02 to $1.75 a ton.

There was an increase of 42,175 tons in the amount of calcined gypsum sold in 1913, yet the average price per ton was $3.43—the same as in 1912. A total of 1,680,157 short tons was calcined for wall plaster, Keenes cement, plaster of Paris, etc. About 1,250,000 tons of this amount was used for mixed wall plaster, the so-called cement plaster and hard wall plasters of the building trade.

It is interesting to note that only 10 years ago (in 1903) did the output of the gypsum industry first pass the million-ton mark. The present production of over 2,500,000 tons, as shown by the figures, goes very largely into the manufacture of Portland cement and of hard wall plasters.


# Fall in line—NOW

## for doubled profits on Fall building

***Since August a year ago, hundreds of wide awake contractors have joined the doubled profits company, by buying lumber of Hewitt-Lea-Funck***

## Start now—write for price list—
## Send the lists you now are figuring—
## Don't lose out on the big money any longer

Begin making a doubled profit on the jobs you are working on ***now.*** Send us a copy of your lists of materials and ***find out*** just what we can do for you in the way of price. You'll be surprised when you get our freight-paid quotation. It will open your eyes to the profit you've been *missing*. You'll be surprised again when you *see* the lumber that we ship.

Our yellow fir is beautiful in grain, straight and clear. Our red cedar is the kind that has made the Puget Sound Region famous for lumber. Our lumber comes from forests and mills which we control and our officers own. We absolutely guarantee grades, and count—also *guarantee satisfaction* or your money refunded.

### *Special plan service*

Our architects are always at your service for the working out of special plans following your own ideas. These plans, together with our *guaranteed estimates*, have resulted in the greatest satisfaction for contractors using our service, and enabled them to add many dollars to their profits.

### *Quick delivery service*

Our delivery service is immensely satisfactory to contractors. Seven railroads compete for our business. They know they've got to give us service to get the business. Shipments leave our mill within 24 to 48 hours after order is received—reach points as far as Mississippi River in two weeks. You always figure ahead lots farther than that.

## *Do something NOW* toward DOUBLING YOUR PROFITS.
## Make a doubled profit on your next job. Send us the list today for hurry-up quotation. Freight-paid to you
## Fill out the coupon, too.

### *Many practical plan ideas in our Prize Plan Book*

In the planning of your fall jobs you'll get great help from our Prize Plan Book. Over 100 plans—worked out by our own architects—and pronounced by many leading contractors the most practical book of plans ever published. It is worth a thousand dimes to you but costs you only one dime.

**HEWITT-LEA-FUNCK COMPANY**
**408 Crary Building**
**Seattle, Wash.**

### Still time for good big Silo Orders

Many silos are erected during August and September. Get the orders for the ones to be erected in your neighborhood
Write quick, for our proposition.

**Hewitt-Lea-Funck Company**
**408 Crary Bldg., Seattle, Wash.**
***(Write your name plainly, please)***

Please send the following:
( ) Delivered, freight-paid price on enclosed list of lumber, millwork and other materials (no charge for quotation).
( ) Lumber Price List and Millwork Catalog (free).
( ) Prize Plan Book (ten cents enclosed).
( ) Barn Builder's Guide (four cents enclosed).
( ) Silo Folder (free) and special Silo Proposition.

Name _____

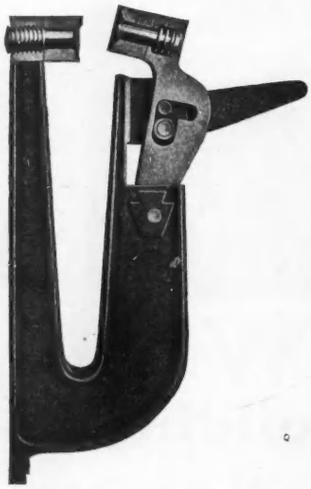
Street No. or R. F. D. _____

Post Office _____

State _____ Business _____

## Keystone Folding Saw Clamp

A very handy folding saw clamp is the Keystone, made and sold by the Keystone Grinder & Mfg. Co., 106 Wood Street, Pittsburgh, Pa. The accompanying illustration shows a cross section view through the operating mechanism. Eccentric lever automatically centers the jaws exactly opposite each other with one closing motion, giving the tightest possible grip, all working quickly and with slight effort. The jaws are provided with screws that take up lost motion as the faces wear away.



Section Through Saw Clamp.

This Keystone clamp takes up little space in the tool box; it can be fastened instantly to a work bench, tool box, window sill, or to the edge of a board, plank, pile of lumber, fence rail, or any other suitable place without the use of nails or screws. The clamp weighs three pounds. It is made of malleable iron and is warranted not to break. The Keystone Grinder and Mfg. Co. have such confidence in this saw clamp that they guarantee it absolutely. The clamp costs very little and the manufacturers say "money back if not satisfactory." Write them for full particulars.

✣

Easter manufacturers are looking to the Northwest for hardwoods for the manufacture of clothes-pins.

## Bishopric System Book

A nicely illustrated thirty-two page booklet containing a good deal of valuable information is being distributed by the Mastic Wall Board & Roofing Co., 530 Este Ave., Cincinnati, Ohio. It is entitled "Durable Homes by the Bishopric System." It tells all about Bishopric stucco or plaster board and shows how it is being used for both interior and exterior plastering. The use of this material has increased enormously in recent years and all builders should be thoroughly familiar with it.

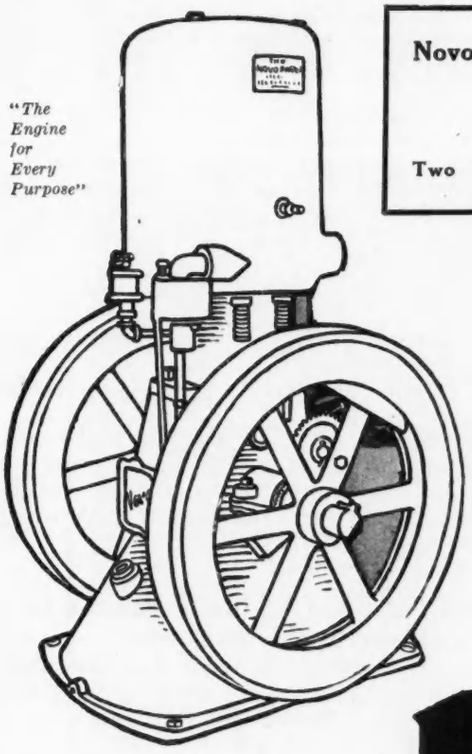
The company will gladly send a copy of this book, together with a sample of Bishopric stucco board, to each one of our readers who will write them.

✣

## Annual Meeting Cement Products Exhibition Co.

The stockholders of the Cement Products Exhibition Co., held their annual meeting at the office of the company, 208 South La Salle St., Chicago, Tuesday, June 9.

The annual report of the directors showed the company to be in prosperous condition. The operations for the year, including the management of the Seventh Annual Cement Show and the National Conference on Concrete Road Building, resulted in a net loss of $2,469.39. The total expenses of the Cement Show and the Conference aggregated $26,987.79. The total income was $24,518.40. The cost of the National Conference on Concrete Road Building, which was initiated by the Cement Products Exhibition Co., was $3,054.69—the principal items of expense being printing and postage. The loss incurred during the year, however, was more than offset by the surpluses which have accumulated. The directors of the Cement Products Exhibition Co. are committed to



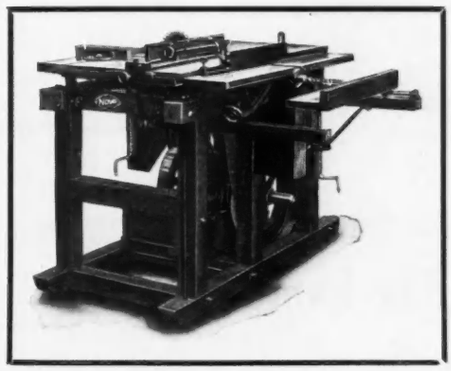
*"The Engine for Every Purpose"*

**Novo Portable Saw Rigs can now be furnished in two sizes—**

***Novo No. 3 Saw Rig* (*3 H. P.*)**

***Novo No. 4 Saw Rig* (*4 H. P., Illustrated*)**

**Two perfect answers for a Convenient, Economical, Reliable Saw Rig**



NO TANK
NO FAN
NO FREEZING
TROUBLE

# NOVO

Reg. U. S. Pat. Off.

## ENGINES and OUTFITS

# The Power an Engine Delivers

Rated horse-power means nothing.

Power delivered under favorable conditions and in factory tests is misleading.

This is the question—

What will the engine do when you get it on **any** job? What power can it deliver?

That's the power that does the work—it's the **only** power you can **use.** How near does rated horse-power come to **usable** horse-power?

Novo power is usable power—power you can count on under whatever conditions the Novo Engine must run.

It is just that quality of reliability, proven under the most adverse conditions, that has won the endorsement of the contracting public.

The reason—

**Simplicity in construction** cutting out the many small parts which are always getting out of order.

**Big factor of safety** on each part—born of experience—that makes the Novo proof against the **unusual** strains that it may meet at any time.

Care in machining and fitting of "hidden parts," and in the selection and testing of material that enters into them.

The Novo does not require skilled help for its operation. Its vertical form and reduced weight make it easily portable. It is four-cycle, hopper-cooled and free from outside tanks and circulating pipes. Its cooling system can freeze solid without damage to any part.

Novo Engines can be furnished for operating on gasoline, kerosene, alcohol or distillate.

Novo Engines are made in thirteen sizes—1 to 15 H. P.

***Let us send you "RELIABLE POWER," the Novo book—valued by every man who wants cheaper and better power. Free if requested on your business letterhead.***

**NOVO ENGINE COMPANY,** CLARENCE E. BEMENT, Sec'y and Mgr. **440 Willow St. Lansing, Mich.**

the policy of paying no dividends, consequently such surpluses as occasionally remain are devoted to the promotion of future exhibitions. The following directors were unanimously elected:

Edward M. Hagar, President, Universal Portland Cement Co.

Norman D. Fraser, President, Chicago Portland Cement Co.

D. McCool, President, Newaygo Portland Cement Co.

A. Y. Gowen, Vice-President, Lehigh Portland Cement Co.

George S. Bartlett, Vice-President, Edison Portland Cement Co.

B. F. Affleck, General Sales Agent, Universal Portland Cement Co.

W. E. Cobean, Sales Manager, Wolverine Portland Cement Co.

J. U. C. McDaniel, Sales Manager, Chicago Portland Cement Co.

J. P. Beck, Manager Publicity Bureau, Universal Portland Cement Co.

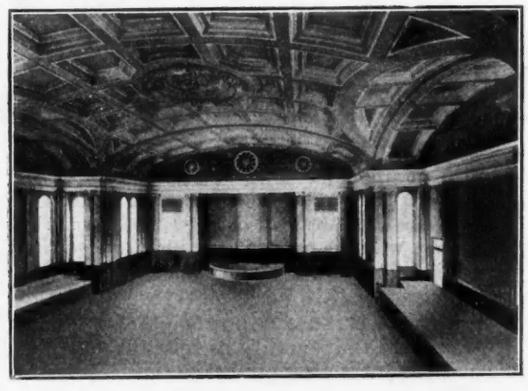
It was announced that the Chicago Coliseum has been leased for the Eighth Annual Cement Show, to be held February 10-17, 1915.

✣

## Prevention of Poor Acoustics Better Than Acoustical Correction

Members of the architectural profession are manifesting considerable interest in the recently completed First Church of Christ, Scientist, Los Angeles, Cal. Their acknowledgment of the exceptional acoustical qualities of this church is a demonstration of the fact that it is better to prevent bad acoustics at the outset than to have recourse to corrective methods afterwards.

The acoustical work in this church was handled throughout by the H. W. Johns-Manville Company. This concern cooperated with the architect from the time the preliminary sketches were made until the building was completed. As the



**First Church of Christ, Scientist, Los Angeles Cal. Elmer Grey, Architect. Made acoustically correct by the J-M Acoustical Method.**

result of this precaution, the church is said to be entirely free from excessive reverberation, as well as from the other acoustical defects which cause so much annoyance in most churches, theaters and other auditoriums.

The methods employed by this company are based on the scientific application of natural laws. No stringing of wires or other obsolete methods are used, but proper principles of design and construction are employed. It is noteworthy that they have solved successfully some of the largest and most difficult acoustical problems on record.

The home office of the H. W. Johns-Manville Company, New York City, will be glad to send to anyone interested, a list of buildings treated by the J-M Acoustical Method.

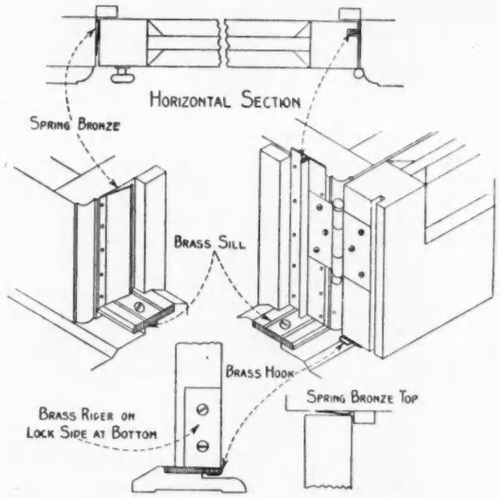
## Prominent Slate Man Dies

Mr. Jas. L. Foote, manager of Slatington Bangor Slate Syndicate, Slatington, Pa., died July 23rd. He was one of the best informed men on slate in the United States and one of the best known. He was engaged in the business for over twenty-five years, practically all his business life, and his death is regarded as a distinct loss to the industry.

✣

## A Weather Strip for Doors

The necessity often arises for placing weather strips on doors in order to prevent the entrance of cold air, dust, etc., through the spaces caused by the wearing away of the threshold in the center, also around the frame of the door due to shrinkage. A weather strip to satisfactorily serve the purpose must be inexpensive, durable and easily installed. Further, it must not have any moving parts which are likely to soon wear out with use. A strip which embodies features that practical experience has demonstrated meets the requirements of the case is the "Pullman," made by the Pullman Weather Strip Co., 22 York St., York, Pa. The details presented show how the strip is installed around a door in order to exclude the elements as well as dust and noise. A heavy brass sill is attached to the threshold and a brass hook which is fastened to the bottom of the door interlocks with the sill when the door is closed, thus making it weatherproof. On the lock, hinge and top sides there is a special spring bronze which is attached to the casing and spring against the door when closed, thus preventing the entrance of rain or dust at these points. A regular beaded strip is sometimes used on the back of the door, but this necessitates cutting a groove in the edge of the door as shown in one of the details. The spring bronze used on the lock side must be cut out to permit the lock to work properly, therefore a special strip, known as a "lock strip," is installed which prevents the entrance of air around the keeper of the lock. This strip is sold direct to builders and carpenters with full instructions as to the method of installation and any mechanic capable of using ordinary tools can install a door complete in abount two hours. The weather strip equipment consists of a brass sill, drilled and countersunk for screws; a brass hook for the bottom of the door; spring bronze; brass rider; bronze lock strip; brass screws and coppered nails. The company in question also makes a full line of weather strips for double-hung windows, casement windows and transoms.




**Details of Pullman Weather Strips.**

## A Valuable Saw Book

Henry Disston and Sons have just issued a hand book of eighty-six pages that every user of saws should have. It contains a treatise on the construction of saws, illustrating and describing exactly how they are made in the Disston plant. It also tells how to keep saws in order. The point is made that saws must be specially toothed and filed for different kinds of work; and all of the different styles and sizes of toothing are clearly illustrated. For the younger man this Disston Hand Book will prove a gold mine of valuable information; and it is safe to predict that even the most wise and experienced of the old-timers will find something new to them in this book.

In addition to saws of various kinds some other well known Disston tools are discussed, including try square and bevel, trowels, files, rasps, etc. Address Henry Disston and Sons, Inc., Philadelphia, Penna., for free copy of this new Hand Book.

✣

## Low Cost Concrete Walls

A very interesting booklet entitled "Concerning Costs" has been prepared by the Van Guilder Hollow Wall Co., 720 Chamber of Commerce Building, Rochester, N. Y. It takes up in detail the labor and material costs on a typical two-story residence, 25 by 27 feet, 26 feet high from cellar floor to eaves. It shows that with Van Guilder Hollow Wall system—the double cellar walls being six inches thick outside and four inches thick inside and superstructure of four inch walls—the total cost is $356.60. This is the cost of the outside walls complete from footing to plate.

Interesting figures are also given in this little book for estimating cost of hollow concrete cellar walls for a frame house. Also for cost of double wall silos.

Copies of the booklet will be mailed to those writing the Van Guilder Hollow Wall Company.

✣

## Heavy Reinforced Asphalt Shingles

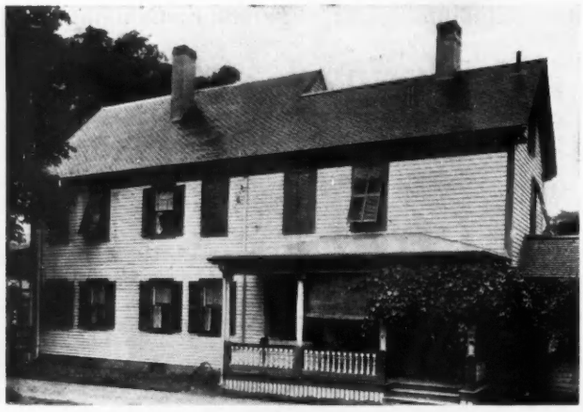
Neponset roofing is now on the market in shingle form. These Neponset shingles are having a great sale and their use is certain to spread, as they are quality-built, like all of the Neponset products.

**Neponset Shingles Come in Pairs; the Shingle Butts are Triple Thickness.**

These shingles are not simply shingle sizes cut from rolls of prepared roofing; the Neponset shingle is built up and strongly reinforced. The butt end consists of three layers of Neponset roofing laid so that the grain or weave of the inside layer runs at right angles to that of the other two. This heavy butt end with rounded edge presents a weathering surface that will not warp or curl up at the edges. When laid there are not less than seven layers of roofing over every part of the roof.

In appearance the Neponset shingles are unusually attractive. Their original color is a rich gray, which weathers to a darker shade, resembling weathered red wood.

Neponset shingles are shipped in bundles and are laid like ordinary wooden shingles. Any carpenter, roofer, or handy man can lay them. They come in double widths, two shingles together like Siamese twins, each shingle being 8 by 12¾ inches in size; the double shingle measuring 16 by 12¾ inches. Two hundred and twenty-six double shingles weighing 176



A Residence at Canton, Mass., roofed with Neponset Shingles.

lbs. are required to cover one hundred square feet of roof. This is with shingles laid 4 inches to the weather as recommended by the manufacturers.

These shingles are said to cost approximately $5.00 per hundred square feet, less than slate, asbestos or tile. It is claimed that the reinforced butt prevents the annoyance of flapping in the wind, the danger of catching fire from flying sparks along raw edges and the fraying out of exposed edges and curling up at the corners.

The Neponset shingles are manufactured by Bird & Son, East Walpole, Mass. They will gladly send descriptive matter and a sample to any one of our readers who will write them. The high quality of Neponset products is well known among carpenters and builders; and this improved Neponset shingle should receive the attention it deserves.

## Unique Invitation

Quite a novelty reached us a short time ago—a shingle post card; a white pine slab, bearing the printed announcement on one side that the Ives-Hartley Lumber Company of Baldwin City, Kansas, invite all their friends to the opening of their new lumber yard, Saturday, June 27, 1914, from 2:30 to 10 p. m., and on the other side was the customary one cent stamp and the address. We don't know what Uncle Sam thinks of wooden postcards ⅛ of an inch thick, but it struck us as O. K.

✣

## A Saw with a Record if Not Much Shape

After twelve years' sawing and filing, sawing and re-filing, the one-time hand-saw shown below has assumed the shape of a compass-saw, with a nose like an ant-eater and teeth like a squirrel.

The story of this old Keen Kutter saw is best told in a letter received by the Simmons Hardware Co., of St. Louis, Mo., from E. T. Lindsay & Co., hardware dealers of Senatobia, Miss.

The letter reads, in part, as follows:

"The man who used the saw, Nelson Smith, requested us to say that he used it continuously for 12 years, and that it is the best saw he ever worked with in his 30 years' experience as a carpenter.

"Yours very truly,
E. T. Lindsay & Co."

Keen Kutter Hand-Saw after Twelve Years' Active Use.

## "Vandor" Hammers Now in Four Sizes

We have been advised by the Van Doren Manufacturing Company, Chicago Heights, Ill., that they are now making their "Vandor" Vanadium Hammers in four sizes as follows: 16 oz. standard size, 13 oz. general purpose, 10 oz. finishing size, and 16 oz. ripping style. All of these hammers are warranted absolutely against defective material or workmanship.

✣

## New Sasgen Derrick

A portable one-ton stiff legged derrick has just been placed on the market by the Sasgen Derrick Co., 2053-57 No. Racine Ave., Chicago, Ill. The construction of this derrick is well shown in the accompanying illustration. The derrick is equipped with all steel fittings, including the double drum geared winch, making it strong and light and easy to put up or take apart. It is arranged so that it can be used by man, horse or power.

**New Model Sasgen Derrick.**

The legs and sills can be swung in or out to rest at any angle desired. It is claimed that with one setting of this derrick using an 18-foot boom every stone on a 30-foot one-story front can be placed.

Two extra fittings are provided so that the boom can be used separate as a tower boom when desired.

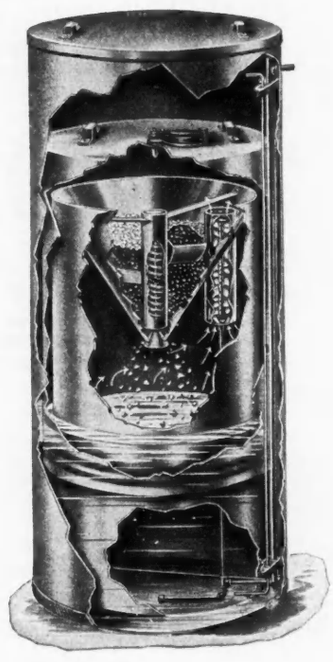
The Sasgen Derrick Company have been putting out a great many popular and practical derricks of different types and it is expected that this new portable, one-ton, stiff-legged derrick will find many users.

✣

## Carpenters Wanted

The Gem City Acetylene Company, Dayton, Ohio, inform us that they would like to get in touch with a number of ambitious carpenters to take orders for their acetylene lighting systems. They say that their convincing sales literature and follow-up system really make the sales. What they want is a reliable builder in every community to look after the business locally for them. They say that no money is needed and previous experience is not necessary.

These people make the "Faultless Pit Generator," a well-known acetylene lighting system. All those interested should write at once, addressing Dept. B, Gem City Acetylene Generator Co., Dayton, Ohio.



**"Faultless Pit Generator".**

## New 1914 Model "Standard" Double-Acting Checking Floor Hinge

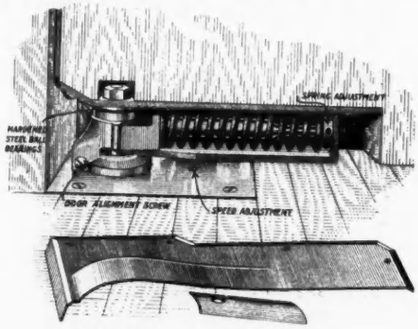
An improved model of the popular "Standard" floor hinge has just been announced. It embodies a number of notable features that make it even more desirable than former models put out by the Standard Manufacturing Co. that have already met with such a demand. The business of the Standard Manufacturing Co. has, in fact, grown to such proportions that they have been obliged to purchase a new site and erect a new factory devoted exclusively to the manufacture of "Standard" double-acting checking floor hinges. As this new factory is equipped with the most up-to-date economical machinery, they are able to give their customers the double advantage of low price and high quality.

The new 1914 model hinge is a ball-bearing hinge. The entire weight of the door rests on hardened steel ball-bearings operating in a steel ball cup and cone placed in the top of the hinge and so far away from slop and grit. In the old hinge the weight of the door simply rested on the iron post in the bottom of the bowl. The new bearing makes a joint that will never wear out.

The new model hinge is made considerably heavier and more strongly ribbed than the old; also the back part of the form bends at an angle of 45 degrees, so that the wood screws go into the wood diagonally, making a much stronger attachment than heretofore. The cam and plunger are of malleable iron and have large wearing surfaces. They are nearly double the size of the rollers and cast plunger which answered the purpose in the old style hinge.

In the new hinge the manufacturers have produced an appliance that is very much easier for the carpenter to install. Only a small hole has to be cut for the simple rectangular oil chamber.

The checking mechanism has also been perfected. When the Standard Manufacturing Co. first put out a double-acting hinge with checking attachment it was hailed as the greatest improvement ever offered. The closing spring and checking mechanism automatically close the door without a slam, bringing it to a stand-still at the center line without passing through and flopping back and forth. An unchecked, double-acting door is dangerous and a menace to the household. The door check feature means absolute safety. No matter how hard or fast the door is opened it comes back slowly and quietly and stops without flapping back and forth. And now this checking mechanism also has been improved.




**1914 Model "Standard" Hinge.**

Architects, contractors and builders are recommending and using these hinges enthusiastically. The Covell Construction Co., Architects and General Contractors, Ionia, Mich., after placing a trial order for six of them, write that this new hinge fills a long felt need, and that they will use it and specify it in all their work. Our readers will all do well to write at once to the Standard Manufacturing Co., Shelby, Ohio, and ask for complete description.

## Make Money Building Silos

**SET OF WORKING PLANS FREE**

"Are the carpenters and builders who read your paper going to be interested in a type of silo which they can erect out of material which they can buy in their local lumberman's yard? In other words, a type of Home-Made silo built of flat batts and 4-inch flooring?"

We were asked this question the other day by a prominent Iowa lumberman who is a keen student of the silo situation and also a great booster for the country carpenters and builders. We replied that it certainly seems reasonable that the carpenters and builders will take a personal interest in a farm silo that requires their services to erect.

"The policy of most of the stave silo concerns has been to cut out the carpenter and we believe he has resented it," we said. "The stave silo people have told the farmer that he and his hired man can easily put in the foundation and erect the stave silo, and the result has been that many silos have not been properly put together and have fallen down. While the farmer is naturally an all around handy man, silo building is really builders' work and the farmer should call in outside skilled assistance."

"Well then, this Home-Made silo is just the ticket for builders, and they can work up some nice business with it. For a great many years this type of silos has been built back in New York state. Some of the New Yorkers moved out to Kansas and then they began building these silos in Kansas. We first learned of them in Kansas. The silo is not patented and can be erected by any one, and when completed it makes a better silo than any of the stave silos; it gives the farmer more advantages, and costs the farmer from $100 to $150 less than any other good silo would cost him. The farmer can buy the material for a Home-Made silo and hire regular builders to put it up all at a lower cost than a stave silo which he would try to erect himself.

"My people, the Deal-Rice Lumber Co., Des Moines, Iowa, are advocating the Home-Made silo for the reason that it is the best silo for the farmer, for the lumber dealer and for the carpenters and builders, and also because it makes use of our 'Drico' Expansion Silo Doors. Here you see a large set of working plans we are giving away—they show exactly how a silo should be built.

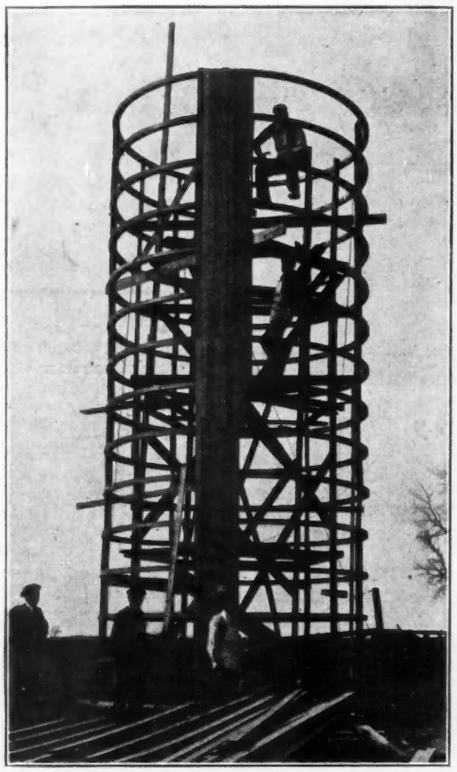
### Best Construction of Silo

"You will notice that the hoops are made of flat batts curved around a form to get the proper circle and eleven of these flat batts are nailed together to make a strong, durable hoop. These hoops are then set, around a scaffolding, two feet apart on centers and four inch flooring is nailed inside and outside of the hoops.

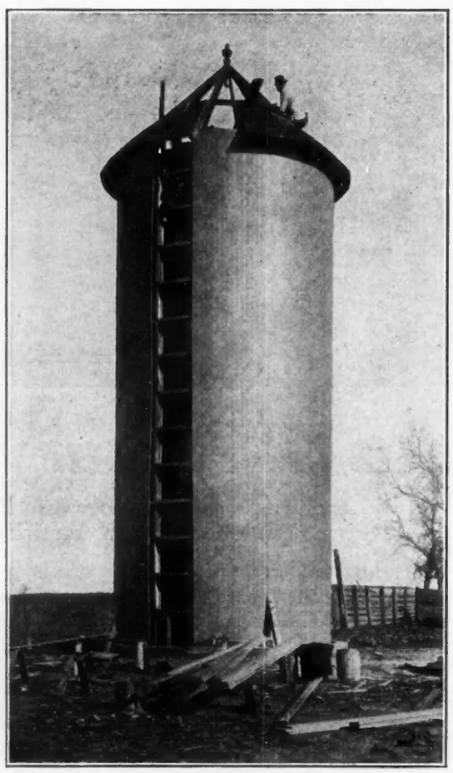
"The wooden lining gives the fermentation benefits claimed by the stave people. The hollow-wall with its dead-air space gives the freezing protection claimed by the hollow-tile people and when the outside sheeting is omitted and metal lath is used and covered with cement the farmer secures the fire protection claimed by the cement people.

"The silo cannot blow down as it is well anchored, it cannot drop to pieces as each board is securely nailed in place, there are no hoops to tighten and none to loosen.

"The doors which the farmer will admit are about the most important part of the silo are the 'Drico' Expansion doors, each two feet high. They have an expansion feature at the right hand side of the door termed the sealing strip. When the door is locked by pulling down the crank arm, this sealing strip is moved outward against the door jamb and makes the opening absolutely tight. When the crank arm is raised this strip is drawn in and the door can be removed with one



Hoops in Place with Scaffolding on Inside.



Home-made Silo Almost Completed.

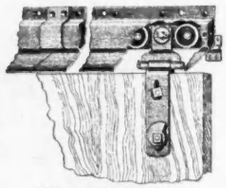
hand without binding or sticking. No swelling or shrinking of the lumber can affect the doors. The crank arms form a very convenient ladder, for climbing to the top of the silo. These doors are cheap and can be purchased from any lumber dealer.

"To your carpenter and builder readers I want to say to send the name of your lumber dealer to the Deal-Rice Lumber Company, 606 Clapp Block, Des Moines, Iowa, and they will send you a full set of plans for building a silo of any size with flooring and flat batts that you can get at any lumber yard. You do not pay anything for plans.

"This handbook gives complete plans and specifications for 66 different sizes of silos. Any man who can drive a nail can build them. Write for the plans today, and be the first man in your teritory to get the silo business. Be sure to send your lumber dealer's name."

## A New Door Trolley Track

The Wagner Mfg. Co. of Cedar Falls, Iowa, have recently placed on the market two new tracks that will meet a need that has long been felt by architects and builders.



View of Hanger.

One of these new tracks is called the Wagner Ever-Tight; the other is the Wagner Rain-Shed Track.

The illustrations show at a glance the great advantage of this improved type of track. Instead of being formed entirely of one strip of sheet steel, as the Wagner Tubular Trolley Tracks are, this new track is made of two pieces of steel securely riveted together at the top with one part overlapping the other. This forms a continuous bracket that serves to hold the track securely at every point and at the same time keeps rain from driving in between track and building. To still more completely shed rain and prevent snow and sleet from driving in under track, the Wagner Ever-Tight and Rain-Shed Tracks are made with a downward and outward curve on the outside of the hanger groove (A, Fig. 1), at the bottom, this piece being extended out over the door. This deflects the rain completely and makes the track absolutely weathertight, giving complete protection to the hanger and underside of track as well as the top of the door. This track is bird-proof, being tightly closed at both ends, and the construction is such that it is practically impossible for any dust or dirt to get into the track and impede the trolley. If any dust or trash should be blown into the track it is naturally forced out by the wheels. The shape of the track is such that dust or dirt cannot lodge in it.


Fig 1

The two parts are securely riveted together with ¼ inch rivets every 6 inches, the outside pieces overlapping the inside piece at the top with the edge of metal (B), so that it will be forced into the wood, making an absolutely tight connection. To fasten track to building, a bolt hole is provided every 12 inches for a ⅜-inch lag screw or machine bolt. The lengths of track are fastened together and the joints made weather-proof by a special bracket which conforms to the shape of the track.

Fig 2

Both tracks are furnished in 4, 6, 8 and 10 ft. lengths; ⅜ by 2½-inch lag screws for putting up the track and brackets for joining the sections are included.

The Wagner Rain-Shed Track (Fig. 2) is the same as the Ever-Tight, except that it does not have the piece of metal (A) extending out over the door.

These two new weatherproof tracks, as well as several new models of door hangers especially designed to go with them, are shown in new literature which is just off the press. A copy will be mailed free to contractors, architects or dealers. Address Wagner Mfg. Co., Dept. F, Cedar Falls, Iowa.

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## J. H. Baldwin Retires

J. H. Baldwin, Secretary and Treasurer of the Southington Hardware Company, retires from active business about August 1. Mr. Baldwin has been identified with this company for the past twenty-eight years, twenty-five years as an officer. His associates in the hardware and tool manufacturing business and his many friends in the trade will miss him sadly.

## Cut Geared Dumb Waiter

The Warner Elevator Manufacturing Company are now making a special offer on their cut geared dumb waiter, built expressly for use in hotels, restaurants and private houses. Hundreds of them have been installed in apartment houses of three, four and five stories.

The gearing operating this dumb waiter is cut from the solid blank on a milling machine making every tooth perfect, which enables it to run with very little noise and with little liability of getting out of order. The cars are made of ash with removable shelves. The counterweight is adjustable. The car is suspended by an iron wire tiller cable and the brake is automatic in operation and will hold the dumb waiter when loaded at any point while being loaded or unloaded.

These dumb waiters are set up complete and run before they are shipped from the Warner factory, and it is a very simple matter to install them, as all the gearing is trued up and put in perfect working order and shipped in this condition. Three standard sizes of this dumb waiter are carried in stock and can be shipped on a day's notice. The guides and the carriage are made of maple and any number of shelves or trays will be furnished.

The Warner Elevator Company, Cincinnati, Ohio, have been building this style of dumb waiter for the past twenty-five years; hundreds of them are in operation.

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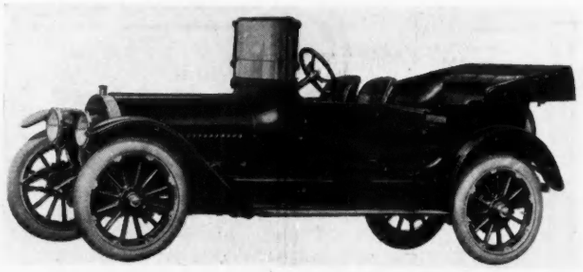
## Two-Door Auto Coming Style

The most significant announcement of the year in the automobile industry is the introduction by the Kissel Motor Car Company of a two-door body as a standard construction. This revolutionary style is offered as an optional feature of the new KisselKar 48-"Six," known as series B.



**New Kissel 5-Passenger Car Has One Wide Door on Each Side.**

For some months the Kissels have been building this body type on special order, and with such increasing success that it was decided to manufacture it in quantity.

The two-door body is very handsome, giving the car a notable distinction as well as grace and smartness. It is a perfect, unbroken stream line from the bow of the bonnet to "midships." Both driver and passengers enter the tonneau from 26 inch doors set at the rear on either side of the car.

The front seats are individual and between them is an eight inch aisle permitting free passage from the rear. Both a four and five passenger model is offered, the rear seats in the four passenger being separated by an arm.

By those who recall how completely and quickly the introduction of the four-door type supplanted the old "open front" automobile, a repetition of history is predicted. It is pointed out that while the four door served no purpose except to beautify the lines of the car, the two-door style offers improved comfort and convenience as well as a better appearance.

The new 48 "Six" is an extremely classy car and with the two-door body will unquestionably attract wide attention.

## Novo Portable Saw Rig

Every builder or contractor can save money and make money by owning a good portable saw rig or wood worker.

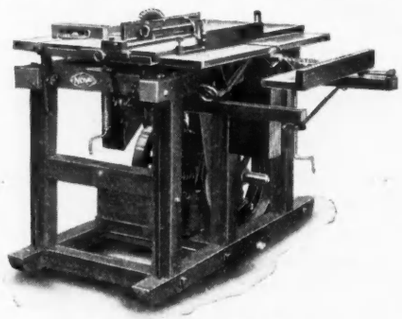
The variety of work that can be done, the accuracy with which it can be done, and the saving of time over hand work are features of the Novo saw rig that make its initial cost an economical investment. This is the portable power rig just brought out by the Novo Engine Company, 444 Willow St., Lansing, Mich.

The cost of operation is so small that it hardly need be mentioned. The Novo saw rig No. 4 will work hard all day at an expense of less than 60 cents for fuel and oil.

Novo saw rigs are adapted to any place where light or medium sawing, boring, planing, etc., is to be done. They are built to stand hard, continuous service.

The real vital part of any saw rig is its power plant. If you are not familiar with the reliable Novo engine, which furnishes the power for Novo saw rigs, it will be worth your while to write for "Reliable Power," the book which describes its various features in detail. The Novo is a well balanced engine with little vibration. It is simple in construction and as near trouble proof as any engine can be built. The special governing system with which every Novo engine is equipped is claimed to bring about a great saving in fuel, for instance, if a 4-horse-power Novo is doing 2-horse-power work it uses practically 2 horse-power fuel.

The frame is made of 3½ by 3½-inch seasoned hard wood,



**Novo Portable Saw Rig.**

accurately framed and strongly bolted, insuring strength, rigidity and durability.

The top is 54 by 30 inches, made of accurately planed iron. It is strongly hinged to the rear of the frame and is readily raised and lowered by the hand screw, and firmly held in any position by clamps on each side. It is independent of the jointer table, and neither interferes with the other.

The ripping gauge is adjustable and has a tilting fence for bevel sawing.

The cut-off gauge can be set to cut squares, mitres or any angle desired.

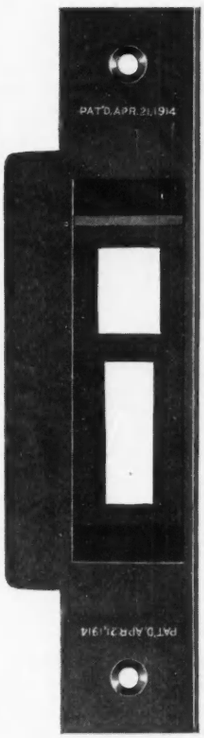
The boring table is adjustable. The bits have ½-inch shanks, and are carried in the end of the saw arbor, securely held by a hollow safety set screw.

The jointer or planer is entirely separate from top of machine. It has a steel cutter head fitted with two 6-inch knives and slotted on two sides to receive matcher bits or moulding cutters for working a large variety of shapes.

The regular equipment consists of 4-horse-power engine, with batteries, spark coil and connections, endless driving belt, rip and cut-off gauges, one 14-inch rip saw, one 14-inch cut-off saw, one ½-inch and one ⅞-inch dado head; one jointer head with two 6-inch knives; one each ½-inch and 1-inch auger bits; one sander drum and sander disc; one emery wheel with arbor; one throat piece for dado heads; one throat piece for saws, oil can and wrenches.

A smaller 3-horse-power machine is also offered. For further particulars address the Novo Engine Company.

# Move the Holes Instead of the Plates




## Wiley's Adjustable Lock Striker

will save your door casings from ever having to be CUT, which is worth many times its cost.

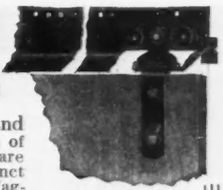
If your door sags and the LATCH BOLT is out of line so that it will not catch and keep the door closed, THE REMEDY WITH WILEY'S ADJUSTABLE LOCK STRIKER IS VERY SIMPLE. With A SCREW DRIVER you release the screws and adjust the INNER PLATE to the proper position and set the screws again and your troubles are all over as far as the door is concerned.

**They are made in two qualities from cold rolled steel and from solid brass, and finished in all finishes. Each one is adjustable for right or left strike door.**

Size: Full length, 6⅜ inches.
Size: Upper opening, ¾ x 9/16.
Size: Lower opening, 1¼ x 7/16.

**Wiley Hardware Mfg. Co.,**
(Not Incorporated)
**746 First National Bank Bldg.,**
**CHICAGO, ILL.**
**Phone Randolph 5334**

# WAGNER DOOR HANGERS



are furnished in styles, sizes and weights to meet every requirement of modern building. While there are more than a score of distinct models all have certain Wagner features that make them pre-eminently the *best* Door Hangers on the market. For instance:

**High grade roller bearing wheels**
**Improved tandem trolley with bumper on end which prevents damage to trolley wheels.**
**Patented cam and lateral adjustments that insure easy and accurate adjustment.**

Other important features of Wagner Trolleys and Tracks are illustrated and described in our new circular which we will gladly send you, free. Write for a copy today.

## Wagner Ever-Tight Trolley Track

—a specially designed new track that meets a long felt want. Fits up absolutely tight to building and lower part protects hangers and top of door. Impossible for rain or snow to drive in. Self-cleaning the same as all Wagner Tracks. Absolutely bird-proof. Impossible for door to come off.

## Ask Your Dealer

for Wagner Door Hangers and Tracks. If your dealer isn't inclined to supply you with Wagner goods, we'll fill your order direct.

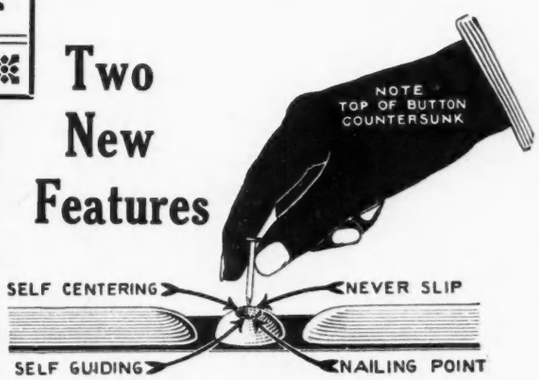
**Wagner Mfg. Co.**
**Dept. F**
**Cedar Falls, Iowa**

## This Illustration

shows a full-size cross section of Wagner Ever-Tight Track. All Wagner tracks are made of high carbon steel. Insures longer life and better service.

# THE Rapid Increase

## Two New Features




The bead is made extra long, in shape of half an oval, reinforcing the ceiling plates at joints, fitting snugly over underlapping bead, making a tight and perfect-fitting joint. The top of nailing button is counter-sunk, forming a self-centering, self-guiding, never-slip nailing point. These features permit a considerable saving when erecting.

in building has created an enormous demand for Berger's Classik Steel Ceilings, and no ambitious dealer can afford to overlook this profitable opportunity. Write to our nearest branch today for large illustrated catalog.

**The Berger Mfg. Co., Canton, Ohio**

For prompt service address nearest branch.

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| New York | St. Louis |
| Philadelphia | Minneapolis |
| Boston | San Francisco |

We also manufacture Ferro-Lithic and Multiplex Reinforcing Plates, Metal Lath, Roofing, Eaves Trough and Conductor Pipe, and Sheet Metal Building Products of all kinds.

*Export Department—11th Avenue and 22d Street, New York, N. Y.*

## D. A. Johnson Now Chicago Mgr. J.Dixon Crucible Co

Mr. Dudley A. Johnson succeeds the late Sam Mayer as Chicago Branch Manager of the Joseph Dixon Crucible Company.

He had for a number of years been an assistant to Mr. Mayer at Chicago, and he now comes to the full branch management of the Chicago office, fully equipped by the experience of many years' acquaintance with the Dixon line and the Dixon customers.

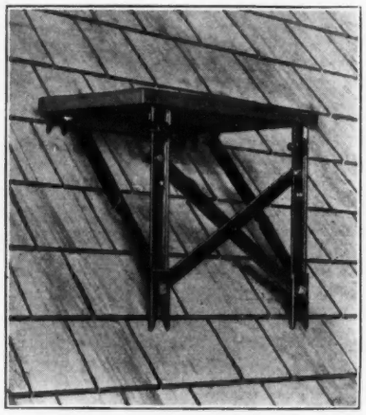
When he came with the Dixon Company in 1898, he brought with him experience in the lead pencil and stationery business from P. F. Pettibone & Company and the Holyoke Envelope Company. During the first few years after coming with the Dixon Company, he had charge of the lead pencil department and the school work. Later on Mr. Johnson assumed charge of the crucible and black lead department of the Dixon Company in the Chicago territory, and is, therefore fully equipped to ably represent the Dixon Company as its branch manager in the Chicago territory.

✣

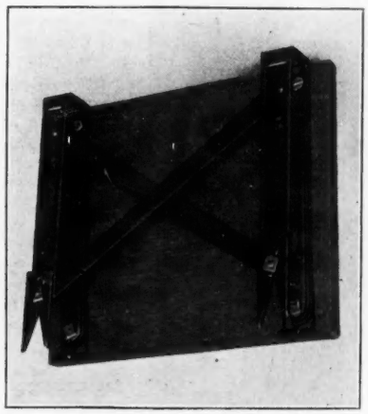
## A No-Slip Shinglers' Chair

A shinglers' chair with which a carpenter can work a third faster, lay shingles easier and entirely without injury to the roof is now being offered by the Foster Sheet Metal Co., Sprinfield, Ill. The illustrations show how this chair is made and how it is used. Some might think from the looks that this seat would slip, but those who have used it say it will hold two or three men perfectly safe. In fact, it is almost impossible to place this roofers' seat so that it will slip. It is easily picked up and moved along. The sharp claw points at both bottom and top hold the seat securely in position.

Carpenters find this seat very useful, as do also painters who use it in painting valleys, roof gables, etc. After the first three or four courses of shingles are laid this seat is all that is needed.



Seat on Roof



Seat Closed

Although it has been on the market only a short time the manufacturers say it is selling rapidly—many repeat orders. In one instance a salesman calling on a job where men were working sold five; one to nearly every carpenter on the job. For further particulars address the Foster Sheet Metal Co., Springfield, Ill.

## An Addition to the "Standard Mixer" Line

One of the most recent inventions in the concrete machinery field is the removable discharge hopper which appears in the illustration below.

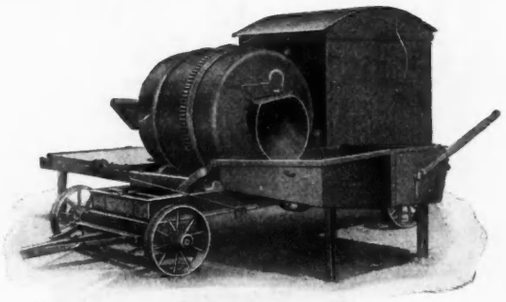
The efficient engineers of the Standard Scale & Supply Co., Pittsburgh, Pa., are always and ever alert to the most economic assistance to their host of patrons.

When the low-charging feature of their mixers was supplied to the trade, their activities did not cease, but through perseverance and careful study they now offer to the contracting world the Removable Discharge Hopper and thereby add another distinctive, effective feature for contractors to their already popular line of machinery.

Only the most cardinal points of the Removable Discharge Hopper can be covered in this first announcement. It is certain that this new device will continue to meet with the same enthusiasm among contractors.

In operation, the Removable Discharge Hopper is placed so that the entire batch can be discharged from the drum into the hopper. Then the wheelbarrows are loaded from it, while another batch is being mixed. The hopper holds more than one batch of concrete so that the delays in placing concrete in forms by the wheelers will not effect a delay in the mixing process. Therefore work can be rushed to a maximum output by increased speed of the workmen at the charging end and also at the distributing end of the mixer. A door is provided in the hopper end, and by operating it, the concrete flows into the barrows. This enables the barrows to be charged with any quantity desired. The hopper can be folded up against the drum in cartage and removed when discharging into wheelbarrows, or when discharging into forms as well as into hoisting elevators. All the "Standard" low-charging mixing machines can be equipped with the hopper at a slight extra cost. They can be furnished to the present owners of machines by being mounted on four legs, not being necessary to attach it to the truck frame, although it can be done.

The Removable Discharge Hopper, as shown in the illustration, is constructed of sheet metal and of the usual sturdy design that is characteristic of "The Standard" mixers.



**"Standard" Mixer with Discharge Hopper.**

To attest to the receptive manner in which the trade desires this time-saving device, the F. Johnson Co., of Chicago, Ill., after buying one, ordered all the remainder of their machines equipped. The F. Johnson Co. are one of the largest contractors of foundations of flats in the United States.

In this device, contractors will again appreciate that it is not in the material used, but in the use of economical machinery that the greater profits are made.

The Standard Scale & Supply Co., of 1345-47 Wabash Ave., Chicago, Ill., with offices in Pittsburgh and Philadelphia, Pa., and New York, have considerable data on "The Standard" Removable Discharge Hopper and will be pleased to mail a catalog to anyone interested.

## New Rotary Sand Screen

The Grand sand sifting machine is a light screen that can be easily moved from one job to another, as one man can handle it easily. It is very strongly and rigidly built to stand up under hard service. There is nothing complicated about the screen to get out of order, and is ready for service as soon as placed on the work.

**The Grand Sand-Sifting Machine.**

One great advantage of this screen over old methods is that it is equipped with an automatic patent tapping device which keeps the screen clean when sifting wet material. This tapping device is controlled by an adjustable spring which can be set so that tapping device will strike the screen either light or hard, just depending upon the condition of your material. It can also be thrown out of gear entirely where the material is dry.

With this screen, it is only necessary to handle the material once, as the coarse material rolls out of the discharge end of the screen in one pile and the screened material is thrown off to the side. The screen is very easily turned by a small boy, and will screen all the material two men can shovel into it. It can be equipped with pulley to attach to power if desired. The wire screen is quickly removed by simply taking out two small bolts, and any different size mesh can be quickly put on to suit the requirements of the contractor's work.

In this machine there is no cheap iron to rust away, no gearing to wear out, and no complicated mechanism to get out of order.

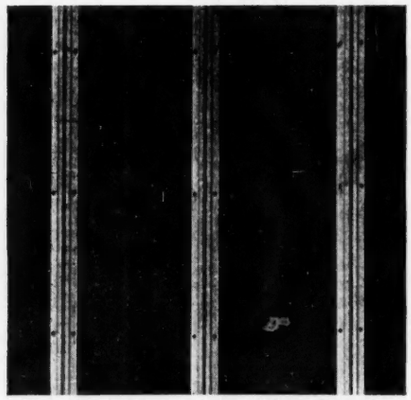
The machines are complete, set up and ready for work. All machines are guaranteed to be as represented.

Weight, 100 pounds.

For further particulars, address the Hall-Holmes Manufacturing Company, 420-424 Oak Street, Jackson, Mich.

## Metallic Battens Popular

In the six months that metallic battens have been on the market they have made such a hit with barn builders that the Metallic Batten Company have had to increase their output every month; in fact, it has kept them hustling to keep up with their orders and not disappoint their customers. While the first metallic battens were formed by hand, the manufacturers have now perfected and installed complete machinery equipment for turning out battens in large quantities. The machine product is an improvement, since it is absolutely uniform and has a refinement of contour that the first hand-made batts did not have.



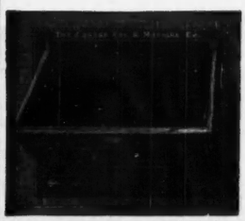
**Metallic Batts over Painted Barn Boards.**

These metallic battens are heavy galvanized metal. They come in 8 and 10-foot lengths and can be joined together with interlocking joints. When nailed on between vertical barn boards they present a perfectly smooth wind and weather tight wall. Sliding doors roll flush against the barn where these batts are used, as they do not stick out and interfere as wood batts do.

The metallic battens are labor savers besides making a better job. Write today to the Metallic Batten Co., Owensville, Ind., for full particulars.

*Ordinary cellar windows leave any building at the mercy of thieves and burglars. The Canton Coal Chute is positively burglar-proof*


# Canton Coal Chutes



prevent battered foundations, broken windows and sash, blackened walls and dirty lawns.

Always specify a **Canton** for your buildings. If you want to use the **best**—the most solidly built coal chute at a very fair price.

**Booklet B-1 will give details. It also shows our complete line of Builders' Iron Work. All we need is your name and address.**

**Canton Foundry & Machine Co.**
Canton, Ohio

# *In specifying varnish take this tip from the paint man*

There's one varnish that beats them all, because it works easily, has a good body, covers well, dries in a hard, firm coat, gives a brilliant surface of deep lustre, is unaffected by moisture and water, does not wear or scratch white and is long wearing. You get it when you specify

**Lowe Brothers "Little Blue Flag" VARNISHES**

The offices of the Lowe Brothers Company were not refinished, but merely cleaned, after they were submerged with slime and water during the Dayton flood. The old varnish still looks fine.

Write for "Varnish and Varnishing." It's full of valuable varnish information.


**The Lowe Brothers Co.**
457 E. Third St., Dayton, Ohio

Boston Jersey City Chicago Kansas City Minneapolis
Lowe Brothers, Ltd., Toronto, Can.
See Sweet's Catalog
1914 edition
pages 1916-1917

# HESS MEDICINE SANITARY CABINET LOCKER

The Recessed Steel Medicine Cabinet

**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, 920L Tacoma Bldg., CHICAGO**

Makers of Steel Furnaces — Free Booklet

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# $50 Bovee Economy Furnace $50

**At Manufacturers' Prices.**

Has large combustion chamber.
Saves one-third of the fuel.
Has perfect **Ventilating System.**
**Most perfect hot air plant sold.**
Send pencil sketch of floor plan for our manufacturers' price and illustrated catalog. Address

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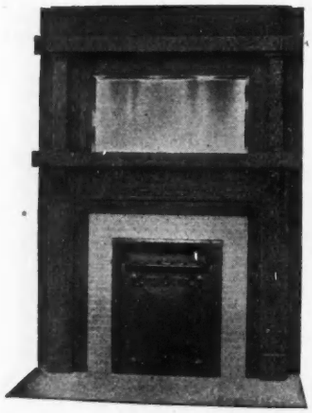

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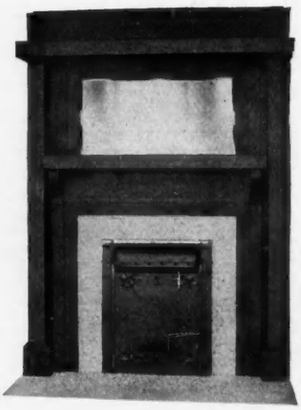
**FOR THESE ELEGANT, MASSIVE, SELECTED OAK OR BIRCH, MAHOGANY FINISHED MANTELS. BEVELED MIRRORS, 18 X 36**

Prices include our "Queen" Coal Grate with best quality enameled tile for facing and hearth. Mantels 82 inches high, 5 feet wide. Furnished with round or square columns, as shown in cuts.

***Catalogue Free***—Will send our 100 page catalogue, the finest ever issued, free, to carpenters, builders and those building a home.

**HORNET MANTEL CO., 1147 Market St., St. Louis, Mo.**



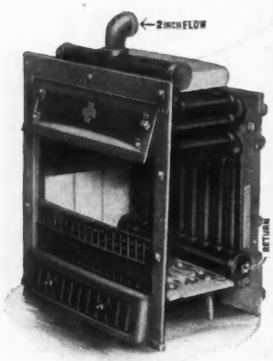



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Illustration shows section of our Heating Coil which if placed in the old style fireplace will easily heat six times the amount of space without additional cost of fuel and affords the same healthful ventilation. Will suit any fireplace or mantel.

**Write for descriptive circular.**

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**No. 126½ N. Fifth St., Quincy, Ill.**

# YOU SAVE MONEY

## WHEN YOU BUY FROM US

No. 1240. In Plain Oak. Quartered Oak and Maple Mahogany. Price in Q. O., $19.06

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The wood in all our mantels is guaranteed to be thoroughly seasoned, free from blemishes and of a beautiful grain.

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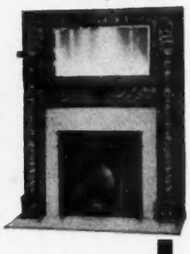


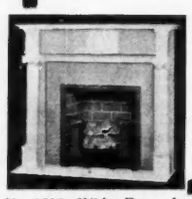
Fireplaces and mantels are in style. They are popular for every house. You can get high grade mantels from us **at the wholesale price.** Think of it. Every mantle warranted to be perfect in material, workmanship and finish.

Write now—today—for our big, handsome Mantel Catalog. It shows 82 styles of modern mantels—all at the lowest prices. Write for this free book immediately.

**The Huber Builders Material Company**

**45-49 Vine Street**
**CINCINNATI, OHIO**

***Get Our FREE Catalog***



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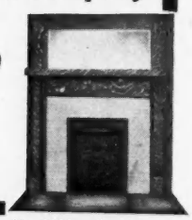

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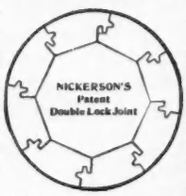


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All kinds of interior trim to detail.

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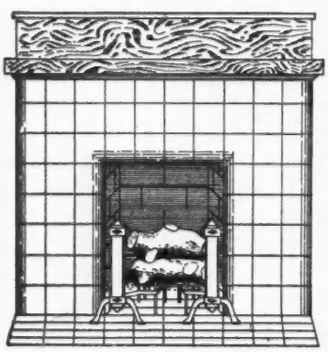

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If you cannot use heavy stone or cast ornaments or statues in your designs, consider light weight, substantial, enduring and economical sheet metal work. You can secure the maximum of artistic merit, all the elegance and refinement of the best sculpture, with a minimum of cost.

## Mullins Sheet Metal Ornaments

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**10 Gallons of water heated for one cent**

**Put a Parrott Heater in the basement, light the pilot light and all inconvenience is past. Opening any hot water faucet in the house automatically turns on the gas in the heater. The water is heated "on the run". In a few seconds it is rushing from the faucet.**

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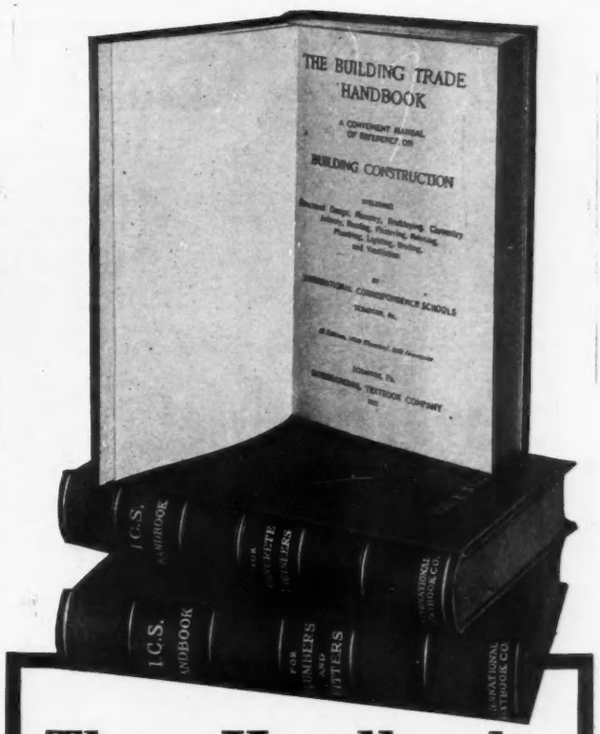
***Your Clients will want a Parrott. Learn more about the Parrott Heater from our literature. Money for you. Write for FREE CATALOG.***

**MICHIGAN GAS APPLIANCE CO.**
**JACKSON, MICHIGAN**

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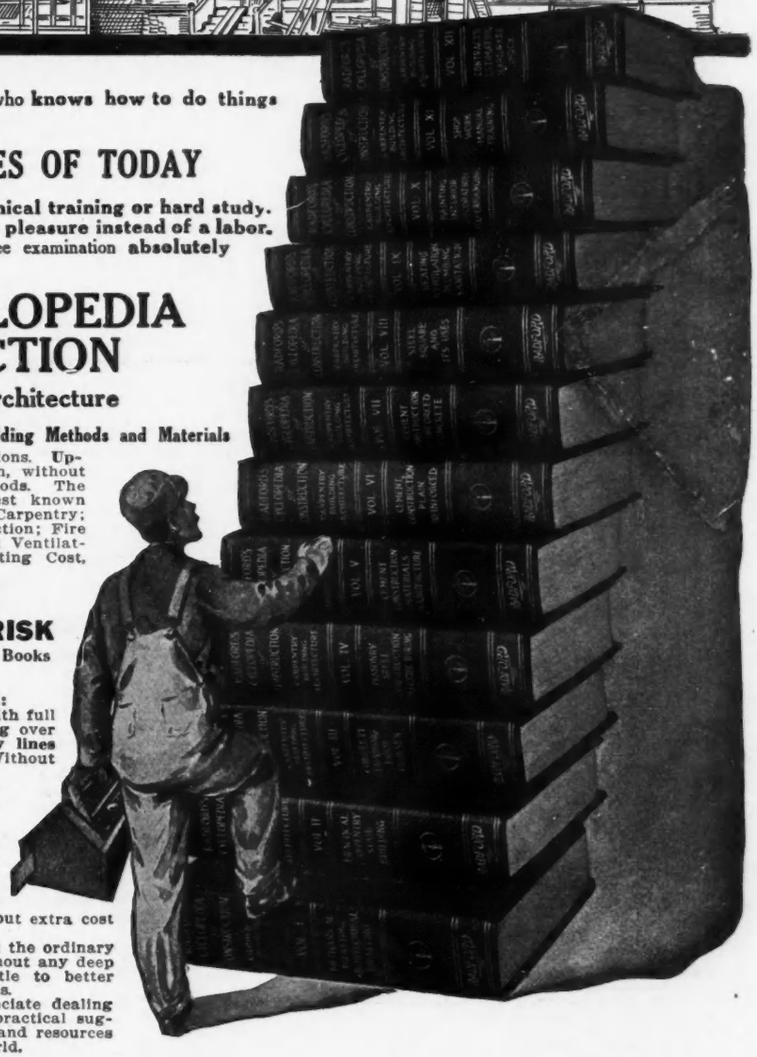

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If you are a Carpenter or Builder, you can do all the ordinary work of the Construction Engineer or Designer without any deep mathematical calculations, thus insuring your title to better recognition, wider responsibilities and higher wages.

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**We Take all the Risk**

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**ON NEXT PAGE**

**RADFORD ARCHITECTURAL COMPANY, 1827 Prairie Ave., Chicago, Ill.**

**SIGN AND MAIL COUPON TO-DAY**

# "Opportunities"

**Have you anything to Sell, Barter or Exchange, Want Help, Agents, or a Situation? Use our**

# Classified Department

**RATES 5 CENTS A WORD. CASH WITH ORDER**

**No Display Type Allowed in Classified Advertisements**

### Patents

**C. L. PARKER, PATENT ATTORNEY. Formerly member Examining Corps, U. S. Patent Office. 920 G. St., Washington. D. C. Pamphlet of instructions sent upon request.**

**PATENTS THAT PROTECT AND PAY—Books free. Highest references; best results. Send sketch or model for free search. Watson E. Coleman, Patent Lawyer, 622 F St., Washington, D. C.**

### Instruction

**DRAFTSMEN'S, BUILDERS' AND FOREMEN'S COURSES—Day, evenings or by mail. MAACK'S ACADEMY OF ARCHITECTURE, 1742 Chouteau Ave., St. Louis, Mo.**

YOU CAN BUILD ANYTHING IN ARTIFICIAL MARBLE, concrete or plaster from my instructions, simplified method of FLEXIBLE MOULD MAKING for ornamental casting of garden furniture, statuary, etc. Sanitary flooring material furnished at wholesale price. Joseph Roth, Office, 45 Frost St., Brooklyn, N. Y.

### Wanted

**AGENTS WANTED for house lighting machines, supplying gas for small country homes as well as large. Simple and economical. Guaranteed. A live proposition. Write for terms. THE ALEXANDER F. MILBURN CO., Baltimore, Md.**

### For Sale

FOR SALE—Well equipped contracting business and old stand. Write for prices and terms. Must sell in 30 days. D. L. Hamilton, Colfax, Ill.

### Miscellaneous

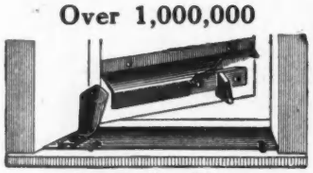
**CABINET MANTELS direct to builder, $3.00 to $40.00. AMERICAN MANTEL TILE & GRATE CO., Hamilton, Ohio.**

FREE—$1.00 Certificate and 4-inch rule. See Ad Page 143. GAGE TOOL CO., Vineland, N. J.

**AGENTS—500 per cent profit; free sample. Our new gold and silver sign letters for store fronts and office windows. Easily applied. Big demand everywhere. Write today for liberal offer to agents. METALLIC LETTER CO., 447 N. Clark, Chicago.**

THE UNIVERSAL PITCH GAUGE is the simplest and most complete tool ever devised for roof-framing. With this Gauge a beginner—even a boy—can mark more framing in less time than the best expert can WITHOUT it. Gives 22 lengths, bevels, etc., for 100 pitches. Any pitch in five minutes. Hundreds of irregular hip rafters. Octagon hips and jacks, etc. Two Gauges, making a perfect Stair and Brace Gauge. Prepaid for $1.00. Money back, if returned. JOHN PARKHILL, Rochester, Minn.

**Over 1,000,000**

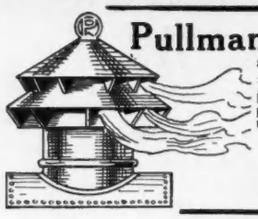


**In Daily Use**

**Here's What People Want The Axtell**

A perfectly tight All-Metal Weather Strip for bottom of doors and swinging windows. Saves sill from wearing and can be put on any door in 5 minutes at 200% profit. Sells at sight wherever shown. Our prices will interest you Write us.

**E. I. Church & Co.**
West Hanover, Massachusetts



**Pullman Roof Ventilators**

are the best exhaust medium on the market. Provide for removing the foul air by using Pullman Ventilators on the roof. Write for booklet. Ask us to solve your Ventilating problems. The Pullman System means Natural Ventilation.

Special System for Moving Picture Theatres.

**Pullman Automatic Ventilator Mfg. Co., 21 York St., York, Pa.**

**THE IDEAL WAY TO BUILD**

**Use a Van Guilder Hollow Wall Concrete Machine**

It builds double monolithic walls tied together and steel reinforced. Continuous air space, dry, warm, sanitary, fire proof, age proof, repair proof. **Better than brick, cheaper than wood.**

*Large illustrated Catalogue and Book "How to Build" free.*

**VAN GUILDER HOLLOW WALL CO.**
720 Chamber of Commerce Building ROCHESTER, N. Y.


**BYERS**

**HOISTING ENGINES**

**Specially Designed for Builders**

*Write for Catalogue No. 20*

**The John F. Byers Machine Co. Ravenna, O.**

**"As Near Rust Proof as Metal Can Be Made—"**

GILBERT & BENNETT

**Pearl WIRE CLOTH**

**Insist upon the genuine. Look for the 2 Copper Wires in the Selvage.**

**THE GILBERT & BENNETT MFG. CO.**
Chicago; New York; Georgetown, Conn.; Kansas City

**2 Dollars a Month**

Buys a Standard Typewriter. Your choice of late style Visibles, etc. Prices lower than other cash prices. Perfect machines only. Guaranteed for one year. 5 days Free Trial. Do not buy a machine until you have my bargain prices and terms. *Write Today*

**Harry A. Smith**
702 R.—231 N. Fifth Ave., Chicago, Ill.


# Think what 5-ply really means!

**Think of a wall board with strength that is more than ordinary; that is more than ordinarily moisture-proof and weather-proof; whose quality, durability and satisfactory service have been convincingly proved in hundreds of different ways by thousands of actual users. There's only one such wall board that you could possibly think of—**

# UTILITY

## *the only 5-ply wall board*

**Five, high-grade, fibre-board layers are solidly welded together with four layers of asphalt, coated on the outside with a special moisture-proofing. In warehouses and factories, offices and hotels, garages and display rooms, UTILITY meets every requirement perfectly. Its limitless possibilities for home decoration form only one phase of its usefulness.**

## Samples and Book Sent to You

**Your name and address on a post card will bring tangible proof to you—specimen sheets and the UTILITY Book. Be sure you write today—NOW——before you forget.**

## THE HEPPES CO.

***Manufacturers also of Flex-A-Tile Asphalt Shingles, Asphalt Paint and Asphalt Roofing in Any Finish.***

**4503 Fillmore Street** **CHICAGO, ILLINOIS**

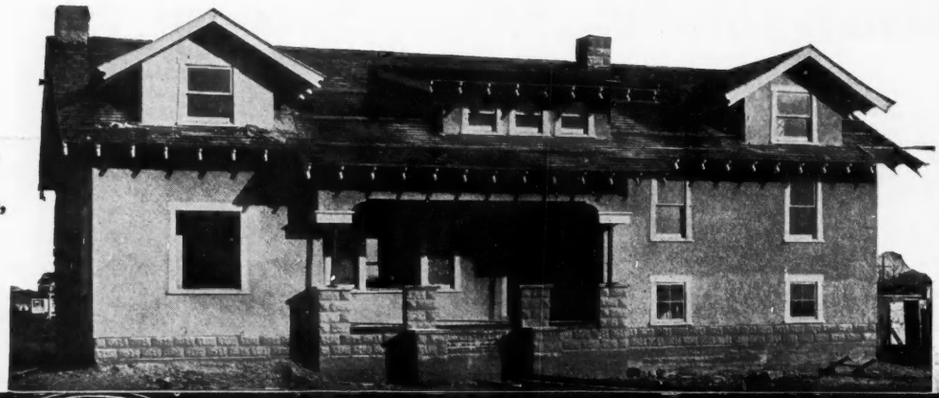
# INDEX TO ADVERTISEMENTS, AUGUST, 1914



**NOTICE TO ADVERTISERS**

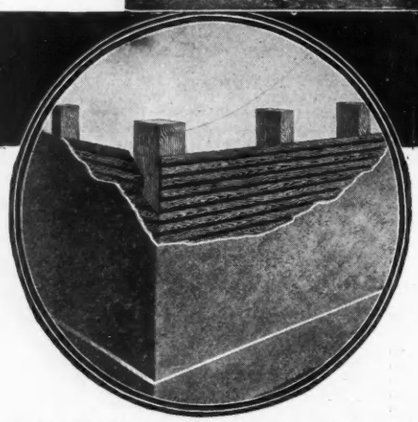
**Forms for the September number of the American Carpenter and Builder will close promptly on August 20. New Copy, changes and orders for omissions of advertisements must reach our business office, 1827 Prairie Ave., Chicago, not later than the above date. If new copy is not received by the 20th of the month preceding date of publication the publishers reserve the right to repeat last advertisement on all unexpired contracts. AMERICAN CARPENTER & BUILDER CO.**

Built by John J. Randall Co. Real Estate and Builders, Freeport, L. I., New York



Bishopric Stucco or Plaster Board Used on this Building

# Durability is the Keynote of All Good Building



Bishopric Stucco or Plaster Board Nailed to Studding and Stucco Applied to Stucco Board

John J. Randall Company used Bishopric Stucco or Plaster Board on the house illustrated above to their entire satisfaction. The testimonial below is only one of the hundreds received proving our claims of the superiority of Bishopric Stucco or Plaster Board over all other plaster board.

**Read This Letter**

TEWS LIME & CEMENT CO. Freeport, N. Y., March 11, 1914.
Mr. Frank Piphorn, 895 Buffum Street, Milwaukee, Wis.
Dear Sir: We have used Bishopric Stucco Board on two houses which we have built during the past fall and winter. We are very well satisfied with the board, and think that it is superior to any metal-lath which can be used. The house which is completed has stood during the winter, and shows no effects whatever from either heat or cold. There are no cracks, nor any signs of dampness.
Yours very truly, JOHN J. RANDALL COMPANY,
By E. S. Randall, Treasurer.

Mr. Builder: Investigate the merits of Bishopric Stucco or Plaster Board. You cannot help but be convinced of the simplicity, economy and practicability of Bishopric Stucco or Plaster Board. Note carefully the application of Stucco on Bishopric Stucco or Plaster Board in circular illustration. Then study the diagram below and you will begin to really appreciate the great superiority of Bishopric Stucco or Plaster Board.

THE DOVETAILED KEY "LOCKS THE PLASTER"
**BISHOPRIC STUCCO OR PLASTER BOARD**
TRADE-MARK REGISTERED

***"Dampness Can't Penetrate"***

Bishopric Stucco or Plaster Board makes plaster and cement walls *permanent*—they can't crack, crumble or disintegrate when this time-defying stucco board is used. For five long years we have tested Bishopric Stucco or Plaster Board. *Every test* that a score of building experts know has been used upon it and it has *always* "stood up"—*always* made good. Its recent introduction and service already rendered have won it hundreds of friends. It will win you, once you investigate and know its many merit points over other backgrounds.

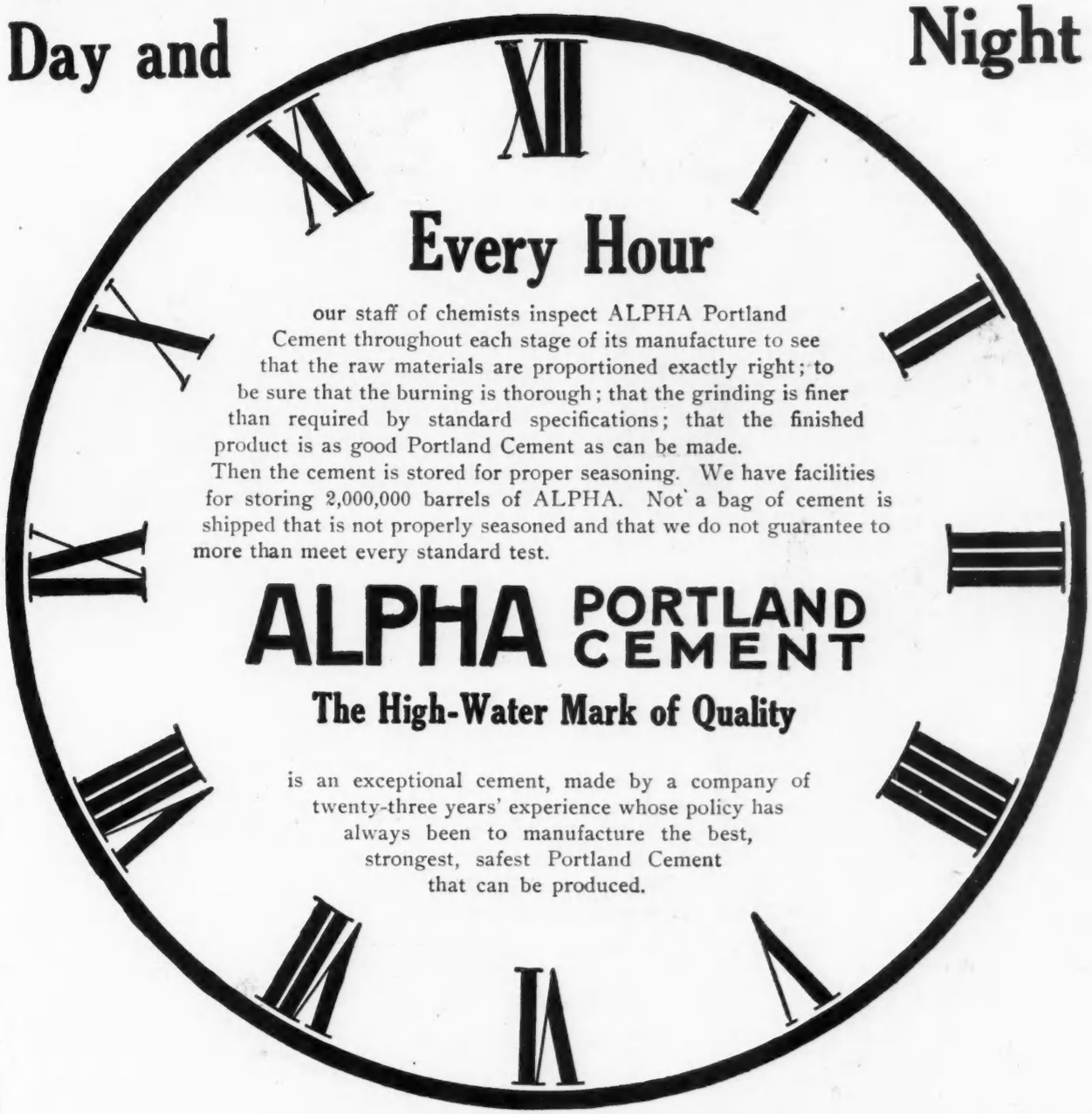
You can recommend and use Bishopric Stucco or Plaster Board without the slightest hesitation or fear of endangering your reputation. We guarantee Bishopric Stucco or Plaster Board to be as represented.

*Don't delay*—write today for free samples and free handsome illustrated book, just out, "Durable Homes by the Bishopric System." Contains *latest* information on stucco work. Every builder should have a copy. Get yours *now*.

**THE MASTIC WALL BOARD AND ROOFING COMPANY, 530 Este Ave., Cincinnati, Ohio**
CENTRAL DOOR AND LUMBER CO., Portland, Ore., Licensed Manufacturers and Distributers for Pacific Slope


**NOTE THE UNDER-CUT-**
**THIS IS THE KEY THAT MAKES STUCCO STICK**

# Day and Night



## Every Hour

our staff of chemists inspect ALPHA Portland Cement throughout each stage of its manufacture to see that the raw materials are proportioned exactly right; to be sure that the burning is thorough; that the grinding is finer than required by standard specifications; that the finished product is as good Portland Cement as can be made.

Then the cement is stored for proper seasoning. We have facilities for storing 2,000,000 barrels of ALPHA. Not a bag of cement is shipped that is not properly seasoned and that we do not guarantee to more than meet every standard test.

# ALPHA PORTLAND CEMENT

## The High-Water Mark of Quality

is an exceptional cement, made by a company of twenty-three years' experience whose policy has always been to manufacture the best, strongest, safest Portland Cement that can be produced.

# Specify ALPHA and be SURE

Six great plants on six great trunk lines—one plant directly on the Hudson, with private docks, ideally situated for Coast, Canal and export shipment—enable us to render ALPHA Service that is on a par with the high quality of ALPHA Portland Cement.

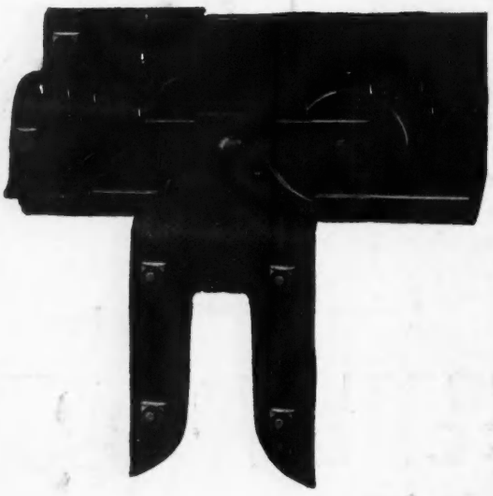
*Let us send you, free of charge, valuable literature dealing with the use of ALPHA Portland Cement, with stucco work, concrete houses, and concrete improvements generally. Ask for ALPHA Book No. 10 and ask also for special literature on the kind of concrete work that most interests you.*

**ALPHA PORTLAND CEMENT CO.**

General Offices: **Easton, Pa.**

***Sales Offices:*** **New York, Chicago, Philadelphia, Pittsburgh, Boston, Buffalo, Baltimore and Savannah**

# Storm-Proof Hanger



## Distinctive Features

Easy running.

Anti-Friction steel-roller bearings.

Frictionless contact with rail.

Great strength and durability.

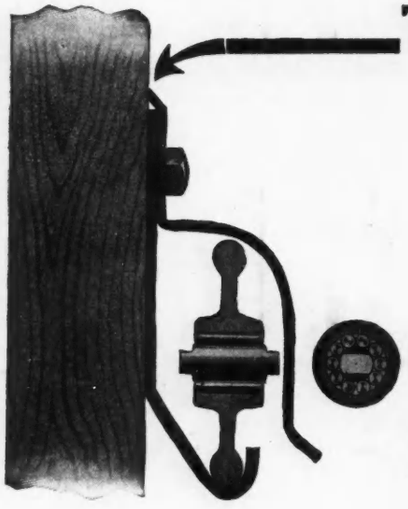
Illustrated directions packed with each pair.

The cut shows the No. 66 Rigid style.

The No. 77 has a Flexible Hinge Joint.

# STORM-PROOF RAIL

## TITE-FIT



Requires no brackets.

Forms a continuous bracket in itself.

Requires no housing. Fits close against the building. (See sectional view.)

Perfect tread for hanger wheels. Bird- and Storm-proof.

A detailed description will be found in our general Catalog, a copy of which will be gladly mailed on request.

# NATIONAL MFG. COMPANY

STERLING, ILLINOIS