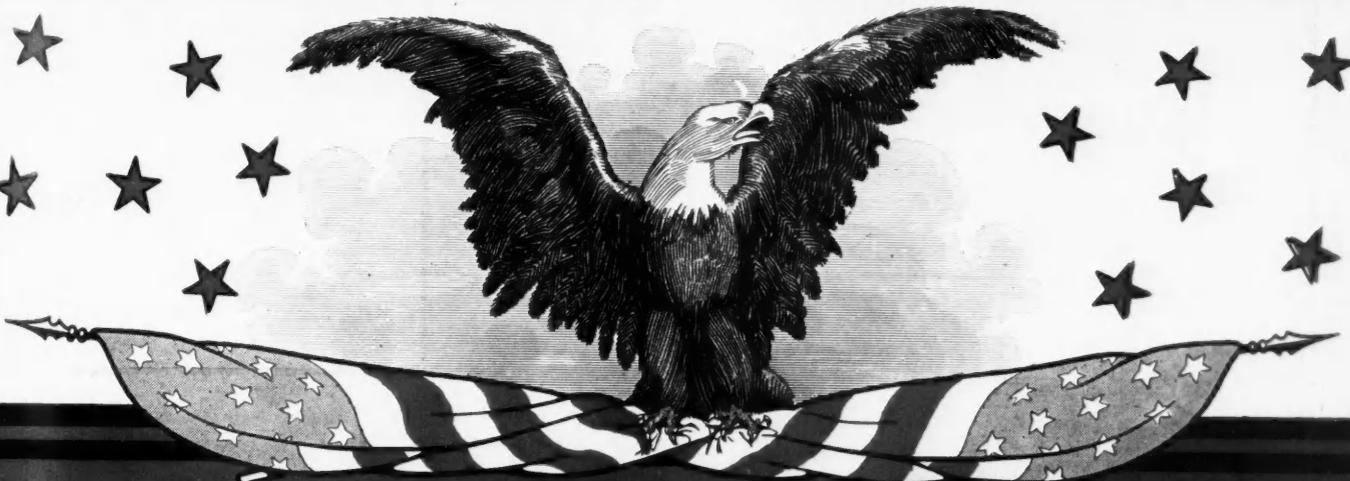


JULY 1916

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# AMERICAN CARPENTER AND BUILDER



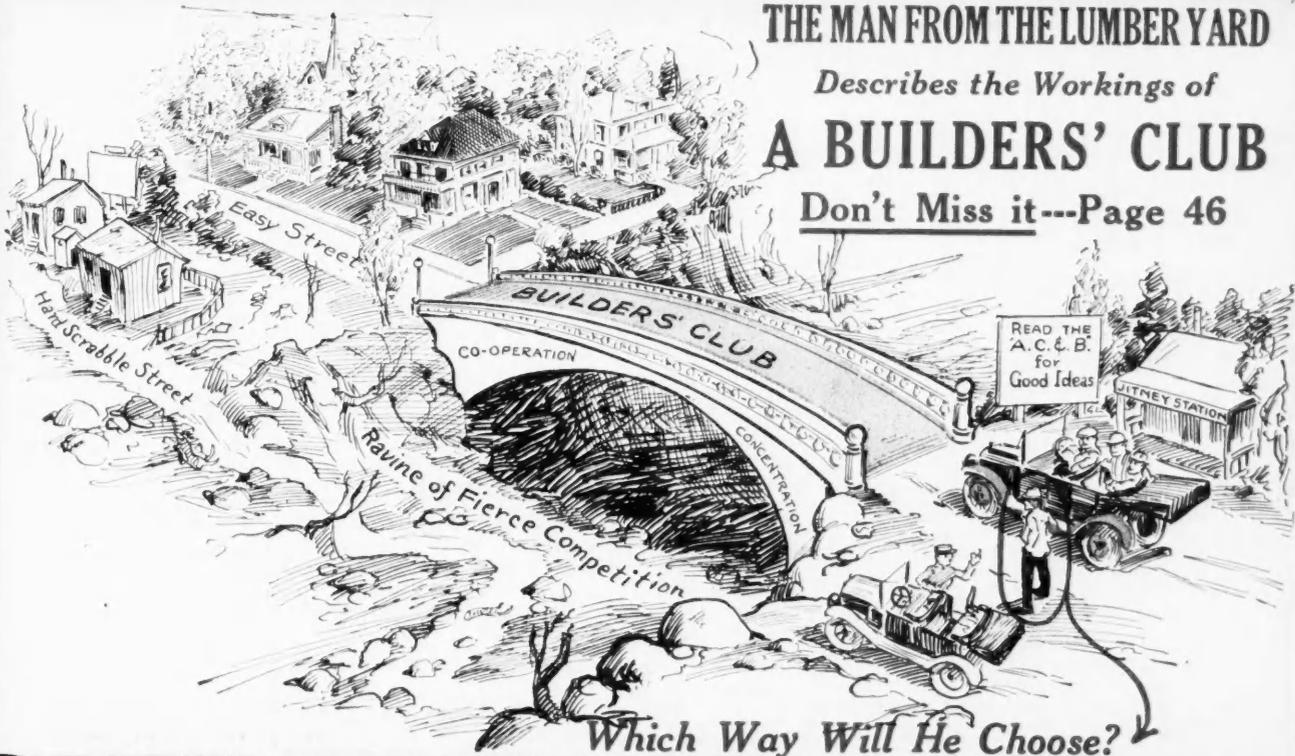
THE WORLD'S GREATEST BUILDING PAPER

THE MAN FROM THE LUMBER YARD

*Describes the Workings of*

**A BUILDERS' CLUB**

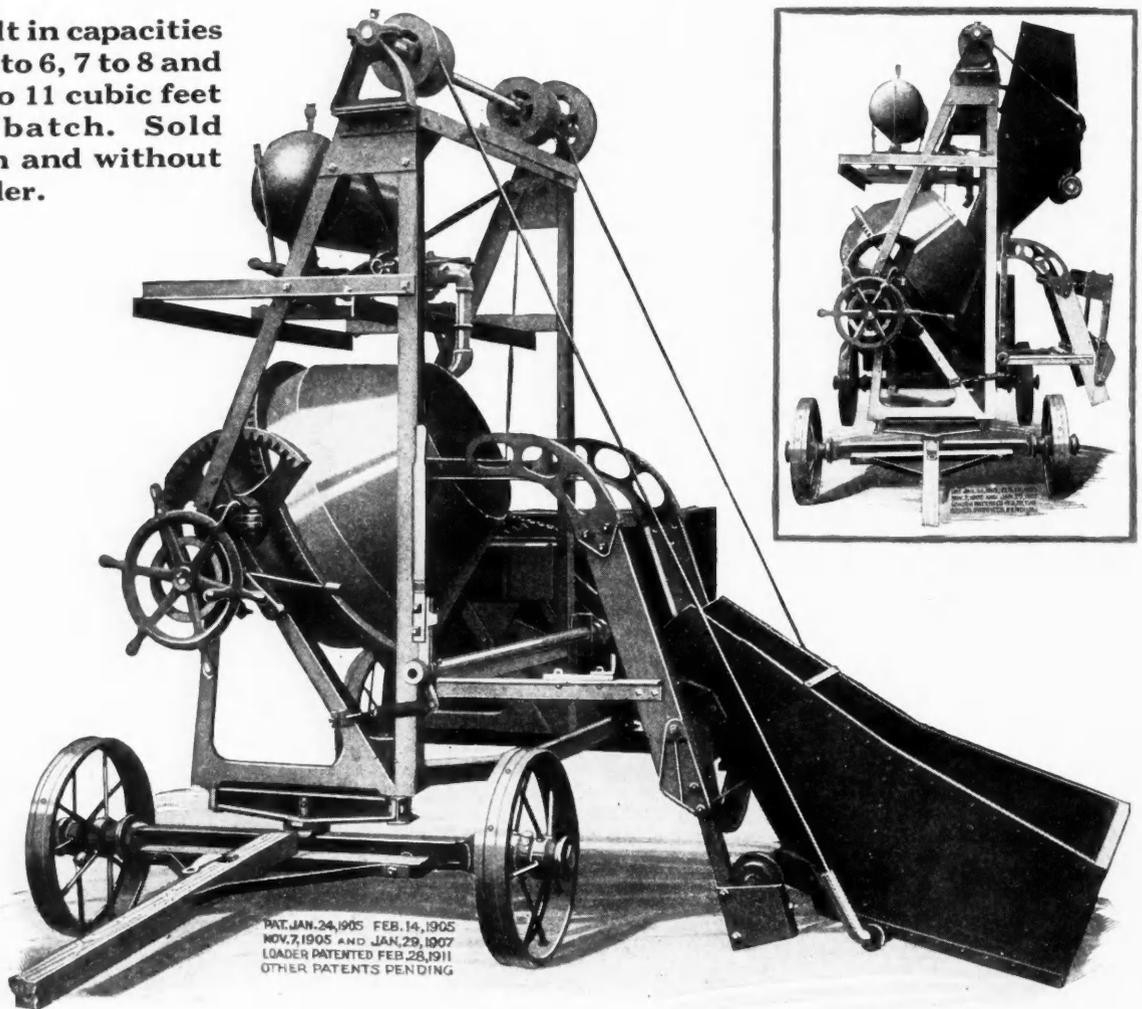
**Don't Miss it---Page 46**



Price 20 Cents

More than Ever—  
***“The Mixer that Makes the Money”***

Built in capacities  
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10 to 11 cubic feet  
per batch. Sold  
with and without  
loader.



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NOV. 7, 1905 AND JAN. 29, 1907  
LOADER PATENTED FEB. 28, 1911  
OTHER PATENTS PENDING

The WONDER Mixer with Folding Track Loader is a notable advance in mixer construction. It permits more time for the mixing operation, while it completes the cycle from loading to discharging in the same time as old style loaders, thus meeting the increasing demand for *Perfect Concrete* without sacrificing speed. This makes the Wonder

**The Fastest Perfect Mixer**

Investigate this and other features of superiority which have given this mixer national reputation—which have induced many of the largest engineering firms to standardize on it, and you will decide that the Wonder is the only logical choice.

*It will pay you to get in touch with WONDER Efficiency*

**WATERLOO CEMENT MACH'Y CORP'N, 103 Vinton St., Waterloo, Iowa**

Mfrs. Mixers, Pavers, Backfillers, Pumps and Contractors' Equipment

NEW YORK

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WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER

## Short Talks with Our Subscribers

### How About Your Office?

**M**OST building contractors have an office; all architects have one; so do all lumbermen. In the majority of cases, having an office is a necessity, tho sometimes it is a luxury. In all cases it can be made and should be made a real help in getting business. Too often, however, it is conducted so that it drives away more business than it brings.

We don't propose to get personal about this and call anyone by name. There is no need of bawling anyone out in meeting; but we just want to ask "How about *your* office?" and leave it with each one individually to work out the answer for himself.

### Signs of a Good Office

**E**VERY office, no matter what the business, should be clean, well ventilated, inviting, and at the same time businesslike in its atmosphere. It should be arranged and conducted in a way to encourage prospective customers to make use of it. Some claim that the location has everything to do with the number of customers and prospective customers who will come to the office. We have not found this to be the case. If there are matters of interest at the office, facilities for obtaining information, and the assurance of intelligent service, customers will hunt out the office, even if it isn't on the main street.

Loafing, however, should and must be discouraged. Let everything and everyone be intent on business. Otherwise have no room for it.

### Let Everything Suggest Building

**I**N a builder's office—and this applies equally as well to the offices of the retail lumber dealer or of the architect—have everything suggest building. Concentrate on the building improvement idea. Put up some neatly framed pictures of bungalows, farm buildings, modern factories, or whatever type of structure you specialize in. Put up a few interesting blueprints and a few of the most attractive wall hangers that adver-

tise building products. Have all of the pictures on the walls suggest building improvements. You have no room for anything else, and don't permit anything else to be up to divert and scatter the attention of prospective customers. Help them to concentrate on the building business that brought them to your office.

### No Fiction Papers-No Newspapers-All Building

**W**HERE there is an outer office it is often conducted as a small reading room. This is an excellent idea; but, mind you, it should be a reading room that will *encourage the building business*; no barber shop assortment of fiction papers and newspapers should be permitted. Rather furnish an assortment of the best building and architectural magazines, a plan book or two, some up-to-date building material catalogs, and some standard books on building construction written in popular language. Let your customers know that these magazines and books are supplied for their benefit.

We have had letters recently from several lumber dealers proposing to start such reading rooms in connection with the lumber office. This idea is right in line with the informal Builders' Club suggestion being made by "The Man from the Lumber Yard." Where it has been tried, it has worked out to the benefit of all concerned. There is a great advantage in having a circle of friendly customers who depend on you for information and advice, and—when the time comes—for service. When customers get into the habit of dropping in regularly, for instance to inquire "Is the AMERICAN CARPENTER AND BUILDER in yet," there isn't much danger that anyone else but you will get their building business.

But above all, have everything—reading matter, pictures, and the whole atmosphere of the office—pertain to the building business. Discourage war talk and discourage gossip. Concentrate on building improvements.

### Samples of Materials

**M**ANY offices are made extra interesting and instructive by having a well displayed cabinet of building material samples. A number of the manufacturers furnish these on request, some of them gotten up in most nifty, persuasive style.

Very few offices are perfect; no doubt there is chance for improvement in the best.

How about *your* office?

Yours for business,

EDITOR AMERICAN CARPENTER AND BUILDER.

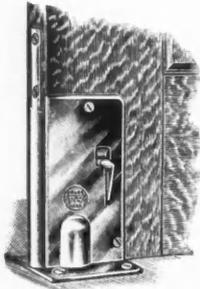
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**CHICAGO**  
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Do you specify a spring hinge with distinctive features which will appeal to your client and assure satisfaction to all concerned?



### Chicago "Relax" Spring Hinges

are in great demand. They are substantial in construction and readily applied. The EXCLUSIVE FEATURE of spring action release, allowing the door to be placed at any desired position and automatically re-engaging when the door is closed,

is of recognized merit and utility.

Send for Catalogue C32. It fully illustrates and describes the most complete line of Spring Hinges manufactured

**Chicago Spring Butt Company.**

CHICAGO

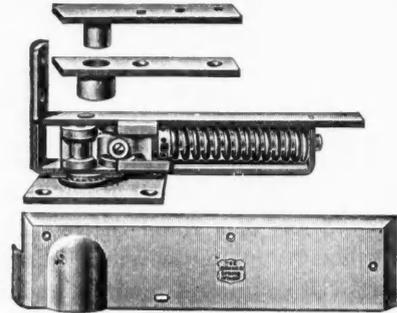


NEW YORK

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**Bommer Bros., Manufacturers Brooklyn, N.Y.**



A Bungalow for Permanent Occupancy. Charles E. Anderson, designer. White Plains, N. Y. "The roof is covered with shingles dipped 10" in Cabot's Creosote Shingle Stains; the body is stained a rich brown with Cabot's Creosote Stain."

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The colors are so soft and rich and lasting that all other stains look cheap and tawdry in comparison. They go farther, last longer, preserve the wood better and are vastly more artistic—and every gallon is guaranteed. Imitation stains smell of kerosene or benzine and are dangerously inflammable. Cabot's Stains are the genuine Creosote, wood-preserving stains, and they make the wood less inflammable.

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You can get Cabot's Stains and Quilt all over the country. Send for samples and names of nearest agents.

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**Free Trial for Contractors  
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Retails for 35 cents

To readers of A. C. & B.—In order to get you to try the D. A. D., will send one free on receipt of 10 cents to cover postage and packing.

**The D. A. D. Latch Co., Manchester, Iowa**

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VOL. XXI

JULY, 1916.

No. 4

**Bricklayers Best Paid Workmen in Michigan**

BRICKLAYERS were the highest paid men in the building industry in Michigan during 1915, according to figures just made public by Labor Commissioner James V. Cunningham.

Experts in the department of labor have compiled statistics regarding this industry. All told 864 contractors who employ labor were visited.

Carpenters employed totaled 5,112. They averaged 9 hours a day for an average wage of \$3.58. The bricklayers, 1,118 in number, worked 8.1 hours, on an average, and were paid an average rate of \$5.08. There were 522 plasterers on the payrolls, who averaged 8.2 hours a day for \$4.60; and 266 lathers who worked 8.5 hours a day for \$3.99. Painters and decorators numbered 644 and they averaged \$3.47 a day for 8.9 hours. There were 1,299 cement workers, who received an average wage of \$2.80 for a day's work of 9.5 hours.

The contractors whom the experts visited hired 637 foremen, for a nine-hour day, who drew on an average \$4.62. Other mechanics, not classified, numbered 428, for an average wage of \$3.32 and an average day of 8.8 hours. The laborers employed numbered 4,883. They worked, on an average of 9.4 hours and drew \$2.27; while 121 roofers were paid \$2.61 for a day of 9.5 hours. One hundred and nineteen electricians worked 8.5 hours a day for \$3.12, while 15 grante workers drew \$3.82 for an average day's work of 8.5 hours.

The structural iron workers came to 307 in number and they received \$3.47 a day for 9 hours. Other men employed totaled 970, at the rate of \$2.64 for 9.4 hours. All contractors' work averaged 8.9 months for the year.



IT is always the other fellow who became wealthy thru luck.

## Concrete as a Medium for Manual Training

By H. Colin Campbell, C. E.

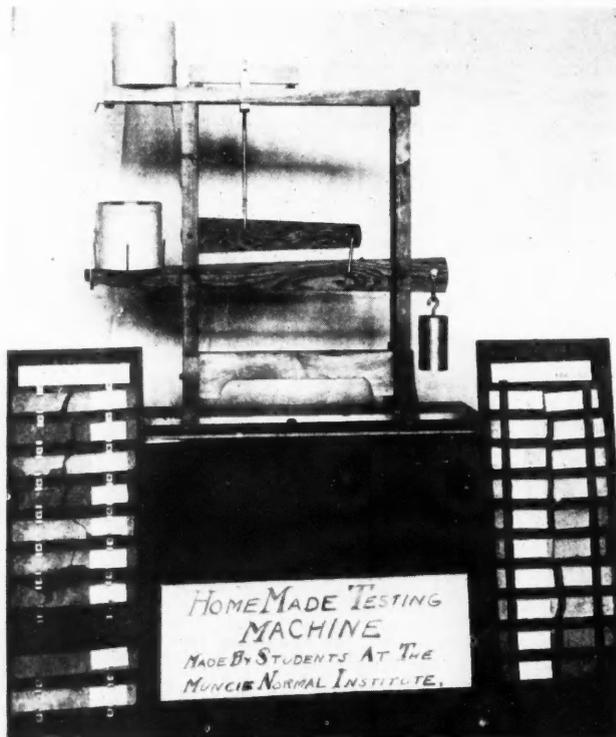
VOCATIONAL education has only within comparatively recent times attained any great recognition in this country, although in Europe, particularly in Germany, it has for many years been estimated at its true worth. In this country, its development is perhaps largely due to the extension of manual training in grade and high schools. We are familiar with the periodical exhibitions that are held to display work of school pupils, a feature of which is a wide variety of creations due entirely to manual

efforts. Many schools have developed manual training to a point where it amounts almost to vocational training. Some have complete courses in pattern-making, cabinet-making, ordinary carpentry and even violin-making. Others have manual training courses covering almost every conceivable vocation intermediate to the above extremes.

One of the most recent and interesting extensions of manual training is the employment of concrete as a medium for expression. At least a score or more of



This Class of Boys at the Plattsville, N. Y., Normal School Seem to Enjoy Learning How to Mix Concrete.



Machine for Testing Concrete Briquettes in Flexure. Made by Students at the Muncie (Ind.) Normal Institute.

prominent schools in various parts of the country have equipped workrooms and provided necessary facilities to carry on a well-planned manual training course in concrete with the limitation, however, made necessary by the material itself as related to the classroom; that is, the school work consists largely of a thoro study of the underlying principles of concrete, its composition and uses, and applying these so far as possible to the construction of objects of use or ornament, or both, such as flower boxes, flower urns, sundial pedestals, garden benches, etc.

Among the schools which have made noteworthy progress in using concrete as a medium for manual training are the Galesburg, Ill., High School; Columbus, Ind., High School, the Libby, Fallon, and Carl Schurz schools, Chicago; the Freeport, Ill., High School; Muncie, Ind., Normal Institute; La Crosse County, Wis., Agricultural School, and various of the Pittsburgh, Pa., public schools. Some of the work of pupils in several of the above mentioned institutions is shown in accompanying illustrations.

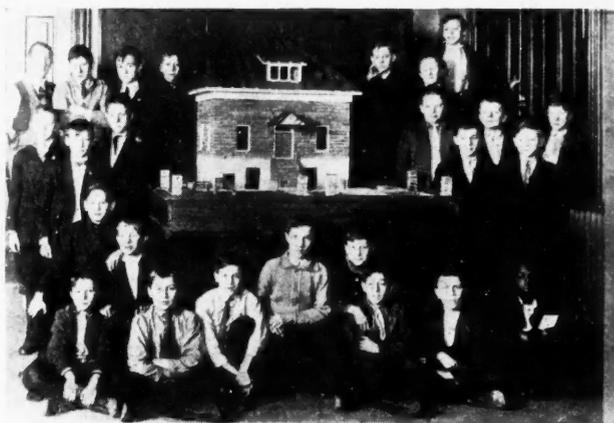
There is something about working in concrete that seems to appeal to many boys who take no interest in other branches of manual training. Perhaps it is the



One of the Finished Pieces and View of Corner of Art Stone Shop at the Freeport, Ill., High School.

instinctive or inborn trait to make mud pies, which at some time early in our careers demonstrates its presence in most of us. Perhaps the strongest appeal which concrete has made to the many schools which have investigated the possibility of using it in manual

pointments or equipment. For many of the concrete exercises prescribed in manual training courses only simple forms are required, and the making these in itself constitutes manual training in carpentry, which in many cases could in no other way be brought to interest a pupil. Before he can use concrete, he must have forms in which to place it. Therefore, manual training in concrete really involves manual training in elementary carpentry, thus serving a double purpose.

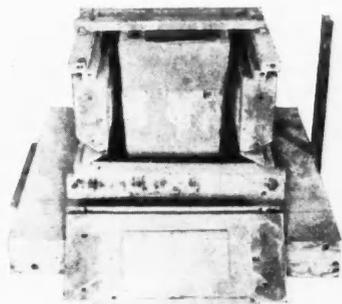


Class of Boys in Pittsburgh Public Schools and the Model Cement Block House They Made.

Experience has shown that concrete work in a school makes a strong appeal for a number of reasons. The possibilities are limited only by the individual skill and ingenuity of the worker. He soon develops a desire to execute work having greater artistic expression. This leads to attempts at modeling and results in studying up the methods of making glue or plaster molds, or both, so that the finished concrete product may be embellished with any reasonable degree of ornament desired.

(Continued to page 41.)

training, owes its existence to the fact that practically all of the materials required can be obtained at a relatively nominal cost, and the facilities necessary—that is, the class workroom requires no expensive ap-



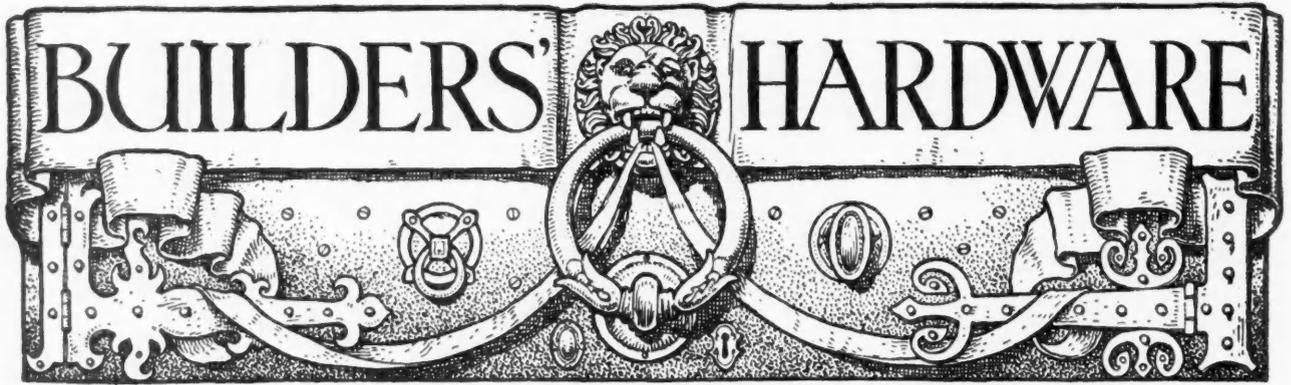
Form Made by J. A. Race and Loaned to J. L. Lewis, Principal, Raymond School, Chicago. A Class of 14-year-old Colored Boys Made the Flower Box.



Concrete Flower Boxes and Urns Made by the Sixth Grade Boys at the Fallon School, Chicago, Under the Direction of J. W. Thompson, Manual Training Instructor.



Concrete Sundial Pedestal Built by Boys at Carl Schurz High School, Chicago.



## Hardware and the Home

POPULAR AND ARTISTIC FINISHES FOR BUILDERS' HARDWARE

By Henry M. Schember

Head of Builders Hardware Dept., Hammacher, Schlemmer & Co.

**Y**EARS ago the only finishes in use were natural metals either polished, electroplated or japanned. With the builders' hardware manufacturers of today this has all been changed, as they have given deep study to the question of finishes; and the various

colors possible amount to quite a number. The body or metal on which these colors are reproduced are iron, steel, brass and bronze, and all standard colors are finished on one or the other.

The more popular finishes used and generally seen are natural brass and bronze, statuary bronze, statuary copper, antique copper, Verdi antique, old or dull brass, and Bower Barff.

The above finishes are produced by chemical action and naturally, like all

plated ware, will not hold the color forever. The wear will be the more noticeable on such parts handled a great deal, as door knobs, sash lifts, etc. Bower Barff (an invention of two men) consists of a furnace treatment at high temperature, the result being a permanent dead black finish, which, although immune to the average conditions, is not advisable for the severe outdoor purposes.

Verdi antique and the various green and brown finishes are supposed to reproduce the ancient bronzes. They are made in a wide variety of shading and some beautiful effects are produced.

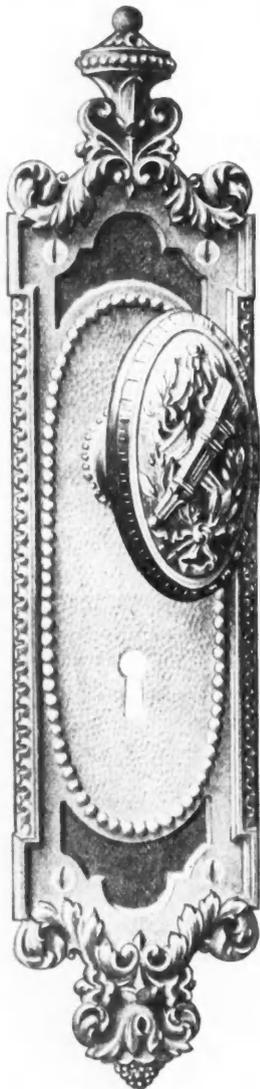
Gold and silver finishes are sometimes used, but the finish is very delicate and it depends entirely upon the manufacturer as to their durability. Where it is necessary to use one or the other the wearing qualities should be ascertained.

The textures of the surfaces of the various metals are generally as follows: Buffed, unpolished, wheeled, smooth, and sanded. The buffed surface is bright and highly polished. The unpolished is the metal as it comes from the die or mould. The wheeled surface is polished, but not buffed. The smooth surface is dead smooth without bright polish and the sanded surface is a rough fine-grain finish.

The colors that can be put on the above surfaces are of a sufficient range to satisfy the most factious client. The blending and shading has become an art with manufacturers of good hardware and that, coupled with the artistic designs, has won the confidence of the architect, builder and owner. The following will show some of the various finishes in classified form:

**BRONZE FINISHES.**  
 Natural Bronze  
 Natural Bronze Sanded  
 Statuary Bronze (Old Bronze Dark)  
 Statuary Bronze Sanded  
 Dull or Old Bronze  
 Satin Bronze  
**BRASS FINISHES**  
 Emery Finish  
 Natural Brass  
 Natural Brass Sanded  
 Statuary Brass (Old Brass Dark)

Statuary Brass Sanded  
 Antique Brass  
 Antique Brass Sanded  
 Dull or Old Brass  
 Satin Brass  
**COPPER FINISHES**  
 Natural Copper  
 Statuary Copper (Old Copper Dark)  
 Statuary Copper Sanded  
 Antique Copper  
 Antique Copper Sanded  
 Dull or Old Copper  
 Satin Copper



This Type Design is Suitable for a Sanded or Unpolished Finish.

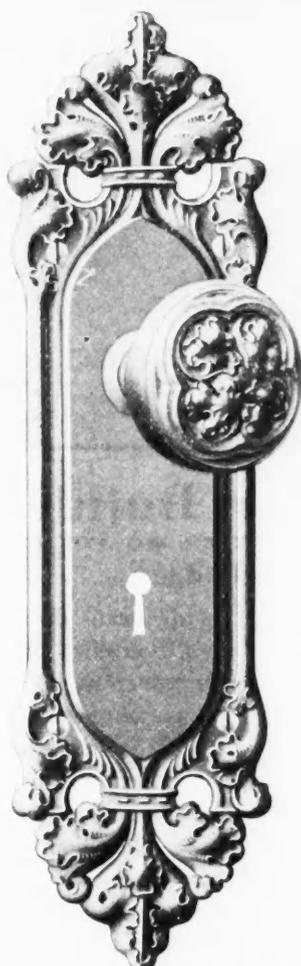


A Buffed, Wheeled or Dead Smooth Finish Will Set Off This Type Design to Satisfaction.

- SILVER FINISHES
- Silver Plated
- Antique Silver
- Dull Silver
- Satin Silver
- GOLD FINISHES
- Gold Plated
- Dull Gold
- Satin Gold
- MISCELLANEOUS FINISHES.
- Verdi Antique
- Verdi Antique Sanded
- Olive Green
- Olive Green Sanded
- Bower Barff (Dead Black)
- Nickle Plated Polished

It is understood that the above list does not comprise all the finishes and shadings that are or can be produced, but gives an idea of the more standard colors in use, and from which the various other colors and shadings branch.

Care should be taken when selecting finishes, as all colors will not match all wood. The list herewith will give a good conception of the kinds of wood in general use and will be a guide for proper harmony:



- CYPRESS, CHESTNUT, OAK OR MAPLE
- Antique Copper
- Antique Brass
- Statuary Copper
- Bower Barff
- Statuary Bronze
- Bronze Plated
- Olive Green
- Verdi Antique
- FLEMISH OR MISSION OAK
- Natural Bronze
- Natural Brass
- Antique Brass
- Dull Brass
- Statuary Brass
- Gold Plated
- Verdi Antique
- Bower Barff

Two Textures Can Be Used on This Type Design. The Flat Center Part Polished, and the Balance Unpolished.

- CHERRY OR MAHOGANY
- Natural Bronze
- Natural Brass
- Statuary Brass
- Dull Brass
- Dull Gold
- Gold Plated
- Silver Plated
- Satin Silver
- WHITE ENAMEL
- Natural Brass
- Dull Brass
- Dull Gold
- Gold Plated
- Satin Silver
- Nickel Plated

Consideration should be given as to the amount of wear certain articles will be subjected to and the conditions governing same. For outdoor trim a color should be selected with sufficient body to reasonably withstand the climatic conditions, such colors are statuary bronze, statuary copper, antique copper, antique brass, Verdi antique, olive green and the natural metals, bronze and brass. In the interior it is different as the hardware is amply protected and receives more or less attention, and, as stated before, the only thing to consider is the amount of handling it will be subjected to.

Substantial finishes which have proven excellent for service are old or dull brass, antique brass, dull copper, antique copper, Bower Barff, natural brass, and bronze.

It will be noted in the table of finishes that a sanded finish can be had, this method being especially adapted for rough or neat surfaces. Designs having plain sur-

faces are best for polished finishes. Sometimes part of the design is smooth and the balance rough; in such cases two textures are used.

Nickle-plating, which is used mostly for bathroom trim, has not proven in most cases serviceable, as the steam and the constant cleaning wears or rolls off the nickel. Of late years some manufacturers use a composition metal somewhat similar to nickel-plating, but being of a solid color throughout.



### Concrete in Manual Training

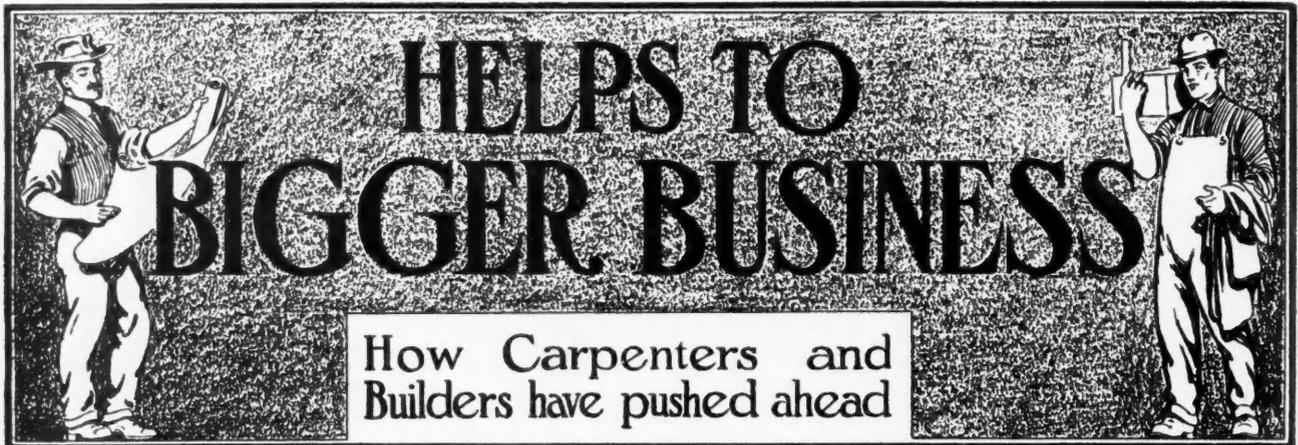
(Continued from page 39.)

One of the accompanying views is deserving of some special mention, namely, the one showing the interior of the workroom at the Freeport High School. In this picture one of the boys will be seen shaping a portion of a flower vase by using a template cut to the contour of the outer face of the vase and using it as a sweep somewhat after the manner of spinning when making clay pottery. This boy ingeniously developed this method of working on the particular vase, first having built up a clay mound on the pallet to serve as a core or form for the hollow portion of the vase, that is, the flower basin, and upon this core built up a plastic concrete mixture to approximate thickness, then struck it off to uniform shape and contour by using the template as illustrated. The finished vase, which was made in two parts, is shown filled with flowers in another illustration.

Some work of the Carl Schurz High School (Chicago) is indicated by the initials embedded in the recessed panels of a sundial, also among the accompanying views. At the Platesville Normal School, the boys have done considerable outdoor building and one of their first structures was a concrete blacksmith shop for school use. The early stages of this construction are shown in another view.

As was to be expected, the sudden popularity of concrete in manual training found most schools unprepared to meet the demand, that is, there were few if any persons competent to teach such concrete work, who were at the same time available. It therefore became necessary for teachers and pupils to work together toward mutual development. This condition, however, is rapidly righting itself in that instructors now recognize that the call for manual training work in concrete is likely to increase and hence the necessity for being prepared has been forced upon many who heretofore had given the subject no thought.

In several rural schools where concrete work is being taught, one notable advantage of the innovation has made itself apparent. Boys living on the farm have gone home imbued with the desire to put some of their school learning into practical use and have been responsible for promoting the construction of walks, hitching posts, porch steps, drinking troughs, hog feeding troughs and many similar farm improvements that were needed, yet which were awaiting the initiative of concrete in manual training.



## Advertising for Builders

MORE BUSINESS AND PROFITS THROUGH PRINTERS' INK AND OTHER PUBLICITY

By H. J. Blacklidge

**F**IRST and foremost, always have your name and address on any building you are erecting or repairing. Have several signs made, at least 3 by 4 feet, and hang or stand them in the most prominent spot on the job. Give your business in full on these signs. Make the name and business bold and prominent, then in smaller letters give the additional information, as "Agent for Blank Wall Board," "Repair Work our Specialty," "House Moving," or anything else you may wish to call special attention to.

These job signs are one of the most important items of advertising that a contractor uses. If you were to go to a strange town and should take a little stroll about after lunch and should see half a dozen jobs with "Blank and Blank, Contractors and Builders," on them and half a dozen more jobs with other names—well, you would decide that Blank and Blank were the people to see for a job, wouldn't you? Those same signs will make the same impression on people who are thinking of building.

"Nothing succeeds like success," they say, and just as sure as any one contractor has all that he can do, he will be the center of attraction for every soul that has a thought of building.

Another style of sign advertising that pulls well in most localities is what might be called "fence rail ads." But have them good ones. Don't use a cheap paper sign and hire some boy to go out and stick them up hit or miss, here and there. They should be placed along the principal roads leading into town. In small towns, suburban towns, or towns where there is an electric train service, an excellent place is opposite the depot. If you can get such a loca-

tion, by all means do so. But use a large sign here, not one of the fence-rail kind.

Never leave *any* sign up after it gets shabby. Better not have any signs at all than to have a lot of old, shabby, rain-stained frights that would make the beholder wonder if the owner was still in business. Have the lithographed metallic signs if you can possibly afford it. They come high, but last long and catch the eye.

Advertising pencils are cheap, and good if you hand them out liberally. Give one to every soul you have any dealings with. Better give out a thousand in one month than to string out several thousand over a year. Have them an exceedingly bright color, or an odd shape, or *something* that will serve to distinguish them from any other pencil in the town. Take a bunch of them to the school house some day at noon and hand one to every kid as he (or she) goes out to lunch.

And right there is one of the fine points to remember in advertising. Remember the kids! When you get

the children talking about you you have started something. Put up an acting bar for the boys at the schoolhouse, or a couple of swings for the girls, and you will get bigger returns for your money than almost any other way you can spend it. It will be, "Mamma, get Mr. Blank to fix the roof; he made us a dandy teeter up at school," "Papa, why don't you get Mr. Blank up to build the sleeping porch? He is a good carpenter; he made Mrs. Sidney's and it's the dandiest one in town." And the children's sayings often count as heavy as the older folk's.

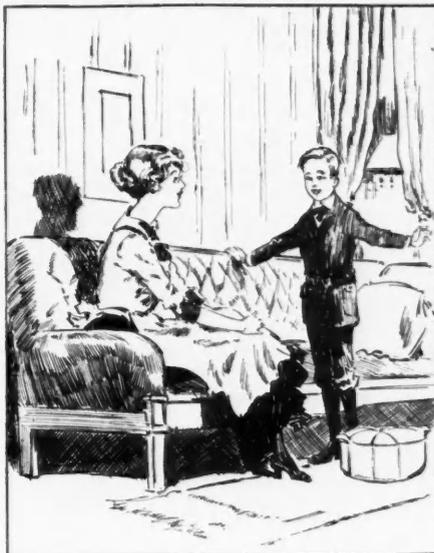
In doing anything at a school or boys' club or gymnasium, deal with the boys themselves. Go to



"Another Style of Advertising that Pulls Well is What Might be Called "Fence Rail Ads."

the trustees or teacher, tell them what you want to do and then stop at the fence some recess and suggest to the boys what a fine idea it would be to have a good high screen back of their ballground. Then offer to build one for them. Let them go and ask the teacher or school board's permission. If you are building a big building near the school invite the boys over some day at noon and show them around. Tell them all about it. And be sure to take them clear up to the top. Tell them anything that will interest them. They will be ready to swear by you before one o'clock. And you will not be bothered by any boys from that school pestering about the building after hours. The girls might be interested in the building when it is completed or nearly so, just enough still undone to show them "how it is did." Get the boys down on you and it will queer more jobs for you than anything under heaven except downright dishonesty.

Hobnob with the real estate agents. They are great advertisers. Get them to allow you to put up a neat sign in their offices. A lot of people will see it there. Real estate brokers can turn a large amount of work to a contractor if they are so minded. It will pay to cultivate them. Often you can secure permission to place your sign alongside theirs on lots for sale.



"Mamma, get Mr. Blank to fix the roof. He made us a dandy teeter up at school."

no man would attempt to do business in these days without them. But make them striking. Have a broad red or yellow band printed across the middle of them. Make them so that if one little edge is protruding from under some papers it can instantly be recognized as "Soandso's card, you can tell it as far as you can see it." It is also well to have a catch word or phrase and use it on all advertising matter—cards, letter and bill-heads, newspaper ads, signs, everywhere. I know of a real estate dealer who for years used, "Chapel Finds the Bargains."

Use all the newspaper space you can afford. And then try and see how little you can put in that

space. STUDY your newspaper ads as you would a new set of plans. Cut out every word that is not absolutely necessary. It is like going into the woods. First you gather up everything you would like to take, then cut out the luxuries, then some of the needed things, then some of the necessities and finally take just as little as you can possibly get along with. "Blank & Blank, Contractors; Phone, 843; Address," will look a heap better in a 2-inch ad than, "Blank and Blank, Contractors and Builders, Carpentry and Cabinet Making, Repair Work, House Moving, Beaver Board, Metal Shingles, George N. Blank, P. C. Blank, Brothers, Not Cousins. Phone, 3322 or Black 4821. Office, \_\_\_\_\_; Mill, \_\_\_\_\_." Oh, dear! Are you tired reading it? I am. And so the customer will be. A few words in bold black type will stand out and catch the eye where half-a-dozen sentences would be entirely lost among the other ads.

And last, always be on the lookout for a new idea in advertising. Study the idea well, and if O. K., go ahead. Originality sure counts in advertising.



**Had Part of It Already**

"OI, OI!" chortled Casey; "an' did Mahoney give yez th' black oye?"

"He did not," retorted Murphy with dignity, "he give me only th' black. Oi hod th' oye ahl th' toime."—*Exchange*.

**A Double Fumble**

"Who was that tough-looking chap I saw you with today, Hicks?"

"Be careful, Parker! That was my twin brother."

"By jove, old chap, forgive me! I ought to have known."—*J. C.*

**Misunderstanding Her Meaning**

As a hardware clerk stepped forward to wait on her, she trained her guileless blue eyes upon him and said:

"I wish you would give me a sponge bath, please."

The clerk was for a moment nonplussed, but at last managed to say:

"Do you prefer hot or cold water, miss?"

**THIS LOT FOR SALE CHEAP**  
Buy Now  
Owner Needs Cash  
**BLANK & BLANK**  
617 Fourth St., \_\_\_\_\_

**BUY NOW!**  
And let us build  
A HOME FOR YOU  
**DASH & DASH, Builders**

They go well together. Each helps the other.

Holiday souvenirs are good. But be sure to have plenty. Because, besides those you figure on, there will be a lot of other people you will have forgotten and some more you did not know of at the time and some more who will come and ask you for one as soon as they see one at the neighbor's house. Calendars are the most common souvenir. Therefore try to get something else. A local factory might turn you out a fairly large order of some small article at a very reasonable figure—a paper weight made from some wood found in the same county or state; or a small Mission frame, tray, candle holder—there are any number of small things that would be suitable. Of course novelties may be had in endless variety, but something on the order of craftsmanship is much more appropriate.

I have not mentioned business cards, as I am sure



## Noon Hour Talks by the Boss Carpenter

### Talk No. 48. Posts or Columns

#### New Series No. 5

THE BOSS TELLS ABOUT THE DESIGN OF POSTS OR COLUMNS IN BUILDING CONSTRUCTION AND SOLVES PROBLEMS

"WE have had several talks about the design of beams used in building," said the Boss, "and now we should know how to design or investigate the members which are to hold these beams in place. When the ends of beams or girders do not rest direct upon a wall or plate, they are supported by means of a post or column placed vertically on a suitable pier or foundation. These posts or columns in large buildings form a very important part of the framing and should be designed with care. Floor loads are carried by the flooring to the beams, and then to the girders, or possibly direct to the girders. The girders in turn carry a part of the loads to the posts or columns, which transmit these loads finally to the foundations.

"Columns are commonly made of timber, cast iron, steel, or reinforced concrete. Short piers for use in basements may be made of brick or plain concrete, but are then considered as straight compression members and not as true columns. The members treated in this table will be of the type represented by timber, cast iron or steel. Reinforced concrete columns are composed of two different materials—steel and concrete—and must be figured by a different method.

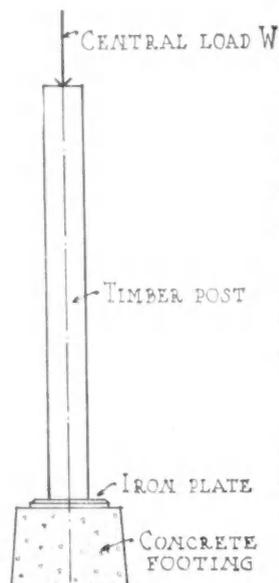


Fig. 5A. Post or Column with Central Load at Top.

"The method of loading a column or post is a matter of great importance in the design of such a member. Loads may be applied centrally at the top of a column, as in Fig. 5A, or at a point on the top away from the center (Fig. 5B), as in the case of a girder supported on a side bracket at the top of a post or column. Each

of these conditions require a different method of calculation. The posts or columns in this talk will be assumed to be centrally loaded, and eccentric loads will be explained at another time.

"Posts or columns may fail by crushing at some cross-section, by a diagonal shearing action in which a part of the material seems to slide away from the original vertical side of the piece, or by a side buckling of the entire member. The first two methods of failure are likely to occur in short columns, while the last method is almost wholly confined to long, slender members.

"While text books on mechanics give three or more kinds of end conditions of bearing or support for columns, the one commonly found in practice is the "square end" or "fixed end" member. Timber parts have the ends squared nicely before they are placed. Metal columns are provided with flanged ends or flat plates which are bolted to a flat, even surface when they are placed. Steel members which are built up are bolted or riveted with another part of the structure in such a way that the ends of the columns are fixed in direction and bear the load centrally and in the same line as the vertical axis of the member.

"Many formulas for the design of posts and columns have been proposed. Some of these are based entirely on theoretical principles; others on the results of actual tests, and a few on a combination of theory and practice. The majority of these formulas agree fairly well when applied to actual design, but those based at least

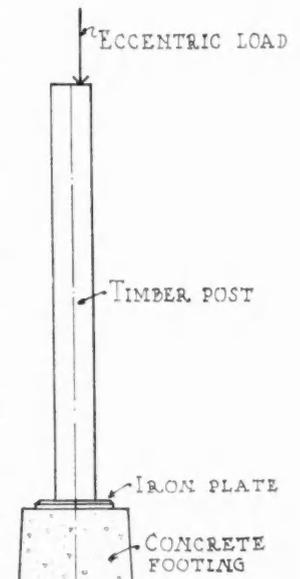


Fig. 5B. Post or Column with Eccentric Load.

in part upon experiment seem to give the most dependable results. In this talk, we will consider three of the formulas which are used to a great extent by engineers and designers—the formula proposed by the Division of Forestry, U. S. Department of Agriculture, and the Winslow formula, proposed by Mr. Benjamin E. Winslow, Mem. Am. Soc. C. E. for timber, and the Rankine formula for iron or steel. Each of these formulas should be used with a proper factor of safety (4 to 8) when applied to the design of a structure if ultimate values of strength are used. We will use working values in each case.

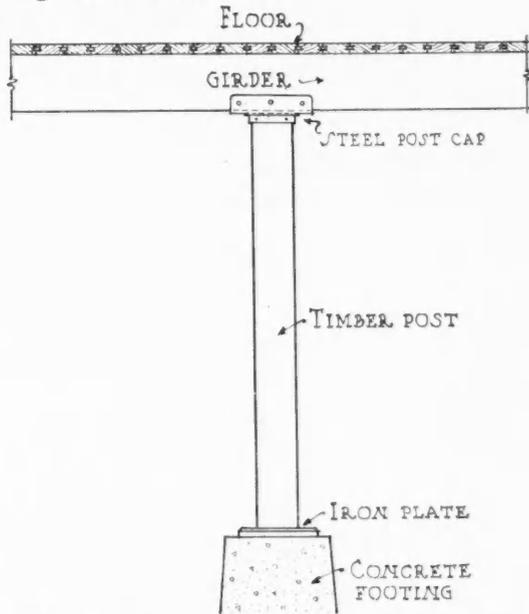


Fig. 5C. Timber Post in a Structure Carrying Load from Floor Girders.

“The Division of Forestry formula for the design of timber posts is as follows:

$$C = \frac{c(700 + 15a)}{(700 + 15a + a^2)}$$

where  $C$  is the strength of the post in pounds per square inch of cross-section,  $c$  is the allowable working compressive strength of timber in pounds per square inch with the grain, and  $a$  is the value obtained by dividing the unsupported length of the post or column in inches by the least side dimension or exterior diameter in inches.

“The Winslow formula for timber posts is:

$$C = c \left[ 1 - \frac{L}{80d} \right]$$

where  $C$  and  $c$  have the same meaning as in the previous formula, and  $L$  is the unsupported length of the post or columns in inches, and  $d$  is the least dimension or least external diameter in inches.

“The Rankine formula is better adapted to the design of steel or iron columns and is as follows:

$$C = \frac{c}{1 + B \frac{L^2}{k^2}}$$

where  $C$ ,  $c$  and  $L$  have the same meaning as explained

above,  $B$  is a constant which has a value of  $\frac{1}{6,400}$

for cast iron and  $\frac{1}{36,000}$  for structural steel when the

ends are fixed. The quantity  $k^2$  is obtained by dividing the least value of  $I$  (amount of inertia) of the cross-section of the post or column by the actual area of the material in the cross-section. The following table gives values of  $k^2$ ,  $I$ , and area for common shapes of cross-section. The values of  $k^2$  for built-up steel columns may be found in the hand books of the steel companies manufacturing the material used in these columns.

SHAPE OF SECTION	LEAST MOMENT OF INERTIA	AREA OF SECTION	$k^2$
Square . .	$\frac{d^4}{12}$	$d^2$	$\frac{d^2}{12}$
Rectangular . . .	$\frac{hd^3}{12}$	$hd$	$\frac{d^2}{12}$
Solid Circle . . .	$\frac{3.14 d^4}{64}$	$\frac{3.14 d^2}{4}$	$\frac{d^2}{16}$
Hollow Circle . . .	$\frac{3.14 (d^4 - d_1^4)}{64}$	$\frac{3.14 (d^2 - d_1^2)}{4}$	$\frac{d^2 + d_1^2}{16}$

“In the table given above,  $d$  is the least dimension of the cross-section as in the formulas above,  $h$  is the other dimension of a rectangular section, and  $d_2$  is the internal diameter of a hollow section. The square section, solid circular, and hollow circular sections are most common unless a built-up steel column is used.

“The value of  $c$  to be used in these formulas may be taken from the following table and is based upon a factor of safety suitable for use when quiet loads are present in a structure:

KIND OF MATERIAL	VALUE OF $c$ LBS. PER SQ. IN.
Timber—	
Spruce . . . . .	600
Oak . . . . .	900
Tamarack . . . . .	900
Hemlock . . . . .	900
Douglas Fir . . . . .	1,200
Yellow Pine . . . . .	1,200
Cast Iron . . . . .	10,000
Structural Steel . . . . .	12,000

“To show the use of these formulas in practice, we will solve a few problems showing the different conditions met. In the first case it may be necessary to find the size of a square timber post needed to carry a central load similar to that shown in Fig. 5C. We will assume that the material is yellow pine and that the unsupported length of the post from floor to girder is 12 feet. If this post supports the load from a sec-

(Continued to page 48.)

## Don't Let the Fear That the Other Fellow May Make a Dime Hinder You from Making a Dollar

—THE MAN FROM THE LUMBER YARD

If there are readers interested in the idea of the BUILDERS' CLUB that do not feel able to begin the initial work, we would be more than pleased to be of assistance.—EDITOR.

**W**E have gotten so accustomed to using big figures these days that we are not impressed with what would have been a nine-day wonder some years ago.

All of you read of the Preparedness Parade of June 3rd in Chicago. 130,000 people may not seem to be very many when you look at the figures.

But it was the largest parade of civilians ever known. You couldn't count that many at a stretch. Take out your watch and count to a thousand. Then count from nine thousand and one, nine thousand and two on up to ten thousand. Then count from one hundred twenty-nine thousand and one on up to one hundred and thirty thousand.

Some job! People don't count that way today. They do it by machines.

It was a wonderful sight. A steady stream of marchers, sixteen abreast, from nine A. M. until 10:30 P. M. flowed on in close ranks. The ranks had to open frequently to let mail wagons thru. Uncle Sam doesn't allow any one to interfere with his work. Otherwise there wasn't a break, no confusion, no tangling of lines. What made this possible? CO-OPERATION—CONCENTRATION.

### Being of One Mind They Came to One Place

At noon I walked over the several blocks where the hardware interests were to mobilize. They were practically empty. At one o'clock they held almost six thousand people. This was CO-OPERATION. At two o'clock they were in ranks with commanding officers in charge. Likewise all thru the day on all streets adjacent to the starting point, thousands of their own free will came together and delegated authority to their leaders, who acted on the word of one man who was practically unknown to the marching hosts



Exit Germs and Disorder. Enter System and Cleanliness.

and who never once saw a marcher. That was CONCENTRATION. Co-operation and Concentration spelled SUCCESS.

I was foot-sore after making the unaccustomed tramp. I was not only willing, but delighted to take commands from the man in charge of our section. No doubt the other thousands felt the same as I did about it.

### Not Funny But Money!

You might be more interested in an amusing story, but there is more money in reading what I have to say. Since I told of the very satisfactory results had by some builders and supply people I have found a most lively interest in the subject of BUILDERS' CLUBS.



Some Would Say Hang Together or Hang Separately.

The only reason I took so much space to tell about the big parade was to show you what could be done by CO-OPERATION and CONCENTRATION. I don't care whether it is in Chicago or Kamchatka, the same principle applies.

One reason big things are done in the big centers is because there they have big men and broad-minded men, that can and do co-operate. They do not have that enervating suspicion of the motives of others that is found so often in the smaller towns.

### Jealousy Often Throws Sand Into the Gear-Box

The greatest difficulty the people mentioned in my May letter had to overcome was petty jealousy. You may remember that there were three contractors, several carpenters, two lumbermen and one hardware man. The other hardware man would not go into anything that his competitor had to do with. It did not make a great deal of difference, as he was so narrow in his ideas and so constipated in his dealings that he would have been a hindrance rather than a help to any organization. There were only two yards in this town. Two of the contractors "hung out" at Smith's yard, and the other one at Jones'. (Jones and Smith were not the names but are used to conceal the real names.) The man who first conceived the Builders' Club idea made his headquarters at Smith's. He talked it over with the other contractor there, also with Smith. When he put it up to Jones, the latter was very favorable, and agreed to attend a meeting at Smith's. The third contractor, whom we will call Jenkins, was at first very unfriendly and tried to persuade Jones not to go to the meeting. He thought

the Smith bunch were going to put something over. He finally consented to a c o m p a n y Jones to the meeting. Everything was so easily understood—so fair to all—so much to be gained with so little effort that it was not difficult to get Jenkins lined up.

**The Lumber Yard Office Before**

The immediate results of the campaign they undertook have been told. There were by-products, however, which are well worth considering.

Smith's office was rather commodious but made no pretense of any elegance, while Jones' office was really a disgrace. When the first meeting was being held in Smith's office, and everyone was suggesting ways and means for stimulating an interest in building, one of the carpenters said to Smith: "Why don't you talk for yourself, Smith, and fix up this old shack?"

**The Lumber Yard Office After**

Smith took it good naturedly and said to Jones: "Let us set the pace." Jones told him that he was "on." Two weeks later, when they had the meeting in Jones' office, they found a remarkable change. Where the old, dingy stove had stood in its box of sand filled with tobacco-juice, was a cheer-radiating base-burner. The germ-loaded atmosphere had been

**Saw Dust**

*Conserve your profits by being friendly with your competitors.*

*Opportunities are found by those who seek.*

*Only the selfish seek the hurt of any fellow-man.*

*Pleasure as well as profit in business demand reciprocity.*

*Eliminate friction from business and it becomes a joy.*

*Real success is never built on the downfall of any.*

*An enterprise that helps your neighbor, helps you.*

*The wise man succeeds best, because he works along the line of least resistance.*

*Imitate a friendly spirit and see it grow.*

*Ordinary ability, plus reciprocity with and for others, spells success.*

*Nature avoids Obstructions, why not man?*

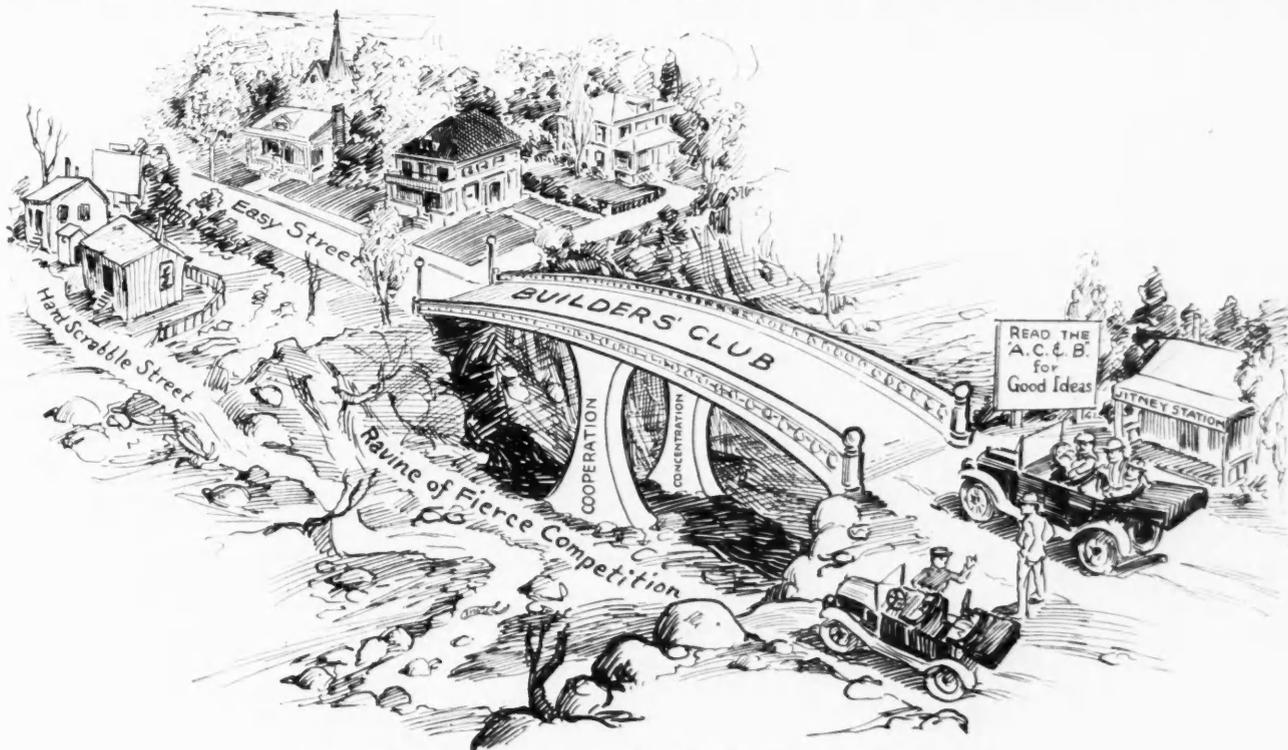
**CONCENTRATION** wins where scatteration fails.

cleaned out with the cobwebs that were routed out of the corners, and by the paint that brightened the woodwork, also the water that cleaned the floor, so that a woman would not want to leave as soon as she entered. The walls had been covered by wall-board in panels. On each panel which acted as a frame was shown pictures of buildings. Jones had fixed up a special corner that he called the "BUNGALOW corner." In the panels of this corner he showed pictures

of various types of bungalows, and with each he showed the blue-print. In order to show different types of wall-board, mill-work, etc., he had made frames, 24 by 12 inches, in which he set all varieties of wall-board. These were hinged so as to fold back out of the way. He sampled on these mill-work and woods finished in various styles. Last, but not least, a high brass cuspidor occupied a conspicuous position and plainly said "don't spit on the floor."

**What Do Your Surroundings Mean to You?**

One of the carpenters covered the case when he said "A fellow's gotta be a gentleman in here." Jones expressed himself as feeling clean, as tho he had taken a bath. "I figure out that I spend more hours in this room than any other. I believe I have hurt myself



Which Jitney Will He Take if Guided by Good Business Judgment?

and my business by not keeping it cheerful and attractive. Even if I don't get my money back I will get more out of life."

#### Lost or Strayed

But I got off of the point I wanted to make, viz: It pays to CO-OPERATE. It oils the bearings. It goes with and not against the current. It means all pushing for each and each for all. It is constructive, not destructive.

Don't let the fear that the other fellow may make a dime hinder you from making a dollar. Many a man has been put on the rocks because he wouldn't let the other fellow make a profit.

Jenkins was originally a man of this type. Yet, he told me that he had not only never had so much profit out of his work, but he had real delight and pleasure in his association with his competitors, after he knew them.

My dear sir, don't you know that your competitor is probably as nice a man as you are—and possibly as honest and square dealing? Get acquainted and help each other with your problems. Concentrating their efforts thru the BUILDERS' CLUB—concentrating on an especially effective program put money into the pockets of all.

#### Why Pass Up the Roast-Beef and Mashed Potatoes?

The reason I am so deeply interested in this is because I remember the fierce competition among all the people interested in the building line, when I was a youngster.

I know hundreds of good fellows that don't get out of life what they are entitled to, because of fear of the other fellow, who in turn is fearful. Many will read this and say, "Yes, that's a good idea," and then sharpen his pencil to re-figure some specification, to see how much he can cut off. Such a fellow reminds me of my brother who had the family trait of being pig-headed. One Sunday we had a corking good dinner of roast beef, gravy and mashed potatoes. Everything was lovely until my brother was refused permission to take the horse and buggy out. That threw him off center, and he passed up a good dinner and sulked because everything didn't come his way.

The idea of the BUILDERS' CLUB won't do any good unless it is put into use.

Sincerely yours,  
THE MAN FROM THE LUMBER YARD.



#### Posts or Columns

(Continued from page 45.)

tion of floor 16 feet by 16 feet in size and loaded with 150 pounds per square foot dead and live load, the total central load carried will be 38,400 pounds. We will use the Winslow formula to find the number of square inches of cross-section needed.

$$\frac{38,400}{\text{Area}} = c \left[ 1 - \frac{L}{80d} \right]$$

$$\frac{38,400}{d \times d} = 1,200 \left[ 1 - \frac{12 \times 12}{80 \times d} \right]$$

$$\frac{38,400}{d \times d} = 1,200 - \frac{1,200 \times 144}{80d}$$

$$38,400 = 1,200 \times d \times d - \frac{1,200 \times 144 d}{80}$$

Dividing both sides by 1,200,

$$32 = d \times d - \frac{9}{5} d$$

Approximately,

$$32 + 2d = d \times d$$

"By trial, we see that the number which will satisfy this equation is about 7. This means that the nearest commercial size of timber that we can use will be an 8 by 8-inch post, which is actually 7½ by 7½ inches when it is surfaced on all four sides.

"If the problem is reversed and we wish to find the central load which can be carried safely by a 10 by 10-inch (9½ by 9½-inch actual) Douglas fir post, S-4-S and 14 feet long, we can solve by each of the formulas. First by the Winslow,

$$C = 1,200 \left[ 1 - \frac{14 \times 12}{80 \times 9\frac{1}{2}} \right] = 936 \text{ lbs. per sq. in.}$$

Then  $9\frac{1}{2} \times 9\frac{1}{2} \times 936 = 84,500$  lbs.

This is the central load which could be carried with safety.

"Solving the same problem by the Division of Forestry formula,  $a = \frac{14 \times 12}{9\frac{1}{2}} = 17.7$  (nearly).

$$C = \frac{1,200 (700 + 15 \times 17.7)}{(700 + 15 \times 17.7 + 17.7 \times 17.7)} = 907 \text{ lbs. sq. in. (nearly).}$$

Then  $9\frac{1}{2} \times 9\frac{1}{2} \times 907 = 81,800$  lbs.

"While the answers by the two methods do not agree exactly, they are near enough to show the value of the two formulas.

"If it is desired to find the load that a hollow circular cast iron column 12 feet long, 6 inches outside diameter with metal ¾ inch thick will carry with safety, we will use the Rankine formula filled in as follows:

$$C = \frac{10,000}{1 + \frac{1}{6,400} \times \frac{(12 \times 12)^2}{(6^2 + 4\frac{1}{2}^2)}} = \frac{10,000}{1 + .92} = \left. \begin{array}{l} 5,208 \text{ lbs.} \\ \text{sq. in.} \end{array} \right\}$$

Then  $\frac{3.14 (d^2 - d_1^2)}{4}$ , the area of a hollow circle will equal  $\frac{3.14 (6^2 - 4\frac{1}{2}^2)}{4}$ , or, 12.3 sq. in. Multiplying 12.3 by 5,208, we have 64,050 pounds (nearly) as the allowable load on the column.

# Moving an Artistic Cemetery Cobblestone Arch

AN UNUSUAL JOB FOR THE BUILDING MOVER SUCCESSFULLY HANDLED

By Frank C. Perkins

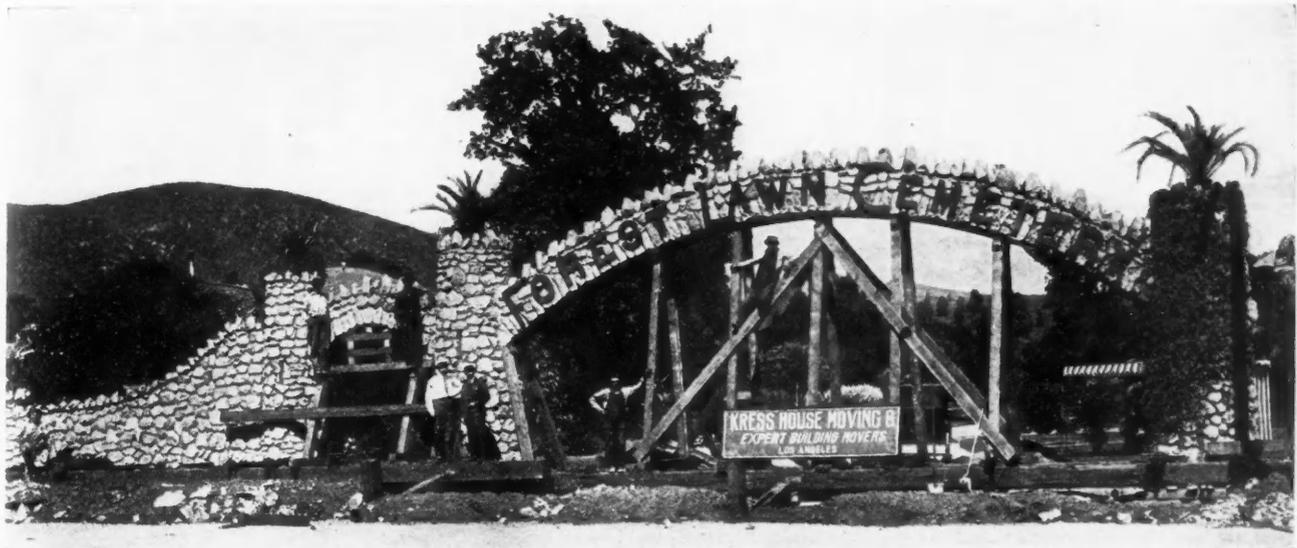


Fig. 1. An Unusual Moving Job at Los Angeles. Span of Stone Arch is 38 Feet.

THE accompanying illustration Fig. 1 and drawing Fig. 2 show the methods employed in the moving of an artistic 38 ft. stone arch spanning a cemetery entrance at Los Angeles, Cal. The arch, with its abutment piers and flanking sidewalk arches, forms a piece of cobblestone masonry 105 ft. long and the portion moved is a 90 ft. length of the structure.

The moving was made necessary by a change in the street alignment at the entrance, which beginning about opposite the right hand main abutment amounted to a shift of about 6 ft. The span of the main arch is 38 ft., the sidewalk arches 7 ft., and section of main arch, 30 x 36 in. The main abutment piers measure 6 ft. in diameter at bottom, 4 ft. at top and 18 ft high, while the sidewalk abutment piers are 4 ft. thick at bottom, 3 ft. at top and 15 ft. high, with no reinforcement in the masonry at all.

There were two 20 x 20 in. timbers 60 ft. long forming the main base or support for the structure in moving and they were placed on either side, stretching along arch piers and the wing wall. The weight of the piers was transferred to them by steel needles of I-beams and rails while the main arch was carried by two 24 ft. lengths of plank laid against the intrados

and supported by A-frames resting on main timbers.

Other A-frames carried the left hand sidewalk arch—the right hand sidewalk arch, not being included in the section to be moved, had been cut loose alongside the main pier. When supports and needles were in position, the main timbers were jacked up to take the load and to bring the runways into position. The moving was done by jacks pushing horizontally against the timbers as illustrated.

It is of interest to note that the main arch and the structure to the left in photograph Fig. 1, are supported on the needles and bents ready to be shoved back horizontally in their new location. This cobblestone arch and wing-wall which was moved 6 ft. by regular house-moving methods had a total weight of about 125 tons. It was moved for \$650, which is about half the estimated cost of tearing down and rebuilding the masonry, and the work was done within ten days. It is said that the time taken was only one-fourth of the time that it would have taken to wreck and rebuild the arch, the alternative originally considered. Not a crack was found in the masonry after the structure was placed on its new foundation, the moving being a complete success.

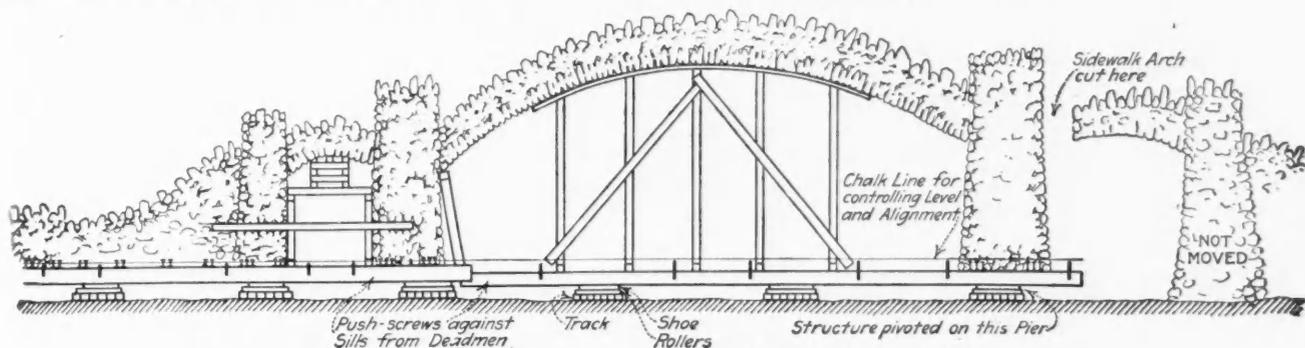


Fig. 2. System of Props and Foundation Timbers Used in the Moving of Cemetery Gate.

# IDEAS FOR HOME BUILDERS

## California House of the Chalet Type

By Charles Alma Byers

THERE is a combination of simplicity and individuality about the American architect adaptation of the Swiss chalet that is particularly commendable. Of course, there are many and various interpretations of the style, but a general appearance of plainness in the structural lines, with just a suggestion of rusticity, is invariably retained.

The house here shown is a particularly interesting example of this type of home as found in California. Cool and inviting porches and balconies usually constitute a prominent feature of the style, and in every other way are these houses planned to induce one to spend much of his time in the pure, fresh air of the out-of-doors. Across the front of this house, on the ground floor, extends a deep veranda and uncovered terrace, and above is an especially roomy balcony, while in the rear is found another second-floor balcony. On the first floor is also a large sun porch, in the rear, and above is an unusually large screened sleeping room—both being features that make the plan of this house of more than common interest.

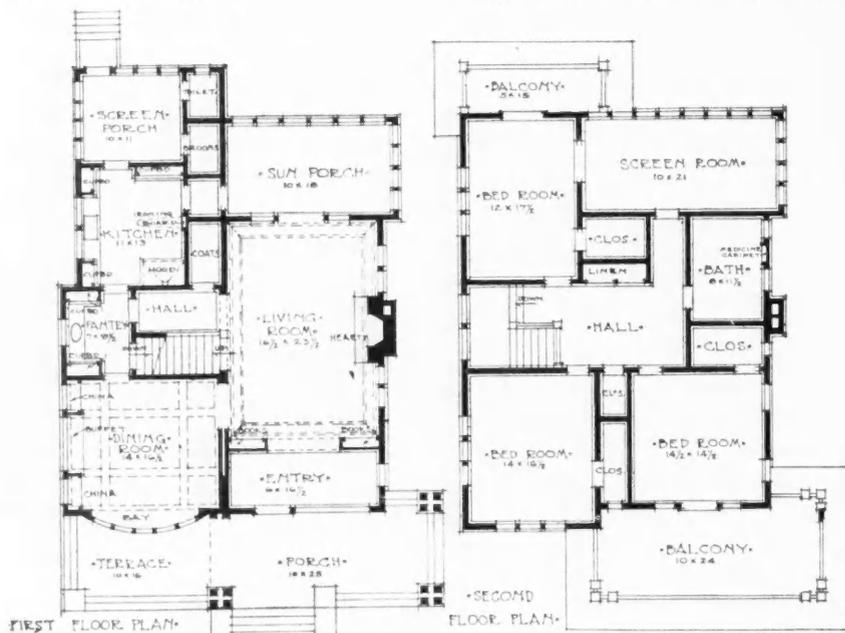
As will be observed, the roof is of comparatively slight pitch, with wide overhangs in the eaves and gables. The covering is of white asbestos-like composition. The siding is of sawed red-wood shakes, laid with about 16 inches of their length exposed to the weather, and spaced approximately  $\frac{1}{2}$  inch apart. On line with the tops of the doors and windows of the first floor runs a narrow timber belt, to help in overcoming an appearance of too pronounced severity, while, with the same aim in view, an asbestos roll extends across the gables, 16 inches above the tops of the second-floor windows. The chimney and porch piers and walls are constructed of plain brick and plastered with concrete, pure white in tone. The porch and terrace flooring, as well as all walks and steps and the caps of the piers, are of cement. There is a basement to the house, 12 by 20 feet in its dimensions, which is walled with concrete and floored with cement, and the house's concealed foundation is likewise of concrete. The exterior finishing timbers, which are of Oregon pine, are square sawed and unsurfaced, and the porch and balcony railings are of such construction. The siding shakes are stained a soft brown

color, and the trimming is done in a brown of considerably darker shade.

The arrangement of the interior of this house is especially good, and the accompanying floor plans should be closely studied. On the first floor are several built-in conveniences that will be especially appreciated by the housewife, and the large number of roomy closets will delight her still more. The rooms are tastily finished and decorated,



View of Living Room, Looking Toward Entry.



Arrangement of Rooms in Chalet Type Dwelling Illustrated on Opposite Page.

and in every other way they appear very cozy and homelike.

The front door opens into a sort of entry, or reception hall, and leading from it to the living room is a broad open arch. At either side of this opening, on the living-room side, is a spacious built-in book case. This room contains a fireplace, with mantel and hearth of old-gold brick, of simple construction, and from the opposite side of the room ascends the staircase.

The dining room is shut off from the living room by sliding glass doors, and in this room is a simple little buffet, with a china closet at either side. A



Dining Room in Los Angeles Chalet Type Dwelling. The Arrangement of Buffet, China Cabinets, and Windows is Especially Well Handled.

large plate-glass window is set above the counter-shelf of the buffet, and above each of the china closets is a small leaded-glass window. A bay with a total of five casement windows is a feature of this room, on the front.

The woodwork of these two rooms is of California redwood, which is simply waxed and therefore possesses nearly its natural color, and the flooring is of quarter-sawed oak. The walls of the living room, as well as of the entry, are covered with grass cloth. In the dining room the lower portion of the wall is paneled, with a plate rail along the top edge, and the wall space above is papered. The ceiling is beamed. The height of the first-floor ceiling is 9 feet and of the second-floor ceiling, 8 feet 6 inches.

Between the dining room and the kitchen intervenes a small pantry, with the customary cupboards, and from it descends the stairway to the basement. The kitchen possesses, besides the usual conveniences, a disappearing ironing board, which folds up into a tiny wall

cabinet, and a hood for the range. Back of the kitchen is the screened porch, with its wash tubs, and off of it is a small closet for brooms, as well as a lavatory. A hall leads from the pantry

to the living room, and between the kitchen and the sun porch is a similar passageway. French doors also lead into this sun porch from the rear end of the living room.



Chalet Type Dwelling at Los Angeles, Calif., Costing \$5,500. E. B. Rust, Architect.

The woodwork of the pantry and kitchen is white enameled, and the lower part of the plastered walls is hard finished and likewise enameled. The walls above are tinted. In the screened porch and the sun porch the woodwork is painted a light brown color. Casement windows on two sides of the latter enable the porch to be converted into a closed room if desired. The flooring in this part of the house is of pine.

On the second floor are three bed rooms and the bath room, besides the screened room and the balconies previously mentioned. Each of the bed rooms has a closet, and in the hall that forms the necessary connections is also a closet, besides the usual linen closet. The woodwork in all of these rooms is white enameled, and the walls of the bed

rooms are papered. In the bath room the finish of the walls is similar to that of the kitchen, and the flooring is of tile. Pine flooring is used thruout the remainder of the second floor. The screened sleeping room is provided with casement windows that may be closed when desired. French doors lead from the front bed room on the right to the front balcony and similar doors lead from the rear bed room to both the rear balcony and the screened room.

The house is heated by a hot-air furnace, located in the basement. The construction is warm and durable thruout, making the house suitable for duplication in almost any climate. The home is located in Los Angeles, Cal., and was designed by E. B. Rust, an architect of that city. The total cost was \$5,500.

feature is its unusually attractive entrance way. This is about eight feet square with the front door located at the center of the back and a built-in seat at either side. This enclosure has red brick floor, above which there is an opening in the roof, which is now covered by growing rose vines. The ex-

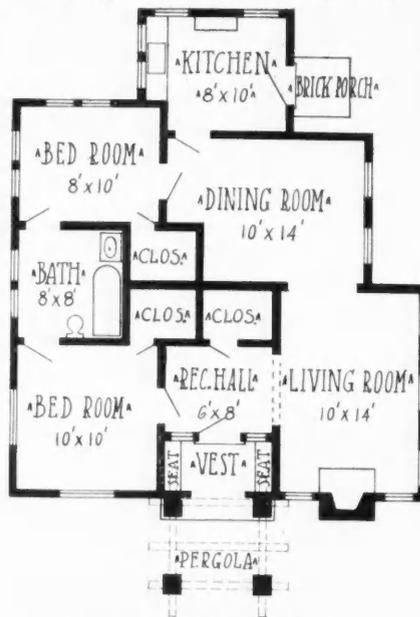
## Two Artistic California Bungalows

IN no part of the country is being shown so decided a preference for a particular style of architecture as in California for the bungalow. And their bungalows are different from those being built in the East. The mild climate is favorable to the use of lighter materials, and the low flat buildings which would seem out of place elsewhere, harmonize perfectly with things out there.

The home of J. Glenwood Jones (Bungalow No. 1), 715 Central avenue, Glendale, California, is the direct result of the leaning of the residents of California toward the flat or squatty home. From the street it appears as though the roof of this home was flat, but this is not the case. Although it has a slight pitch it is hidden by the two-foot extension upward of the walls of the home beyond the roof proper. The covering of the roof is paper, commonly called composition. The building is practically square and contains six rooms, bath and screen porch. The prominent brick chimney is one of the pretty features of this home. It is five feet in width and is made of common

red brick. There is a wide brick fireplace built in connection with this chimney.

Possibly this home's most attractive



Floor Plan of Jones Bungalow.



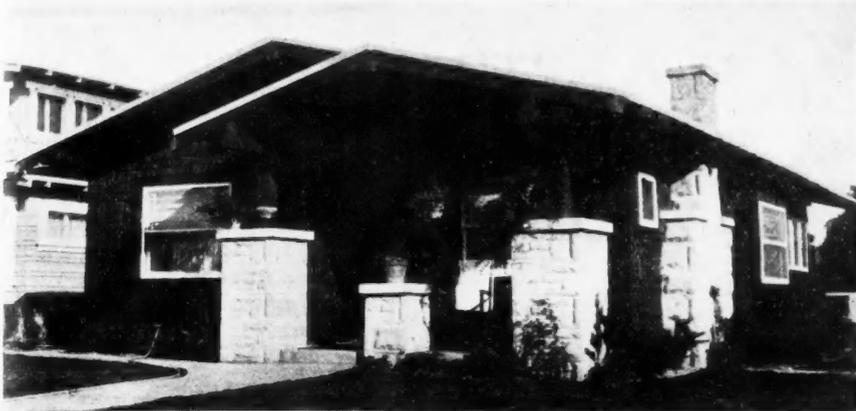
Bungalow No. 1. Home of J. G. Jones, Glendale, Calif.



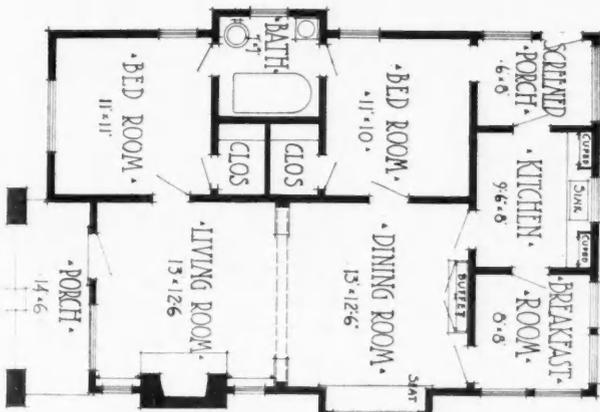
Pretty Seat in Entry of Jones Bungalow.

terior of the home, including the pillars of the pergola at the front, is covered with sawed shakes and is finished in gray, the trimmings being of white. About this home flowers and vines of many kinds abound, these greatly enhancing the home's appearance. This bungalow cost something like \$2,500.

Another pretty example (Bungalow No. 2) is seen in the residence of G. J. Welling on La Brea Court, Tropic, Calif. This is a dandy little place containing five rooms, bath and screen porch and could be duplicated for about \$1,500. There are two bed rooms, living room, dining room, kitchen, bath and porch, all being modern in design and beautifully finished in slash grain Oregon pine. At the right side of the front there is a nice porch having cement floor and extension roof, beamed effect, etc. The pillars at the front of this house are made of cement blocks and harmonize nicely with the modern chimney. The body of this cement work has the appearance of genuine stone, while the caps of the pillars and also of the flower holders of the chimney are finished smooth. Within the living room and connecting with the outside chim-



Bungalow No. 2. Home of G. J. Welling, Tropic, Calif.



Floor Plan of Welling Bungalow.

ney is a wide cement fireplace, having a small window above the mantel shelf on either side.

The exterior walls are covered with

sawed shakes and have been stained a dark green, while the roof covering is of paper. This home was designed and built by Charles M. Retts of Tropic.

ALBERT MARPLE.

Cozy Shingled Bungalow

This pleasant looking residence was put up for Mr. A. B. McCullough, Point

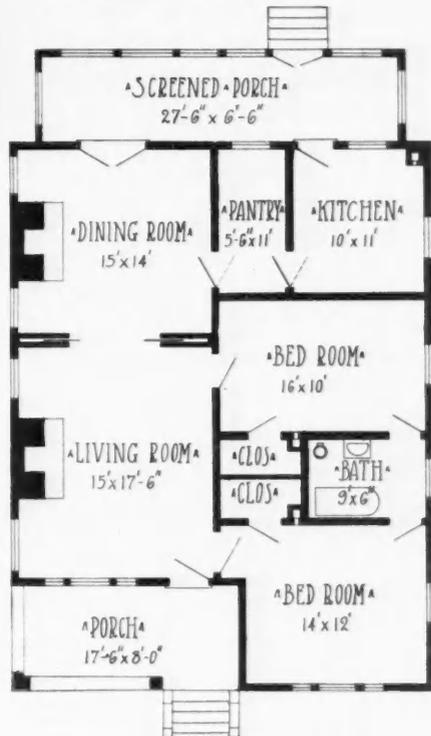
Pleasant, W. Va., by Mr. A. H. Wagner, Kanauga, Ohio.

An economical use of space has allowed for a 15 by 17-foot 6-inch living

room, and a 15 by 14-foot dining room, two good bed rooms, a convenient bathroom, compact kitchen, and roomy pantry. A full width porch, screened, offers additional room during warm weather.

Folding doors separate dining and living rooms, and each room has a fireplace.

A rather unusual feature is the arrangement by which the bathroom can be entered from either bedroom.



Floor Plan of Wagner Bungalow.



Five-Room Shingled Bungalow Planned and Built by A. H. Wagner, Kanauga, Ohio.



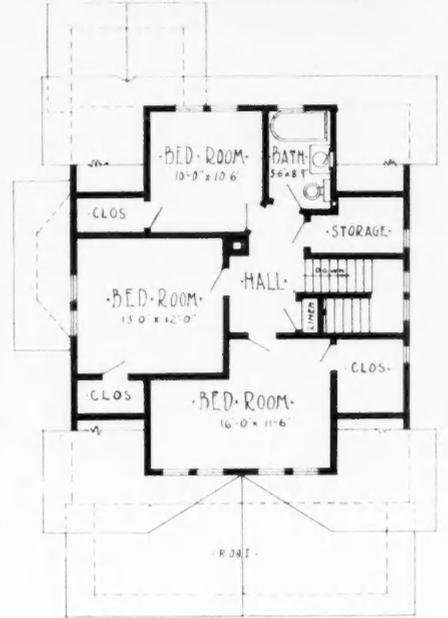
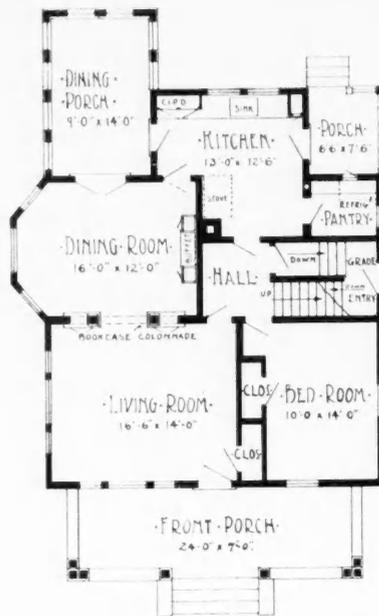
**A Cheap Seven-Room Bungalow**

The pleasing little bungalow design shown here is an example of what may be built at a reasonable expense, and at the same time contain a great many desirable features, crowded into a house of rather moderate proportions.

The first floor contains a well-lighted living room, dining room, kitchen, bed room and dining porch. Entrance from the front is into the living room. Between this room and the dining room is an especially attractive bookcase colonnade which will also prove to be of considerable use in this part of the house.

The kitchen is arranged with the cupboard, sink and cabinet all along the outside wall. Entrance to the dining porch is from the kitchen and dining room. This porch is a very pleasing feature.

The second floor contains three bedrooms, a bath, and storage space.



**First Floor Plan. Second Floor Plan.**  
**Arrangement of Bungalow, Size 33 feet by 42 feet.**



Seven-room Bungalow, both cheap and attractive. Size, 33 feet by 42 feet. We can furnish complete set of blueprinted working plans and typewritten specifications for only \$8.00 per set. Blueprints 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. 6811.



Seven-room stucco house. Size, 30 feet 6 inches by 34 feet. We can furnish complete set of blueprinted working plans and typewritten specifications for only \$10.00 per set. Blueprints consist of basement 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. 6793.

**Seven-Room Stucco House**

A feature of especial attraction in this neat stucco home is the exceptionally generous proportions of the down-stair rooms. The living room, extending as it does across the entire width of the house, with the fireplace at one end and the stair at the other, offers an inviting effect to anyone entering the front door.

The cased opening into the dining room gives a view of this large room, with its built-in buffet at the rear, from the front of the house, and offers the housewife an excellent opportunity to make a very pretty display of her fancy ware and dining room furniture.

The pantry placed between the dining room and kitchen greatly facilitates serving and reduces the work in this portion of the house very materially.

A bed room is also furnished on the first floor, which is a desirable feature in a family where the older folks like to avoid walking up and down stairs as much as possible.

The rooms of this floor are well lighted thruout, and the closet space furnished is sufficient for not only the bedroom, but also any table linen or other material may be stored if necessary.

A hall across half of the upper floor, from which all of the rooms are access-

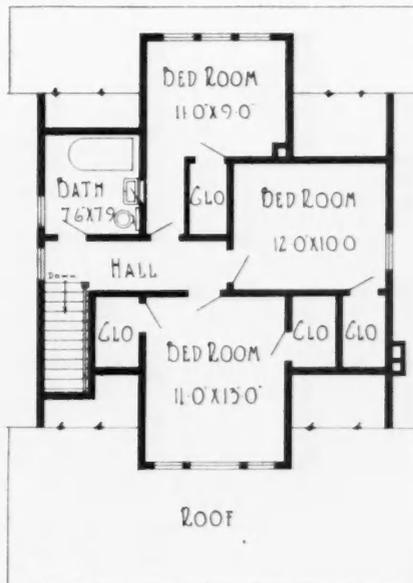
ible, is an arrangement which will be appreciated in case of sickness, as is also the built-in medicine chest with mirror-front door in the bathroom.

The exterior design with its possi-

bility of any color in stucco finish, its broad porch with attractive concrete block rail, its outside chimney, and generous rear porch is worthy of note. This home is one which combines all of the advantages of the two storied structure with the pleasing appearance of the bungalow.



First Floor Plan.



Second Floor Plan.

Arrangement of seven-room stucco house, 30 feet 6 inches by 34 feet.



Nine-room Dutch Colonial home. Size 35 feet 6 inches by 30 feet. We can furnish complete set of blueprinted working plans and typewritten specifications for only \$12.00 per set. Blueprints 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. 6797.

**Dutch Colonial House of Pleasing Design**

Here is shown a type of house that is especially popular in the eastern part of this country. It admits of many possibilities in finish and style and has that peculiar air of dignity and comfort that is distinctive of Colonial homes.

The arrangement of the porches, the white stucco finish, the stone chimney, and the window arrangement make a combination of impressive appearance.

The two Dutch dormers prevent the

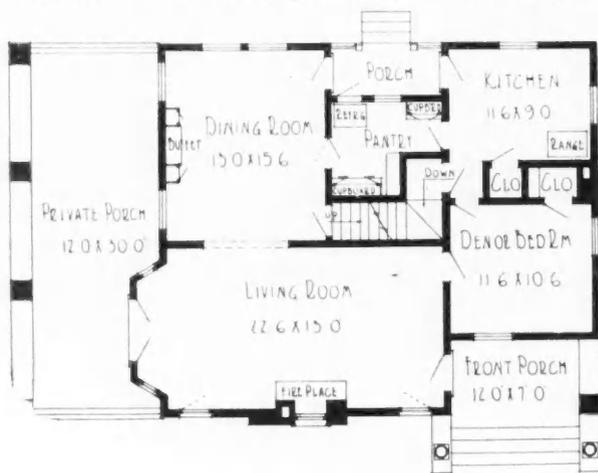
house from seeming to have too steep a roof and also add a large amount of space to the second floor. The many windows in these dormers also will assure well lighted rooms on this floor.

The living room is a beautiful large room such as everyone likes to see in a house. A double door is built in the end in a projecting bay that leads to the large private porch. Arrangements are often made to screen in porches of this kind.

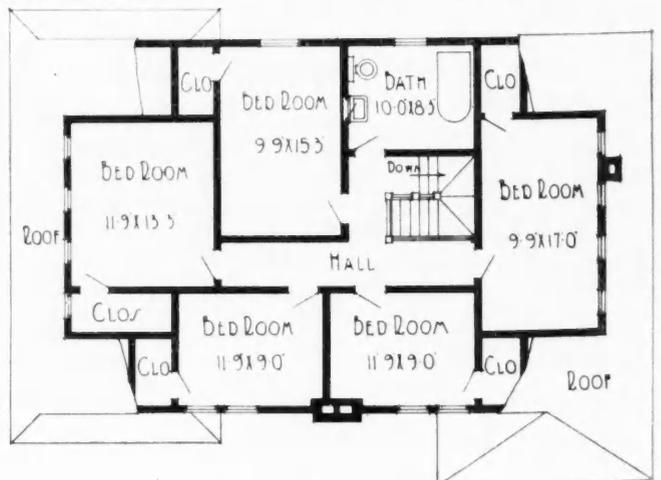
A den, the dining room, and the kitchen

are located on the first floor and five bedrooms with a bath are included in the second floor plan. All bedrooms are independent of one another and are well furnished with closet space.

This house is distinguished by many points of individuality such as the massive masonry chimney with inset window and the quadrant windows in the attic space above the second floor. The private porch may be furnished in keeping with the Colonial style of the home.



First Floor Plan.



Second Floor Plan.

Arrangement of House. Size 35 Feet 6 Inches by 30 Feet.

**Homelike Bungalow of Five Rooms**

Comfortable, simple lines are illustrated here by this little bungalow. A straight hip roof is used with a projecting dormer as the only break in its surface. The hip roof is very useful in this type of house because of the space that can be furnished in the attic. Even if this is not used, the air space provided will keep the main floor cool in the hottest weather. This space is also very desirable in a small house for storage.

The walls are finished with siding and the roof is shingled. The cobblestone chimney is a pleasing feature of the exterior. The broad front porch, extending across the front of the house is attractively decorated with the block columns and the simple railing.

The living room and the dining room form an attractive combination. The entire wall between the two is removed which gives the effect of one big room. Part of this partition between the two rooms is occupied by a colonnade with a seat on the living room side and a china case on the dining room side. The two rooms are connected so closely that care should be taken in choosing the furnishings of the room. They will have to be much alike so a design must be chosen that will be suited to both the rooms. This is not so easy

as the uses to which the rooms are put vary considerably.

The door from the porch opens into an entry which has a small closet for wraps. The other side of the entry has a cased opening that leads to the living room. The view from this entry of the fireplace, the broad seat and window in the dining room and the wide opening between the two rooms is very striking.

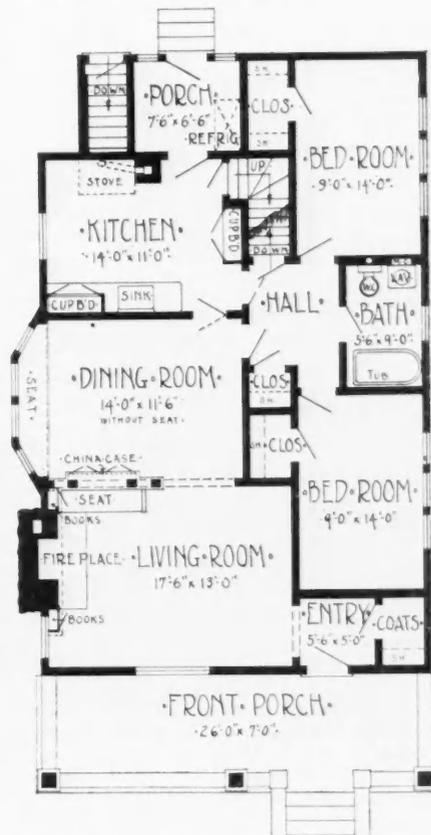
The back porch is built into the house. It is large enough so that it will be valuable as a kitchen annex.

The kitchen is of good size and is conveniently arranged. Many housewives prefer cupboards to a pantry and there are several advantages that cupboards possess. They can be placed in the most convenient place and are always so easy to get at. This plan includes two, both conveniently located with regard to the dining room entrance.

The size of the house makes it possible to have a basement of a size that will be very useful. Sufficient headroom is provided so that a heating plant can be installed of any type that is desired. The basement can also be partitioned off into rooms which will increase its value to a large degree. Very often heavy concrete walls are used for this purpose which will allow the construction of a cold storage room where fruit and vegetables can be kept. If such a room is to be provided it should

be placed as far from the furnace as possible.

Two bedrooms with a bath between are provided in the floor plan.



Floor Plan of Cottage. Size 30 by 44 Feet 6 Inches.



Attractive bungalow of simple construction. Size, 30 feet by 44 feet 6 inches. We can furnish complete set of blueprinted working plans and typewritten specifications for only \$6.00 per set. Blueprints consist of basement plan; roof plan; main 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. 6808.



Seven-room family house. Size, 27 feet 9 inches by 46 feet. We can furnish complete set of blueprinted working plans and typewritten specifications for only \$10.00 per set. Blueprints 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. 6725.

### Seven Room Shingle Sided House

Plenty of room for a comfortable family home are features of the house shown here. All the rooms are of good size and the four bedrooms make this a practical family house. Also the size and arrangement of the living room is a feature of considerable value in considering this house.

The walls and roof are stained dark and contrast in a pleasing way with the white sash.

The entrance to the house is on the side and the private porch at the front of the house is reached thru French doors from the living room.

It is really necessary to see such a house as this to appreciate the many features of comfort and convenience that are included in the plan. The large living room, the attractive dining room and the compact, convenient kitchen are all features that cannot be described but present the best possible plan for a well arranged house.

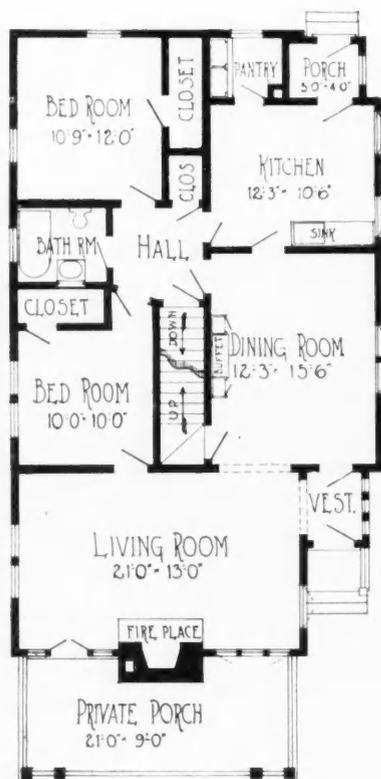
The ample closet space on both the first and second floors will be a source of joy to the housewife who has such a home as this. The large amount of room available in this home makes this arrangement possible.

From the front porch the entrance leads to a small vestibule which opens into the living room. There is also a door in the back of the vestibule leading to the dining room.

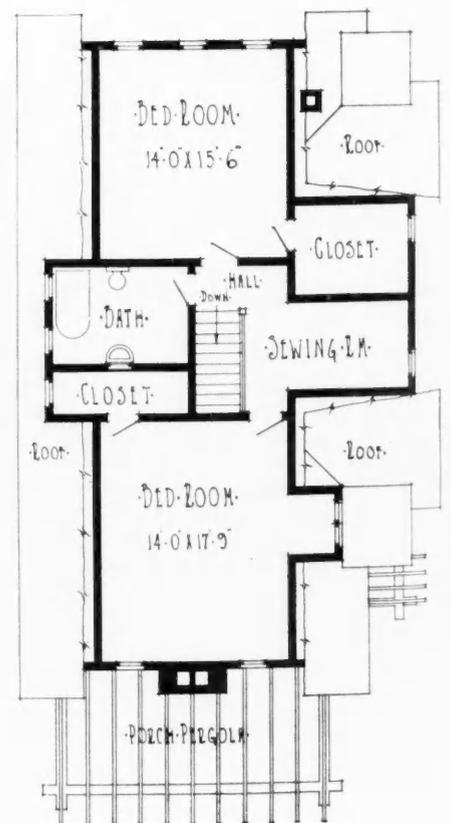
There are two bedrooms on the first

floor with a bath between and a hallway is included to make all the rooms accessible. Two more bedrooms are included in the second floor plan. There is also

a small sewing room built into one of the dormer windows. A bathroom is also built into one of the roof dormers. A hall is also arranged for on this floor.



First Floor.



Second Floor.

Arrangement of House. Size 27 Feet 9 Inches by 46 Feet.

## Modern Rustic Bungalow

A rustic and attractive exterior is a feature of the bungalow shown here as Design No. 6805. The construction of the cobblestone pillars and the decoration of the gable are decidedly unusual. The gable is decorated with wide boards or siding which have a decorative design cut in each board. It illustrates a very pleasing way of handling one of the details of a house to the best advantage. Attention to details such as this makes the distinction between a real home and a house.

The floor plan shows careful work in arranging the rooms for the maximum amount of comfort and convenience. Six rooms are provided and there is also a sleeping porch—a feature in home construction that is becoming more popular all the time. Many people, that are living in older houses, feel that the sleeping porch is one of our modern fads that will soon disappear, but anyone that has lived in a house which includes a sleeping porch in the arrangement will consider quite a while before taking a house without one. They are particularly appreciated during the warm weather and, even during the cold weather, the plentiful supply of air makes a person feel so much better in the morning than if he had slept in a stuffy room. Every home with a sleeping porch is a health resort.

The bungalow, in order to look

its best, must be rather wide and should be on a rather wide lot also. Some types of buildings will stand crowding all right, but the bungalow is not one of them. It always looks its best set off a little by itself. This bungalow is 34 by 48 feet, which is about right for a 50-foot lot.

The combination of the living room, and den will make an attractive ar-

angement. If the den is to be used at times as a spare bedroom, a sliding door can be built between it and the living room. It will of course be more attractive with just a cased opening between the two rooms. The many windows in this little nook will make it like a sun parlor and consequently a part of the house that will perhaps be used more than any other.

The living room is almost square and is made bright and cheerful by the four windows opening into it. The big fireplace can be made in any way that will be suited to the style of finish that is decided upon for this room. A very striking and artistic effect can be secured by building the fireplace of the cobblestones such as are used in the construction of exterior chimney and also the pillars at the front of the house.

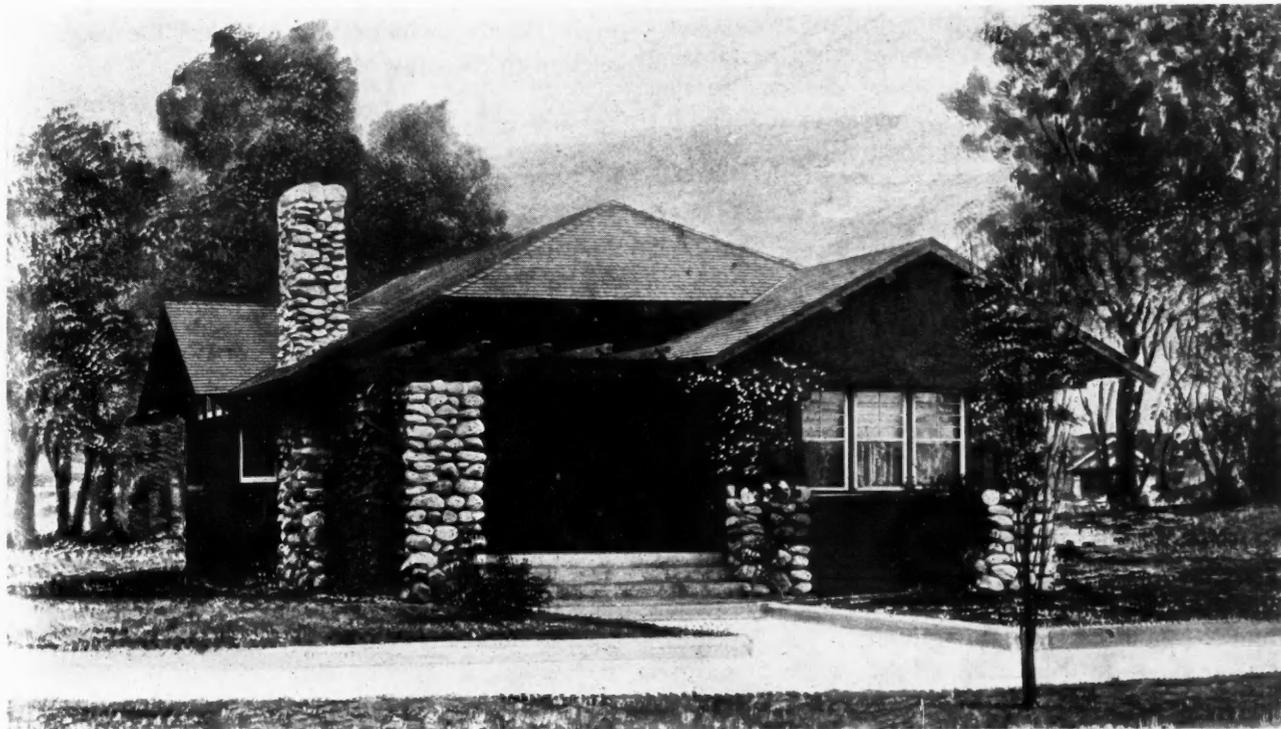
The rear porch and entrance of the house are on the side and lead to an entryway from where a door opens to the kitchen. The kitchen is small and compact and contains a cupboard and also a small pantry with a shelf on each side.

The two bedrooms and the sleeping porch occupy the back part of the house.

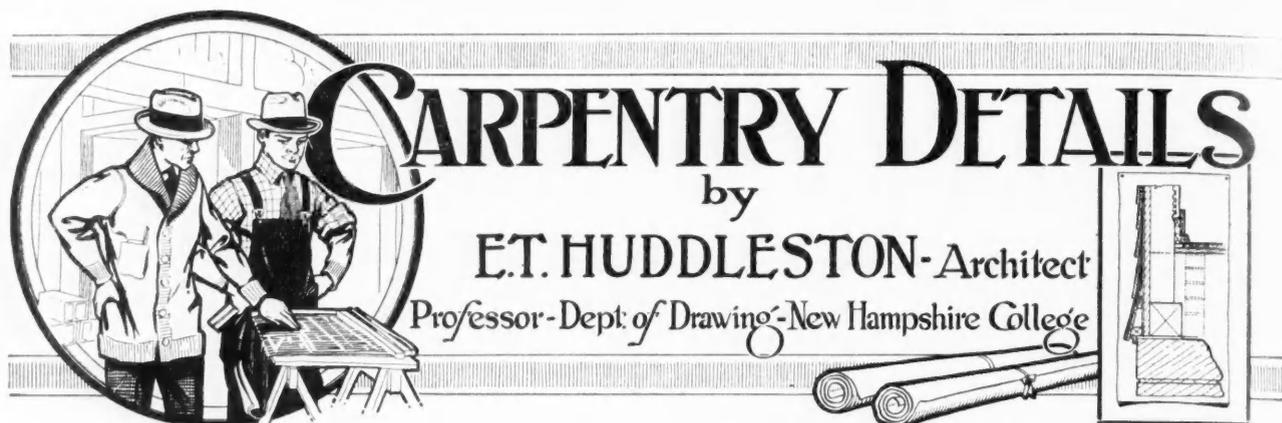
This bungalow contains more desirable features than are usually found, and its unique arrangement is in keeping with its exterior.



Floor Plan of Bungalow.  
Size 34 Feet by 48 Feet.



Six-room bungalow of artistic design. Size 34 feet by 48 feet. We can furnish complete set of blueprinted working plans and typewritten specifications for only \$7.00 per set. Blueprints consist of basement plan; roof plan; main floor plan; front, rear, two side elevations, and all necessary interior details. Specifications consist of twenty-two pages of typewritten matter. When ordering, ask for Design No. 6805.



## A Frame Bay Window in a Masonry Wall

THE FOURTH OF A SERIES OF SIX ARTICLES WITH DETAIL DRAWINGS

A DETAIL that greatly helps the looks of a residence both inside and outside when properly designed, is a bay window. It may be a complex and ornate structure or a very simple addition, depending on the type or style of the house on which the bay is built. It may or may not be of the same material as that of the house proper, but again, that depends largely on the type of architecture under consideration.

For frame buildings, it is unquestionably best to make the bays of the same construction thruout. For masonry walls, the same thing applies where the bay becomes a structural as well as an ornamental part of the building proper, but where the bay is frankly used as an accenting feature on the exterior, then it may be properly constructed of wood. Again, the interior design may call for just such a feature to carry out and terminate an axis, a view or vista originating in some other part of the interior design. In that case, the bay may be frankly made to express the true intent of its purpose and not necessarily act as a part of the exterior design only as it is made to harmonize with the building proper.

The plate opposite shows a frame bay in a masonry wall, that is a hollow tile wall faced with brick on the first story and stuccoed on the second. It is designed both as an interior and exterior feature since it comes on the axis of the room and also serves as a central window motive.

The elevations of the window with section A show this bay as a simple, straightforward effort to serve both the inside and outside requirements in materials and design. Horizontal lines are accented in the design of the house proper, therefore, the horizontal lines are accented in the bay, relieved somewhat by the double mullions with brackets directly under.

In order to further carry out the harmony and give greater character to the design, the meeting rails are raised a little above the center of the window opening, making the lower sash greater in height than the upper sash which have their glass divided into small squares by flat lead bands which cause less obstruction of view

than do wood muntins and permit of much easier cleaning.

In section A, the interior reveal is utilized by a built-in seat and is suitable for the living room or library. Casement sash, swinging in, could well be used instead of the double hung sash, and in many ways have advantages over the latter.

In section B is shown both an exterior and interior flower box. The outside box is the same in both sections, lined with tin which is carried up over the sill and flashed under the stool. The inside box is lined with zinc and drained by a single 1¼-inch lead pipe carried to the outside. This section is more desirable for a dining room where the window space is often given over to the cultivation of house plants and winter flowers and affords greater space and more cleanly facilities for such than the usual plant shelf with its array of pots and vases.

E. T. HUDDLESTON, Architect,  
Durham, N. H.



### Owner of Building Liable to Fine for Construction Before City Inspection

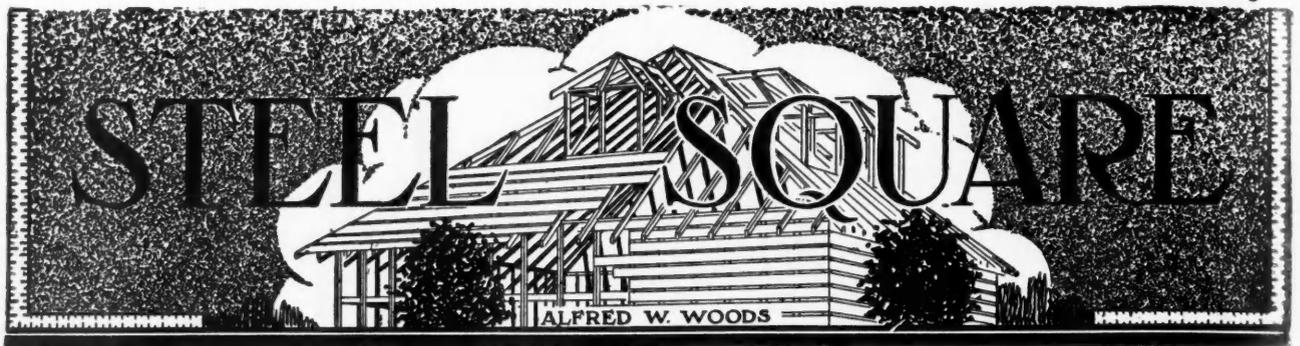
THE State Supreme Court, New Jersey, has approved a ruling of the District Court of Orange against a resident of that city, imposing a fine of \$50 for violation of the building code in lathing a building under construction which he owned before the city inspector had given permission for this part of the work.

The owner of the building appealed this decision on the ground that the district court had no jurisdiction and because the contractor, and not himself, should be held responsible.

The Supreme Court, in its ruling, dismisses these contentions in holding that the district court act of the State provides for the hearing of civil cases where not more than 500 is involved, and that the city ordinance under which the owner of the building was convicted makes the owner responsible as well as the contractor.

—L. R. W. ALLISON.





## Possibilities of the Steel Square

ILLUSTRATING ROOF FRAMING BY THE USE OF THE TANGENT AND HOW THE SAME APPLIES TO THE STEEL SQUARE IN OBTAINING THE CUTS

By A. W. Woods

IN our last article we laid the foundation, or rather illustrated how the angles are determined by circular measure and how the same may be obtained by the aid of the steel square in connection with a table of tangents up to 45 degrees, which, as we explained in the former article, covers the whole field of angles solvable by the aid of the steel square; but the figures as given do not stop alone with what may be obtained with that instrument. Therefore, it is our purpose in this article to take up the subject where we left off; and to do this, it is necessary to reproduce the table of tangents. In order to save space, will not illustrate them in connection with the circle and square, as in the former article, but give the table separately along with their equivalents in common fractions to the one-twenty-fourth part of an inch, which is near enough for practical purposes.

Referring to the table of tangents, let us see what can be done with it in the way of a calculating basis. Remember that the reckoning is from 12 on the tongue as the point of unity and that the tangents are reckoned from the heel along the blade.

First, we can find the miter for any angle in degrees.

Second, the side cut of jack for any angle.

Third, the length of the side of regular polygons.

Fourth, backing of the hip.

Fifth, the area of polygons.

Here are five heads, any one of which would furnish a good text for an extended article alone, but we will take them up in the order given and in as few words as possible explain

what may be accomplished with them.

First—In our last article we explained how to find the angle for any miter, but we did not show how to find the miter for regular polygons, and to illustrate this in its simplicity, we will take, for example, the miter for a square corner. Now, everybody who knows anything about carpentry, knows that 12 and 12 on the square give the required miter; but how many know why these figures give the miter?

To obtain correct results, the square must be applied to a straight edge, or line which in degrees contains one-half of the number of degrees in the circle, or, in other words, 180 degrees, and is therefore a straight line just the same as the straight edge of the timber from which to cut the several pieces required in the polygon.

By dividing 180 by 4 (number of sides), the quotient will be 45, and the tangent for 45 degrees is 12, as shown in the table; *and that is why 12 is used on the blade.*

For a pentagon, or a 5-sided frame, the quotient would be 36, and the tangent for 36 degrees is shown to be 8.72 (8 17/24). Then 12 and 8 17/24 are the figures to use for the pentagon miter. *Proceed in like manner for other polygons.*

Suppose the polygon had 180 sides, then the quotient would be one, and the tangent for 1 is .21 of an inch (5/24); then 12 and 5/24 would be the figures to use on the square, and so on to the end, where the polygon dies out in the infinitesimal and merges into the true circle.

Some of the polygons contain fractions in the quotient. The most

### DEGREES. TANGENT. EQUIVALENT.

45	12.00	= 12
44	11.58	= 11 7/12
43	11.19	= 11 5/24
42	10.80	= 10 19/24
41	10.43	= 10 5/12
40	10.06	= 10 1/12
39	9.72	= 9 17/24
38	9.38	= 9 3/8
37	9.04	= 9 1/24
36	8.72	= 8 17/24
35	8.40	= 8 5/12
34	8.09	= 8 1/12
33	7.79	= 7 19/24
32	7.50	= 7 1/2
31	7.21	= 7 5/24
30	6.93	= 6 1/12
29	6.65	= 6 2/3
28	6.38	= 6 3/8
27	6.11	= 6 1/8
26	5.83	= 5 5/6
25	5.60	= 5 5/6
24	5.34	= 5 1/3
23	5.09	= 5 1/12
22	4.85	= 4 7/8
21	4.61	= 4 5/8
20	4.37	= 4 3/8
19	4.13	= 4 1/8
18	3.90	= 3 1/12
17	3.67	= 3 2/3
16	3.44	= 3 5/12
15	3.22	= 3 5/24
14	2.99	= 3
13	2.77	= 2 3/4
12	2.55	= 2 13/24
11	2.33	= 2 1/3
10	2.12	= 2 1/8
9	1.90	= 1 1/12
8	1.68	= 1 2/3
7	1.47	= 1 1/24
6	1.26	= 1 1/4
5	1.05	= 1 1/24
4	.84	= 5/6
3	.63	= 5/8
2	.42	= 5/12
1	.21	= 5/24

Table of Tangents and Their Equivalent Figures on the Blade of the Steel Square.

notable of these is the octagon, it being  $22\frac{1}{2}$  (not given in the table), and its tangent is 4.97 ( $4\frac{23}{24}$ ).

### Side Cut of Jacks

We will now pass on to the second phase of our subject, side cut of the jack. It should be remembered that the side cut is simply a miter on an incline and all that is necessary to obtain it, is to take the same figures as mentioned above for miter of the respective polygon, but instead of taking 12 on the tongue, the length of the rafter for a 12-inch run should be substituted, and the side of the square on which the latter is taken will give the proper angle.

In case of very steep pitches, it is necessary to reverse the figures on the square in order to take advantage of the blade to accommodate the extra length caused by the pitch.

### Length of Side of Polygon

Passing to the third phase, the length of the side of the polygon. This, too, is very simple, as the quotient before described also represents the length of the side of the polygon, as 12 is the length of the side of the square frame when the inscribed diameter is one foot; 8.72 inches is that for the pentagon and .21 inches is that for a polygon of 180 sides.

### Backing of Hip

Passing on to the fourth phase, these proportions also govern the backing of the hip, so that its beveled back will lie in the plane of the roof and may be found as follows:

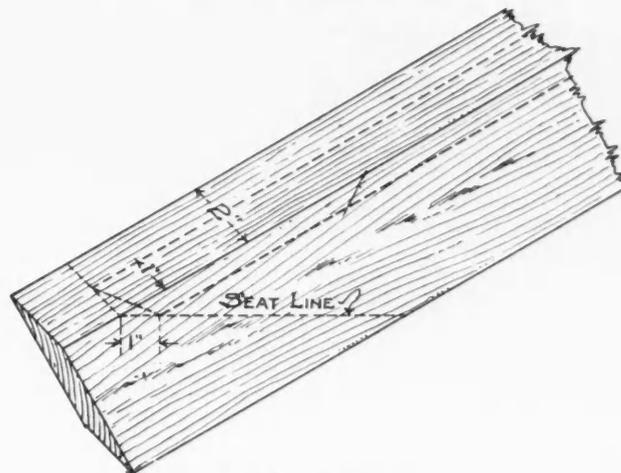
Consider the tangent as to one-half of the hip's thickness, and this amount set off on the seat line will give the point for the gauge line on the side of the rafter from which to remove the wood to a center line along its back.

For instance, we will suppose the hip to be two inches thick; then one-half of its thickness would be equal to one inch, and by considering the tangent as so many twelfths of one inch, to be set off on the seat line. That is, take it in the case of the square cornered building, the tangent being twelve inches, would represent twelve twelfths, or a whole number, and is therefore equal to one-half of the hip's thickness and would be the proper amount to set off on the seat line, as shown in the illustration.

For the pentagon, it would be  $8\frac{17}{24}$  twelfths of one inch, as the proper amount to be set off, and in the building of 180 sides, it would be  $\frac{5}{24}$  of one-twelfth of an inch. This is getting it down pretty fine, but that is what it would be, as the same proportion must hold for any angle the building may have and that, too, regardless of the pitch given the roof, as the swing of the seat line in reference to the edge of the hip regulates the gauge point. In other words, as an illustration, if the hip stood straight up, the seat cut would then be a square cut, yet the amounts as before mentioned would be the proportion to set off on same for the side gauge lines.

We will now pass on to the fifth phase, and that is the value of the tangent in finding the area of angles. Knowing the tangent and the diameter and radius, it is simply a matter of multiplication.

There are other things in connection with the tan-



Backing the Hip.

gents that we would like to mention, but as we have already strung this out longer than we had expected, will not say more at this time, but next month will continue the subject of tangents, showing how they apply in cases of uneven pitches.



## "Doctors' Floor," Latest Skyscraper Wrinkle

An interesting architectural development in this age of specialization is to be found in the ninth floor of the Third National Bank Building, of Springfield, Mass., which has been set aside and is being specially equipped for the exclusive use of physicians, surgeons and dentists.

Hoggson Brothers, of New York, the designers and builders of the new structure, have made an extensive study of the specialized building question and the result is that the medical men of Springfield will be able to lease suites arranged for the installation of complete mechanical equipment. This will permit the fitting up of offices for one, two, three or practically any number of associated practitioners with operating rooms, laboratories, rest rooms as may be required, opening from a reception room used in common.

Here the associated doctors may have the combined service of a staff of assistants, consisting of a nurse, a secretary and a maid, which, under the ordinary arrangement of offices is often prohibited because of the expense.

There is provided gas, electric light and power, and special basins with hot and cold water under pedal control. In each dental laboratory are suitable work-benches, compressed air, gas, electric light and power outlets, hot and cold water and other necessary devices and equipment.



## How to Construct a Flight of Stairs

### Lesson 1.

By Morris Williams

IT shall be the endeavor of the writer in these lessons to furnish all the necessary knowledge pertaining to the subject in the most concise, clear and practical manner. All the details of construction will be considered and thoroly explained, omitting nothing that in any way may be of practical value.

If any item of detail is inadvertently left out, the writer shall be more than pleased to have it brought to his attention.

The most simple type of a stairway is the single straight flight; and, therefore, is selected for the subject of this lesson, its component members being simply the stringers and steps.

When not enclosed by partitions, the newel, rail and balusters will have to be added; but inasmuch as better opportunity will be afforded in future lessons to deal with these members, I shall now consider only the stringer and steps.

What is meant by stringers are the side boards that support the steps. They are either grooved to receive the end of the steps or cut to the form of the

steps which are nailed upon them. The first is known as a housed stringer and the second open, or cut stringer. The term step means the tread and riser combined, the tread being the horizontal surface of the step upon which the foot is placed, and the riser the vertical height of the step.

A wall-housed stringer in position, consisting of 16 steps reaching from one floor to another, is shown in Fig. 1.

Preceding its layout, it will be required to find out the exact depth of the riser and the exact width of the tread, and for this to know the total height between the two floors for the risers and the available run space for the treads. The height between the floors is found to be 9 feet 11 inches.

To find the number of risers it will take, the customary operation is to place in the compass a trial dimension, say of 7 inches, more or less, but always keep in mind that a riser over 8 inches in residential buildings should be avoided. It may be less, providing the tread is made correspondingly proportional to guarantee easy stepping. The sizes in practice generally are between  $6\frac{1}{2}$  and  $7\frac{1}{2}$  inches.

In Fig. 1, the size of the riser is 7 inches, having been found by stepping along a board with the compass expanded 7 inches as a trial dimension. It happened in this case to be the exact dimension, and determined the number of risers required to be 17, as shown upon the story rod in Fig. 1. The number of treads required will be one less because in a flight of stairs, we start with a riser and end with a riser. A very simple accepted standard rule to determine the best proportional tread for a riser is to make

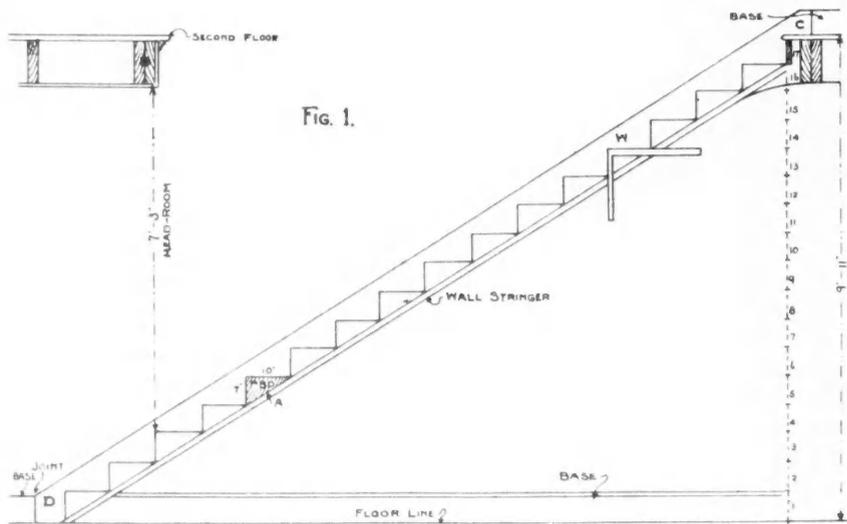


Fig. 1. Elevation of a Housed-Wall Stringer.

the sum of two risers and one tread equal to the number 24.

For example: A 7-inch riser doubled equals 14 inches; 14 deducted from 24 leaves 10 inches for the tread.

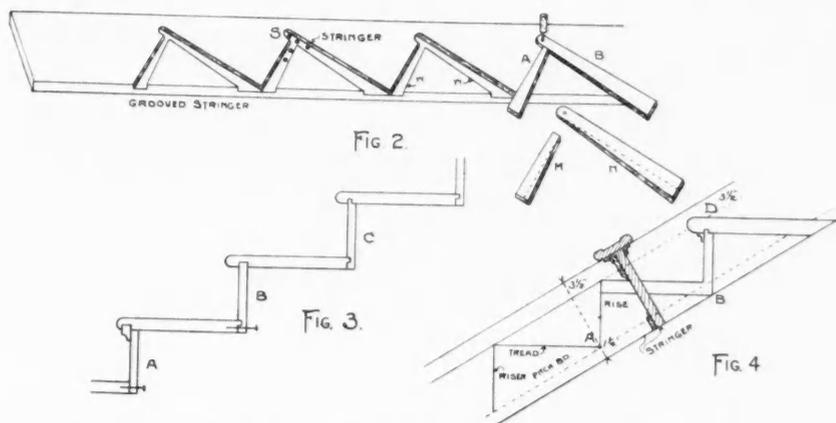


Fig. 2. Showing How to Groove a Stringer. Fig. 3. Different Methods of Connecting Risers and Treads. Fig. 4. Finding the Width of a Stringer.

In cases where the width of the tread is first determined, reverse the rule by deducting its dimension from the number 24; then one-half the product will indicate the width of the best proportional riser.

Attention to this matter should be seriously considered by all stair builders, for it is often a matter of life or death. Never lose sight of the fact that most of the "Falling Down Stair" accidents are traced to defective steps, having been put together any old way without the least regard to prescribed rules of proportion. After deciding upon the step, make a pitch board, which is a triangular template made up of the size of the tread and riser, as shown upon the stringer at A. Use it as shown to mark the form of the steps all along the stringer. The steel square is used by some for this operation in the manner shown at W.

At D is shown the intersection of the stringer with the floor base and at C with the landing base.

An important item that should be kept in mind is the position of the well hole header shown at B.

Never let the space between it and the step directly under measure less than 7 feet. This means that the position of the header should be taken to account when deciding upon the available run space for the stairway, for very often it is found that the joist framer does not know as much as he should about framing well holes.

After the stringer is wholly marked, as shown in Fig. 1, the next operation will be its housing, or grooving, to receive the steps, a process generally performed upon the router machine where mills are accessible, but in rural districts most often by hand on the job. Proceed as shown in Fig. 2 by marking the sizes of the grooves for the treads and risers with the templates, shown at M and N in the manner shown at A and B upon the stringer. The template M consists of the thickness of the riser and wedge combined,

and template N of the thickness of the tread and wedge combined.

First, place upon the stringer the template N, as shown at B, keeping its outside edge parallel with the tread mark; then place template M tight against it, as shown at A, its outside edge parallel with the riser mark, the marks mentioned having been previously made upon the stringer with the pitch board as shown in Fig. 1.

At W and W, the grooves are shown finished, and at S are shown few brace bit holes, indicating how the operation is started. The part surrounding the holes is first grooved, so that the saw may be used to cut out the remainder, the final cleaning out being done by means of a router plane so as to obtain uniform depth.

Few steps are shown in Fig. 3, illustrating the different methods in use to connect together the risers and treads, as shown at A, B and C, respectively. A cross section of the stringer is shown in Fig. 4, indicating the method of finding its exact width.

From the angle A of the pitch board, a space of 1 1/4 inches is allowed to the bottom edge, so that the soffit of the steps when placed in the grooves will align with the bottom edge of the stringer, as shown at B. From the long edge of the pitch board, a space of 3 1/2 inches is allowed for the nosing, as shown at D.

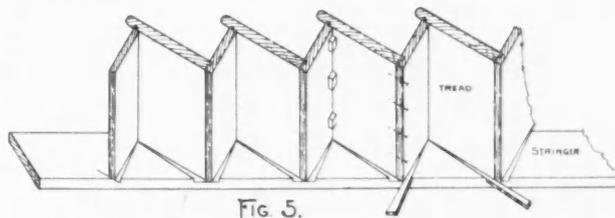


Fig. 5. Method of Putting Steps and Stringer Together.

A view of few steps placed in the grooves is shown in Fig. 5, indicating the manner the wedging is being done as well as the nailing of the risers to the treads and the placing of blocks in the internal angle of the steps.

A job done in this manner is considered the very best that can be made, providing it is done the right way. The best quality of glue should be used to fasten the blocks and to hold the wedges in place after they are driven into the grooves.

*The Second Lesson of this Series by Mr. Williams will appear in an Early Issue—Editor.*



**I**T is a wise man who ignores a chance to get even.



**I**T is difficult to patch up a quarrel so the patches will not show.



## Medicine Cabinets for the Bath Room

HOW TO MAKE TWO MISSION STYLE CABINETS THAT CAN BE ADDED TO A BUILT WALL

By I. P. Hicks

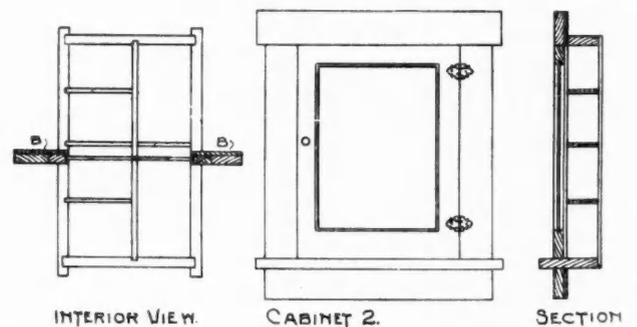
**M**ANY houses have been built without having any provisions made in them for a medicine cabinet. A cabinet of this kind is an almost indispensable adjunct to the bath room; it might well be said that no bath room is complete without it. A receptacle in the bath room for toilet preparations and medicine is a very convenient thing to have. In all modern houses of the present day construction, they are built-in when the house is being built.

What we want to show at this time is a satisfactory way to supply this useful cabinet for the bath rooms in houses that have been built without it. We have two designs in the mission style that can be readily made and put in place by any carpenter.

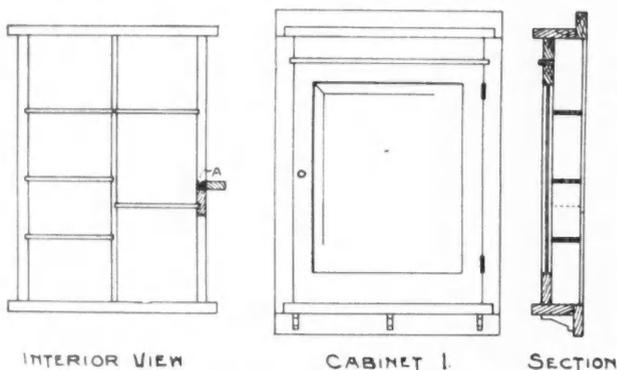
Cabinet No 1 represents a form that can be fastened directly on the wall, using two round head screws with washers. Find the studding, open the door and turn in two screws through the back, one near the top and one near the bottom, and the cabinet is set in place. As this case is all outside of the wall it is desirable not to have it project from the wall any more than is actually necessary; and the design has been made with this in view.

The jambs are  $3\frac{1}{2}$  inches wide, rabbetted on the back edge to receive the back, as shown at A, in the section showing the layout of the shelves. In this design the door is made to fit over the side jambs (not in between them), but is to fit between the head and the stool, leaving the casing to which the back

edge of the jambs are fitted, flat against the wall surface. This gives it the appearance of being built-in and gives it a more presentable appearance. It is made to dimensions that will make a door 20 by 25 inches in size, with a beveled plate mirror 16 by 20 inches,—just a nice size for this purpose. In the layout for shelves the case is divided vertically once, the shelves being placed three on one side and two on the other, as shown in the sketch. This arrangement of the shelves makes it possible to find a place for longer articles than can usually be placed in the average medicine cabinet, and it will be found a very valuable arrangement, making the cabinet more useful.



Sections and Details of Medicine Cabinet No. 2.



Details of Cabinet No. 1 for Bathroom.

We recommend making the shelves of plate glass and that all the interior wood work be white enamel. The back should be made of three-ply veneer,  $\frac{5}{16}$ -in. thick, it being strong and taking up but little space.

### WHAT IT TAKES FOR CABINET No. 1.

Following is a list of material required to build cabinet No. 1, allowing a small margin on the lengths for cutting.

- 1 piece 3-ply veneer, 1 ft. 8 in. by 2 ft. 5 in. by  $\frac{5}{16}$  in. thick for back.
- 2 pieces  $\frac{3}{4}$  in. by  $3\frac{1}{2}$  in. by 2 ft. 5 in., side jambs.
- 1 piece  $\frac{1}{2}$  in. by  $3\frac{1}{2}$  in. by 2 ft. 5 in., vertical partition.
- 1 piece  $1\frac{1}{4}$  in. by  $4\frac{1}{2}$  in. by 2 ft., bottom or stool.
- 1 piece 1 in. by  $4\frac{1}{2}$  in. by 2 ft., top or cap.
- 1 piece  $\frac{1}{2}$  in. by  $1\frac{1}{2}$  in. by 2 ft. 10 in., fillet.
- 2 pieces  $\frac{3}{4}$  in. by 3 in. by 2 ft. 2 in., top and bottom casing.
- 2 pieces  $\frac{3}{4}$  in. by 3 in. by 2 ft. 4 in., side casings.
- 1 piece  $\frac{3}{4}$  in. by 3 in. by 1 ft., 10 in., head over door
- 3 brackets, 2 in by  $3\frac{1}{4}$  in. by 1 in. thick.

## DOORS, SHELVES, ETC.

- 1 piece 1 1/8 in. by 3 in. by 1 ft. 10 in., top rail.
- 1 piece 1 1/8 in. by 4 in. by 1 ft. 10 in., bottom rail.
- 2 pieces 1 1/8 in. by 3 in. by 2 ft. 2 in., stiles.
- 1 beveled plate glass mirror, 16 by 20 inches.
- 5 pieces of glass 2 1/2 in. by 9 in., for shelves.
- 1 pair of hinges 1 1/2 by 2 inches.
- 1 knob turn catch.

The material as listed above will cost about \$2.50 and any good mechanic should be able to make the entire thing in a day of 8 hours. Thus it will not be very difficult for a carpenter to arrive at a proper cost mark for the complete cabinet.

The paint and varnish finish is only a small item of expense, probably not over 50 cents.

Cabinet No. 2 is made of a width that will just fit in between two studding set on 16-inch centers, so that it can be readily cut back into the wall without cutting anything but the lath; this makes it easy to fit in place as there is no danger of cracking the plastering to any such extent that the casings will not cover, thus making as neat a job as if it had been built in at first.

On cabinet No. 2 we put a piece of 3-ply veneer back of the casing on the side casings, making it wide enough to take in just the width of the door stile; this enables us to get a wider door and glass because it puts the casing farther out over the studs away from the side jambs, the door shutting over two inches of the veneer on the sides, as shown at B B in the section showing the layout of the shelves. This cabinet can be nailed in close up to the wall.

### WHAT IT TAKES FOR CABINET NO. 2.

- 1 piece of 3-ply veneer 1 ft. 2 in. by 1 ft. 10 in. by 5/16 in. thick for back.
- 2 pieces of 3-ply veneer 3 in. by 1 ft. 10 in. by 5/16, under head and apron.
- 2 pieces 3-ply veneer 5 in. by 1 ft. 10 in. by 5/16 in. under side casings.
- 1 piece 3/4 in. by 3 1/4 in. by 1 ft. 2 in., head jamb.
- 1 piece 1 1/8 in. by 6 in. by 2 ft., sill or stool.
- 1 piece 3/4 in. by 3 in. by 2 ft., apron.
- 1 piece 1 1/8 in. by 3 in. by 2 ft., head casing.
- 2 pieces 3/4 in. by 3 in. by 1 ft. 10 in., side casings.
- 1 piece 1/2 in. by 3 in. by 1 ft. 10 in., vertical partition.

### DOOR, GLASS, ETC.

- 1 piece 3/4 in. by 3 in. by 1 ft. 4 in., top rail.
- 1 piece 3/4 in. by 4 in. by 1 ft. 4 in., bottom rail.
- 2 pieces 3/4 in. by 3 in. by 1 ft. 9 in., stiles.
- 1 mirror glass 12 by 16 inches, D. S.
- 3 glass 3 in. by 6 3/4 in. for shelves.
- 1 glass 3 in. by 5 1/2 in. for shelves.
- 1 pair hinges, 1 1/2 by 2 inches.
- 1 knob turn catch.

Cost of material for the above will be about \$2.00, and a day's work will be sufficient for a carpenter to make it. Probably more time will be required to set cabinet No. 2 in place because of cutting thru the lath and plaster, but where there are no studding to cut this should not require more than an hour's time. The making of these medicine cabinets is a good winter job and one might do well to take up the idea and follow it up. It might lead to more winter work.

## Pickups On the Job

By H. J. Blackledge

**W**HY not add a screw *holder* to your screwdriver? Start your screw with one hand, leaving the other free to hold the work.

**B**Y all means have a glass cutter. It is a lot quicker and easier cutting an eighth off a light than chiseling a sixteenth off the stile.

**A** NAIL partly out that threatens to break your hammer handle before drawing will sometimes come out easily if struck a sharp blow first. It starts the rust, and then it comes easy. Same thing with a screw. If it will not turn *out*, try a turn *in* first. Does not always work—but if it works once in twenty it's worth knowing, isn't it?

**I**F you have any amount of end squaring-up to do, up to seven eighths, it will pay to own an edge-trimming plane. They are little dandies. When you have hit a piece with one of them you know it is square.

**A** RATTLING good little emergency tool is Stanley's Bench Bracket. Goes into a hole in front of bench or fence rail or any old place—screw it up and it grips your board like a vise. Best effect with two—one to support, and one at fore end same as the regular bench vise.

**A** ND don't fail to connect with an angle divider. You can get any angle, inside or out, with it. For it is practically a double bevel. It gives the "mitre" for any angle instanter.

**I**F you have much doweling to do, it will pay you to own a doweling jig. They are not dirt cheap unless you do quite a bit of doweling. But if you do a good deal they will pay for themselves in the first day almost. It does not take much longer to set one than it does to set the gauge in the old way, and then you are thru with having to set so very carefully to the point of your bit exactly in the cross of the mark and the gauge, etc. Instead you give a half-turn to the screw, to tighten—then go ahead. Half-turn to loosen, slide along to next mark, half-turn to tighten—and bore again.

**D**ON'T be afraid of putting in a few little extras on the job. It will pay well in your reputation if not actually in dollars and cents. Have a fixed policy, not of "How little can I give and still come inside the contract," but rather, "How much can I give and still make something on the job." Such little things as a trap in the kitchen floor for the sweepings, a soiled clothes bin (if in the bath room), or chute (if laundry is in the basement), a couple of flower boxes under the front windows, or a spice cabinet in the pantry, will not add materially to your debit column, but they will be a delight and a pleasure to the owner.

But there is one caution: Never put in any such extras without first informing the owner. He (or she) may have plans that would be entirely at outs with what you propose.



## Heating System for Large Green House

HOW I FIGURED HEAT LOSSES AND DESIGNED A SATISFACTORY HOT WATER SYSTEM FOR BIG FOUR-BUILDING GROUP

By Harold L. Alt, Engineer

"THE scene of my next exploit," said the Old Builder, "was in a nearby town where a good sized greenhouse was erected. The plans for this greenhouse called for a main entrance building connected by a corridor to a central building located in the rear, from each side of which lateral corridors ran to wing buildings. See Fig. 1.

"The reason that I make mention of this particular job is the fact that greenhouses are not figured quite in the same manner as residences. In the first place, there is a much greater proportion of glass surface than in any house and the construction with numerous joints in the glass permits a far greater entrance of cold air than is normally encountered in the residence work. Coupled with this fact is the requirement of almost constant temperature, especially at night, which is the exact opposite of residence work; in other words, the temperature in a house is quite likely to go down as low as 50 degrees between 1 o'clock at night and 7 o'clock in the morning. But in a greenhouse this is absolutely prohibited since such a drop in temperature would be sure to produce disastrous results on the plants. Therefore, we must not only be more accurate in determining the heat losses, but we must also proceed in a slightly different manner and consider the amount of air leakage as well.

"Fig. 2 shows a typical cross section of the building as constructed with the foundations carried up to about 12" above grade. Above this, the sides and roof were entirely of glass of common standard construction with which you are all familiar. This cross section applied to the buildings as well as the corridors, only the wider span of course produced a peak somewhat higher on the larger buildings with the same roof slopes.

"The first thing necessary to decide was what method of heating was to be utilized. After considerable investigation I found that hot water was giving far greater satisfaction

than any other method. This was owing to several reasons. The main advantage of hot water is the fact that there is a large amount of water heated up in a hot water system and this quantity responds very slowly to changes in temperature; that is, where a steam pipe could be sizzling hot at one time and stone cold inside of 30 minutes, the hot water system would have dropped only perhaps 15 or 20 degrees at the most during the same length of time. Farther than this, hot water is a much less intense heat than steam and while it requires more surface in order to supply the necessary heat, this is really an advantage in greenhouse work, since

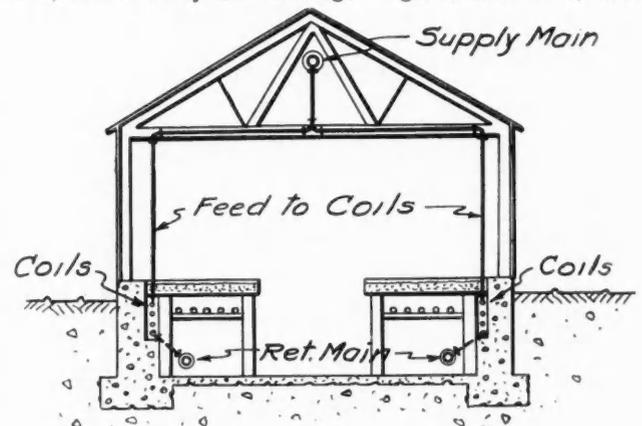


Fig. 2. Typical Section Thru Green House.

it results in spreading the heating surface over a much greater area and making it unlikely that plants near the source of radiation would be overheated.

"The usual way of heating a greenhouse is to carry the coils for the hot water along under the benches and vertically on the outside walls so as to keep the earth warm for the plants and to counteract cold draughts falling from the glass sides onto the beds.

"To obtain the amount of surface necessary for each building and corridor I first took and found the amount of wall surface and reduced it to the equivalent of glass surface. Then I found the amount of glass surface and added a percentage for exposure. I then allowed that the air would be changed twice per hour on account of leakage and found the number of square feet of radiation required.

"Taking Building A, for instance, the sloping roof measures 14 ft. from the peak to the eaves, so that the roof area is 14 ft. plus 14 ft., or 28 ft. times 80 feet long, or 2,240 sq. ft. The sides are 80 ft. plus 80 ft. minus 10 ft. long, or 150 lineal feet. The 10 feet is taken out for the point where

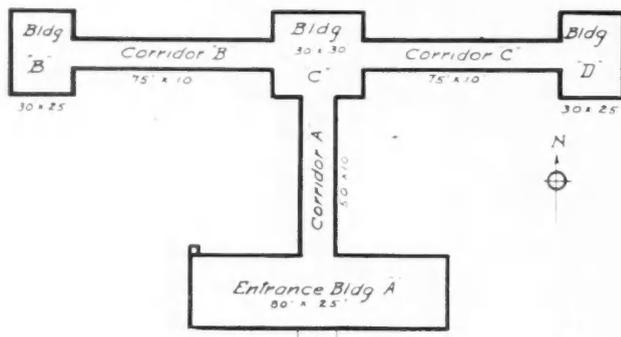


Fig. 1. General Ground Layout of Large Green House Job.

Corridor A is connected to Building A. Since the sides are 4 feet high, this gives us a side wall area of some 600 sq. ft. The ends are 25 ft. plus 25 ft. and 4 ft. high, while the gable is 7 ft. high by 25 ft. wide, which gives us a total area of the two ends of 375 sq. ft. The wall projects 1 ft. above the ground all the way around the building with the exception of the junction of Corridor A, so that we have 80 plus 80 plus 25 plus 25 minus 10 sq. ft., or 200.

"Four square feet of wall is generally considered equivalent to 1 sq. ft. of glass surface, so that changing our wall area to glass area we have 200 divided by 4, or 50 sq. ft. This gives us amounts as follows:

Roof .....	2240 sq. ft.
Sides .....	600 sq. ft.
Ends .....	375 sq. ft.
Wall E. G. S. ....	50 sq. ft.
Total.....	3265 sq. ft.

"Now the glass radiates about 1 B.T.U. for every degree difference between the inside and outside temperature; so that, if it is zero outside and 70 degrees is maintained inside, the glass will lose approximately 70 B.T.U. per sq. ft. with southern exposure. With northern exposure there would be about 25% more, with western exposure 20%, and with eastern exposure 10%. Since Building A faces north and south its exposure will be a combination of a northern and southern factor, or an average factor between zero and 25, which is 12½%. Therefore, our glass radiation loss is 3,265 sq. ft. × 70, or 228,550 B.T.U. 12½% of this is 28,569 B.T.U., making a total of 257,119 B.T.U.

"The two air changes per hour mean that the cubic contents must be changed twice; the cubic contents are 25 × 80 × 7, or 14,000 plus  $\frac{14,000}{2}$ , or 14,000 plus 7,000, making a total cubic contents of 21,000 cu. ft., this means 21,000 × 2, or 42,000 cu. ft. leakage in one hour. This amount of air must be raised 70 degrees so that 42,000 times 70 divided by 50 equals the B.T.U. required to warm this air, or 58,800. This added to the 257,199 lost by the glass, makes the total

SECTION	EXPOSURE	WALL EXP	E. G. S.	GLASS	TOTAL
Bldg A	N & S	2000	50	3215	3265
" B	NW & S	1000	25	1615	1640
" C	N	900	22	1380	1402
" D	NE & S	1000	25	1615	1640
Cor'dr A	E & W	1000	25	1000	1025
" B	N & S	1500	37	1500	1537
" C	N & S	1500	37	1500	1537

Fig. 3.

SECTION	EGS-Expos	BTU	Exp %	Exp BTU	Total BTU
Bldg A	3265 - 70	228,550	12½	28,569	257,119
" B	1640 - 70	114,800	15	17,220	132,020
" C	1402 - 70	98,140	15	14,721	112,861
" D	1640 - 70	114,800	15	17,220	132,020
Cor'dr A	1025 - 70	71,750	15	10,762	82,512
" B	1537 - 70	107,590	12½	13,449	121,039
" C	1537 - 70	107,590	12½	13,449	121,039

Fig. 4.

SECTION	CUBIC CONT	AIR CHANGES	TOTAL	SQ. FT. PIPE	LINEAL PIPE
Bldg A	21,000	58,800	315,919	1805	2346
" B	7725	21,630	159,630	878	1141
" C	9900	27,720	140,581	803	1043
" D	7725	21,630	153,630	878	1141
Cor'dr A	4250	11,900	94,412	539	700
" B	6375	9,110	130,149	743	966
" C	6375	9,110	130,149	743	966

Fig. 5.

the building; therefore, to install 2,346 lineal ft. we must run around coils containing 13 rows, of which some three or four rows could be placed vertically on the walls, as shown in Fig. 2, and the balance horizontally under the beds. Figuring out the other buildings and corridors of the groups gives us results as indicated in Fig. 3, which shows the total equivalent in glass for each building. Fig. 4 indicates the B.T.U. lost by radiation with southern exposure, the percentage allowed for exposure, the number of B.T.U. allowed for exposure and the total B.T.U. lost by radiation. Fig. 5 shows the cubic contents of each building, the B.T.U. required for heating the cubic contents twice every hour to 70 degrees and the total B.T.U. required for the building. In the second column is shown the number of square feet of surface necessary, and in the last column the number of lineal feet of 2½" pipe to supply the required amount of heat. The

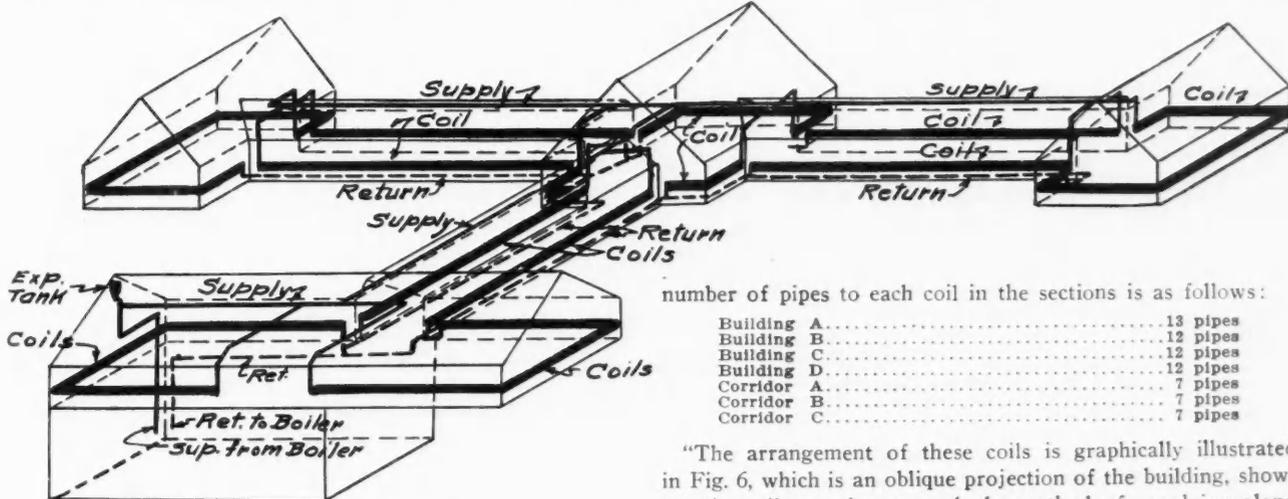


Fig. 6. Arrangement of Heat Coils.

heat requirement for Building A of 315,919 B.T.U.

"With every sq. ft. of hot water radiation supplying 175 B.T.U., I required 1,805 sq. ft. of hot water piping to accomplish proper warming. If I used 2½" pipes, which is the customary size for hot water coils, it would take 1 3/10 lineal ft. of pipe to give a square foot of outside surface, so that for the 1,805 sq. ft. we would require 2,346 lineal ft. of 2½" pipe. This pipe placed in coils around the building, allowing 10 ft. for the entrance door, 10 ft. for the width of Corridor A, and about 10 ft. more lost by running around the inside of the wall, gives 180 lineal ft. of pipe for one row around

number of pipes to each coil in the sections is as follows:

Building A.....	13 pipes
Building B.....	12 pipes
Building C.....	12 pipes
Building D.....	12 pipes
Corridor A.....	7 pipes
Corridor B.....	7 pipes
Corridor C.....	7 pipes

"The arrangement of these coils is graphically illustrated in Fig. 6, which is an oblique projection of the building, showing the coils running around, the method of supplying along the roof trusses and the returns running along the floor. Exact location of the various supplies and returns is accurately given in Fig. 7, as well as the sizes for same.

"In sizing these pipes, the following schedule was used:

1½" pipe will supply	200 sq. ft. of radiation.
2" pipe will supply	350 sq. ft. of radiation.
2½" pipe will supply	650 sq. ft. of radiation.
3" pipe will supply	800 sq. ft. of radiation.
4" pipe will supply	1450 sq. ft. of radiation.
5" pipe will supply	2200 sq. ft. of radiation.
6" pipe will supply	3200 sq. ft. of radiation.
8" pipe will supply	6700 sq. ft. of radiation.
10" pipe will supply	9000 sq. ft. of radiation.

"This is assuming that the center of the radiation is approximately 10 ft. above the center of the heater, or in other words, that there is a head of 10 ft. to circulate the system.

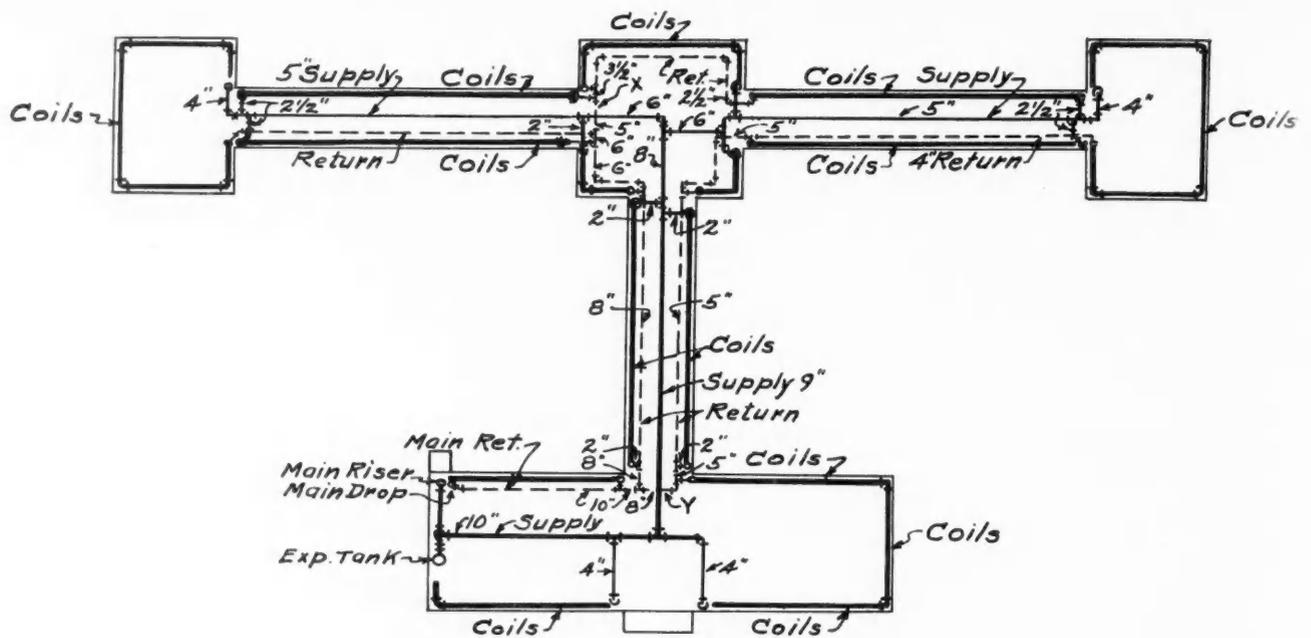


Fig. 7. Plan View of Heat Piping System.

"Using these figures we find that in Building A, where two coils are used, each will have about 1,173 sq. ft. and will require 4" branch supplies to each coil and 4" returns. In Building B, where a single coil is used of 1,141 sq. ft., similar size branches are used. Building D is, of course, like Building B. Building C, however, is divided into 3 coils, the one in the rear containing, roughly, one-half the radiation, or 521 sq. ft., while the other two each contain half the balance, or 261 sq. ft. each. According to our table, the rear coil should have a 2½" supply and return and on the two smaller coils 2" supplies and returns. In Corridor A two coils are used, each of 350 sq. ft., requiring 2" branches, and in Corridors B and C two coils each are used of 483 sq. ft., requiring 2½" branches. These amounts carried back to the main riser give us a 10" main supply pipe and a 10" main return.

"It will be noted in Fig. 6 that air relief is obtained automatically for this system through the expansion tank located near the top of the main riser, which is a high point of the system, the supply pipe pitching downward from this location. In Fig. 7 it will be noted that the return is run on the floor under the benches in such a way as to cross the passageway in two places only, one at "X" and the other at "Y." At "X" I built a small step about 8" high, allowing the pipe to run under the step and extending the step through the door into Corridor B. At "Y" the boiler room extended underneath Building A, so I simply dropped the return main into the top of the boiler room before going across, thus making a step here unnecessary."



### Location of Register in Residence

To the Editor:

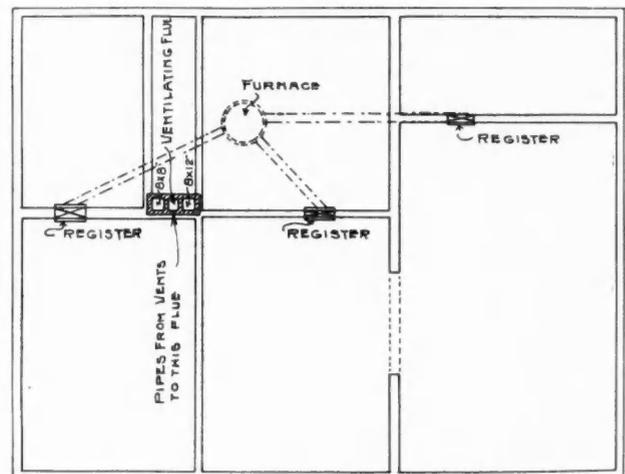
Cleveland, O.

I am sending you a sketch of a residence which I am building, and would like to have you tell me in regard to the location of the heat supply openings in the walls. I have installed a ventilating flue, and will place the openings to this flue near the baseboard in each room which is ventilated. Now, my question is, in what position should I place my hot air registers so as to have perfect heating and ventilation at the same time?

HLAVKA & DIVOKY.

*Answer:* We believe that the best arrangement would be to place the hot air register near the ceiling of the room and the cold air ventilating duct near the baseboard on the same side of the room but not directly under the hot air register.

This allows a current of hot air to come into the room and pass to the opposite side before falling to the floor and being taken away by the cold air duct. Since your sketch did not have the windows of the room marked upon it, it is not possible for us to mark the location of the hot air register or the cold air duct with any degree of certainty. The hot air flue should enter the room on the opposite side to the largest exposed glass surface, or at some distance from it. The foul air flues should be placed in the inside walls. The reason is that the hot air entering the room opposite the window surface, rises to the ceiling, passes along the ceiling to the windows and is cooled. It then drops to the floor line, passes



Suggestions for Placing Heat Ducts in Walls.

along the floor and out the foul air register. Each room should have its separate heating and ventilating flues in order to get proper regulation of air.

Your sketch seems to indicate only one furnace pipe supplying heat to two different rooms. We do not believe that this is good practice.

EDITOR.



**P**OOOR light is an extravagance no one can afford.

## Liability Laws Say Contractor Must Pay

REVIEW OF RECENT LEGISLATION IN 30 STATES—WORKMEN'S COMPENSATION ACTS AND HOW THEY EFFECT THE SMALL EMPLOYER

By Elton J. Buckley, Atty. at Law

**T**O my mind the most important legal development for a long while, remembering the large number of business people of all classes which it affects, is the workmen's compensation acts which have already been passed in about thirty States, and are being passed in more all the time. Probably within a comparatively few months, all States will have a workmen's compensation law.

The States which have already passed a compensation act are: New York, Pennsylvania, Connecticut, Illinois, Iowa, Kansas, Michigan, Minnesota, Nebraska, New Hampshire, New Jersey, Rhode Island, Wisconsin, Arizona, California, Massachusetts, Maryland, Nevada, Oregon, Texas, West Virginia, Ohio, Washington.

The reason for the extreme importance of these laws is that they completely change the relation of an employer toward his employees. He is now practically helpless to defend himself against the expense of accidents which may happen to them while in his service. If the accidents happen, he must in most cases pay for them. The theory which the law goes upon, in enacting these laws, is that the employer, called upon now to face this virtually certain expense with chance of defense, will add it as an item to his cost account, and the public will pay it, which, says the law, is as it should be. Incapacitated workers should be maintained by the public. And employers generally are rather accepting this view, and are not worrying much, inasmuch as they are expecting to collect all the expenses of the new law from the public.

In some States the workmen's compensation act applies to any employer large or small, except a farmer and the employer of domestic servants. The little retail grocer who has one clerk beside himself is as subject to it as the Baldwin Locomotive Works. If his one clerk, through his own gross carelessness, gets a hand cut off in a meat chopper, the employer must go on paying him a percentage of his wages for several hundred weeks. This is so in the great majority of the States. A very few, like Rhode Island, apply the law only to employers with more than five employees. Nevada applies it to employers with more than two employees, but most States apply it to all.

In some States, as in Oregon, an employer is not actually forced to pay for his employees' accidents under the workmen's compensation act. That is, all employers are not—with employers in the hazardous employments it is made compulsory, but other employers—such a merchants, and artisans generally—can take their choice: pay under the compensation act, or allow themselves to be sued for damages in the old way. The law in Oregon and most other

States that do this, however, says to the employer, "if you reject fixed compensation and take a chance on being sued, you will be deprived of your usual defenses if you are sued." Of course this indirectly makes it compulsory after all, and it is therefore expected to bring the employer into line for the fixed compensation.

What I mean by depriving an employer of his usual defenses is this: Take Pennsylvania before a workmen's compensation act was passed. John Jones is a merchant employing clerks. One of them in passing through a shipping room, falls through a trapdoor and breaks his leg. On the ground that it was negligence to leave the door open, the injured clerk sued for damages. The employer could defend on three grounds:

1.—The door was left open by another clerk, who was a fellow servant of the clerk who was hurt. Under the law I am not responsible for injuries caused by fellow servants.

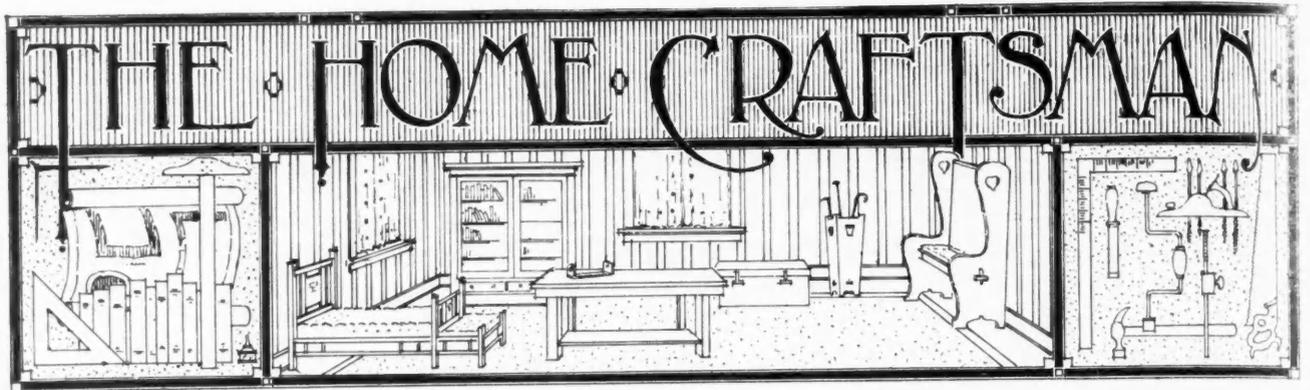
2.—The clerk was himself negligent (contributory negligence) in not seeing that the door was open and avoiding it. Therefore he cannot recover damages.

3.—The clerk knew that the trapdoor had to be open more or less, and in passing through the room he assumed the risk.

Many and many a suit for damages has failed because the employer successfully raised some or all of these defenses. And in all justice, certainly the second one should be raised. An employee who is hurt because of his own carelessness ought not to be allowed to put the cost of his injury on his blameless employer. But under the workmen's compensation acts, the employer who goes into court to defend the suit of an injured employee, has almost no defense at all. Except "the accident didn't happen," which of course would be impossible in most cases. The wilful misconduct of the injured employee, causing the accident, is another possible defense, but wilfulness is not easy to prove.

The course under all the acts, as to paying for employee's injuries, is substantially the same, though details differ. In most States an employer must pay for *any* accident happening to an employee if it arises out of the employment. Occasionally exceptions are made where the accident was intentionally caused by the injured employee's own act, or by the wilful act of a fellow employee, or where it was caused by intoxication, or—in Kansas—by wilful failure to use safeguards provided by the employer. The Ohio law

(Continued to page 73.)



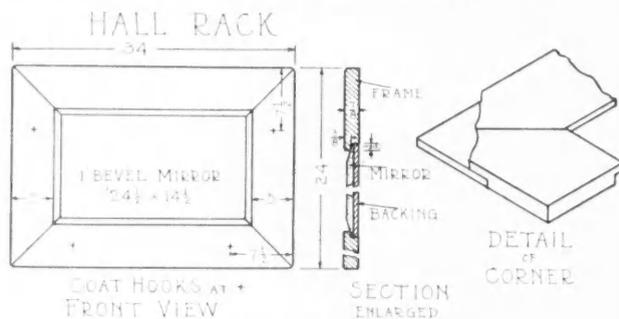
## How to Make a Homecraft Hall Rack and Seat

By George E. Chandler

Supervisor of Manual Training, Rochester, Minn., High School

THE hall rack and seat presented this month give an interesting study in utility, simplicity and proportion. The pieces are compact and occupy but little wall space, which is an advantage in small halls and vestibules. The pieces are placed diagonally across the corner, just fitting in between the hall window at the left and the door leading to the living room at the right. The effect as one enters the house is especially pleasing. The hall seat has a hinged top which furnishes a splendid place to store rubbers, hats, furs, rain-coats, etc.

Note how the crude and unfinished appearance often



Working Drawings of Hall Rack.

found in craftsman designs has been modified and refined by rounding off the corners and edges. This will overcome the tendency to splinter on the corners and will help greatly in the finishing. It is almost impossible to put a good finish on a sharp edge or corner, for the sanding or polishing will cut thru the stain and leave a "white edge."

The pieces shown in the photograph are made of oak, altho birch, mahogany or any wood which will take a good stain may be used.

The following pieces will be needed.

STOCK BILL FOR HALL RACK (FINISHED SIZES)

Frame—2 pieces  $\frac{7}{8}$  x 5 x 34.

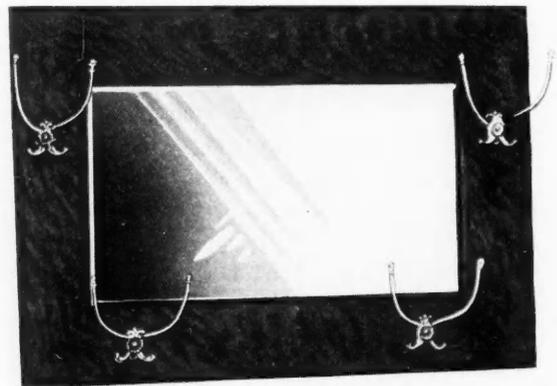
2 pieces  $\frac{7}{8}$  x 5 x 24.

Back—1 piece  $\frac{5}{16}$  x  $14\frac{3}{4}$  x  $24\frac{3}{4}$  (wallboard).

1 Bevel Plate Mirror (1" bevel)  $24\frac{1}{2}$  x  $14\frac{1}{2}$ .

4 Combination Coat and Hat Hooks.

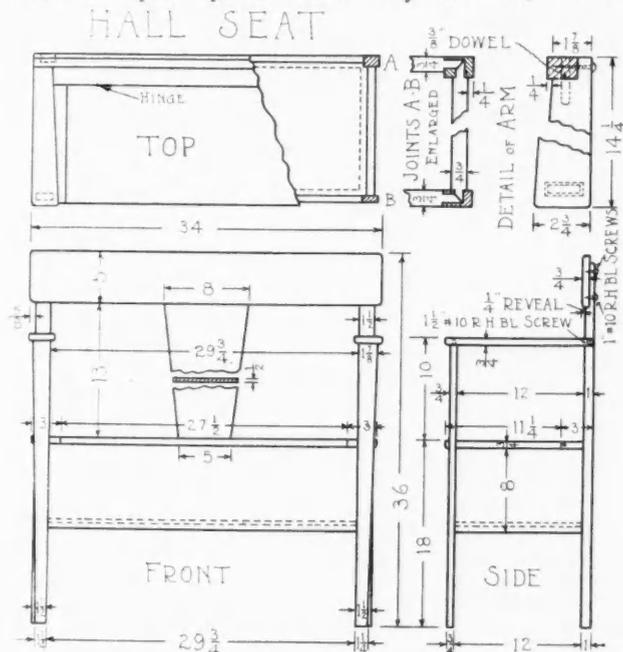
The only thing needing special attention is the construction of the joint at the corners. Altho a straight



Very Attractive Yet Simple Pair of Hall Furnishings. Made as Described Herewith.

miter joint is satisfactory if well made, a halved miter joint is much better. In this joint the lower part is simply halved together while the upper part is mitered (see Detail of Corner). The inside of the frame is rebated at the back to receive the mirror. The backing may be of wall or plaster board or any thin material.

While a plain plate mirror may be used, a bevel



Details of Construction of Hall Seat.

plate mirror adds greatly to its appearance. In ordering the mirror, a 3/4 or 1-inch bevel should be specified.

**STOCK BILL FOR THE HALL SEAT (FINISHED SIZES)**

STOCK BILL FOR THE HALL SEAT (finished sizes).

- Posts—2 pieces 1 x 1 1/2 x 35.
- 2 pieces 3/4 x 1 7/8 x 27 3/4 (1/2 inch tenon).
- Rails—2 pieces 3/4 x 8 x 31 1/4 (3/4 inch tenons).
- 2 pieces 3/4 x 8 x 13 1/4 (5/8 inch tenons).
- Seat—1 piece 3/4 x 3 x 33 1/2.
- 2 pieces 3/4 x 11 3/4 (1/2 inch tenon).
- 1 piece 3/4 x 11 3/4 x 27 1/2.
- Arms—2 pieces 3/4 x 2 3/4 x 14 1/4.
- Back—1 piece 3/4 x 5 x 34.
- Panel—1 piece 1/2 x 8 x 14 (1/2 inch tenons).
- Bottom—1 piece 1/2 x 12 3/4 x 30 3/4.
- 2 pieces 3/4 x 3/4 x 29 1/4.
- 2 pieces 3/4 x 3/4 x 11 3/4.
- Hardware—2, 3/4 x 2 mortise butts (nickel plated).
- 2, 1 1/2" No. 10 R.H.Bl. Screws.
- 4, 1" No. 10 R.H.Bl. Screws.
- 18, 1 1/2" No. 8 F.H. Screws.

For simplicity some of the joints have not been shown on the drawing. For convenience, however, the length of the tenons have been indicated in the stock bill. Note that the front posts are plumb on the inside but taper on the outside from 1 7/8 to 1 1/4 inches; also that the top is mortised into the arm.

The frame for the seat is made of three pieces 3 inches wide, one at the back and one at each end. The two end pieces are mortised into the back piece to make a substantial joint (see Side View). The seat

frame may be fastened to the rails by 1 1/2-inch screws from the inside. The hinged top or seat will be greatly strengthened by inserting a spline. This is easily done by running the ends of the seat over the saw and gluing in a strip the width of the saw kerf.

Plaster or wall board makes an excellent substitute for wood in the bottom of the seat. As before mentioned, all corners should be well rounded in both the seat and the hall rack.

**How to Finish**

Both pieces should, of course, be finished alike. If oak is used, some shade of brown in either a fumed or golden oak stain will be appropriate. If it is desired to finish the pieces "open grain," a thin coat of shellac and a couple coats of wax are all that will be needed. If a polished surface is wanted, add filler to the stain and follow the shellac by two to four coats of a good grade of varnish, being careful to sandpaper lightly between each coat. If a gloss varnish is used, the appearance will be greatly improved by rubbing down the last coat with pumice stone and oil.

For woods other than oak, a suitable stain should be applied and finished in the same manner as the oak.

There are many patterns of coat and hat hooks to choose from, altho the average hardware dealer has but few in stock. It will often be found better to have your dealer order a special hook. Do not make the mistake of spoiling a good piece of work by putting on cheap looking hardware. Hooks in brushed brass and bronze are the best.



**Laws Say, Contractor Must Pay**

(Continued from page 71.)

goes to the limit. It provides that the employer must pay for "all injuries not self-inflicted received in the course of employment causing disability beyond one week or death."

In all States the disability caused by the accident must continue at least one week and in most States it must continue two weeks. The period provided for the payment of part wages to the employee varies. In Pennsylvania, for instance, 50 per cent of the regular wages must be paid for various periods, depending on the injuries. For the loss of one hand, it is 175 weeks. In case of death a lump sum to the relatives.

Practically all the State laws require the employer to furnish some sort of guarantee that the payments will be made. This is done by taking insurance, sometimes in a State insurance fund created by the act, and sometimes in any company that an employer may choose. In some States an employer who can show himself abundantly solvent is exempted from the need of taking out insurance.

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could keep the breeding stock separate and feed accordingly.

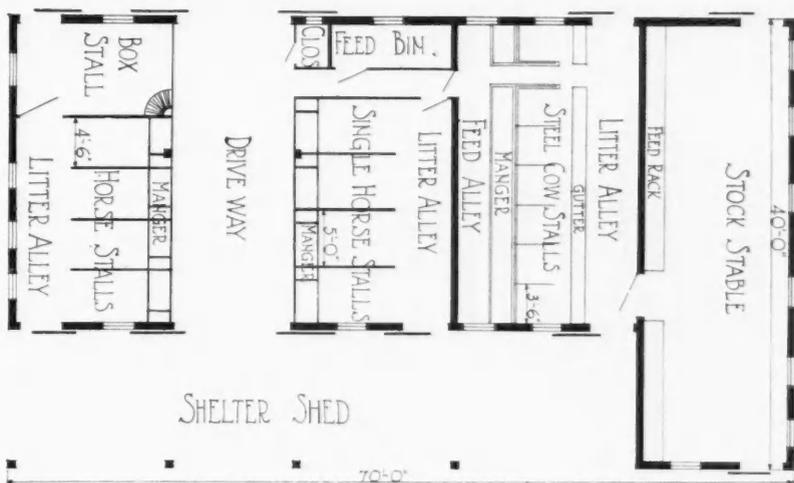
The stable part is built with a solid concrete foundation wall and floor, and both the horse and cow stalls are arranged and built according to the best farm building practice.

It will be noticed that there are a good many windows placed to light the stables from every direction. Light in a modern stable is one of the most noticeable improvements. Old-fashioned dark, dingy stables were dirty and loaded down with foul air. Pure bred valuable farm animals have caused the change.

Building barns to stable animals worth from \$100 up is a different proposition from the old buildings that were considered good enough to stable animals worth from \$50 down.

The high opening through the shed is the entrance to the barn. This arrangement gives a convenient thrashing floor for oats when the crops are heavy and overflow the other barns. Hay settles considerably in a big mow like this before oat harvest, and the space may be used to advantage in such emergencies.

The oat straw is blown by the stacker



Ground floor plan of barn Design No. A297, measuring 70x40 feet.

back into the far end of the mow to be kept bright and clean for winter feed and bedding.

There is as much money in raising beef cattle as there is in keeping dairy cows. Profits depend upon the man. One farmer knows how to make money

by doing a dairy business. Another farmer knows how to breed and feed beef cattle to get big prices.

It is not often that one man makes a conspicuous success with both. He is prone to give his best attention to the kind of live stock that he likes best.



Old time favorite farm barn with covered shelter shed. A combination horse, cattle and stock barn. We can furnish complete set of blueprinted working plans and typewritten specifications for only \$10.00. When ordering, ask for Design No. A297.



## Community Club House

NINTH OF A SERIES OF PUBLIC AND COMMERCIAL BUILDINGS—IDEAS FOR A PRACTICAL LOW COST GYMNASIUM AND RECREATION HALL

**A** COMMUNITY center, or club house planned for gymnasium, bowling, billiards, concerts, public meetings, etc., has many advantages over the so-called gymnasium used for athletics only.

For instance, the building illustrated herewith can not only be used for calisthenics and athletics, but will also serve its purpose as a small town armory where all local men and boys can be marshalled and drilled into the arts of military service. This not only improves the mind and body of each individual of the community, but at the same time serves as a means of strengthening our national defense, the necessity for which at the present time is obvious to the most skeptical.

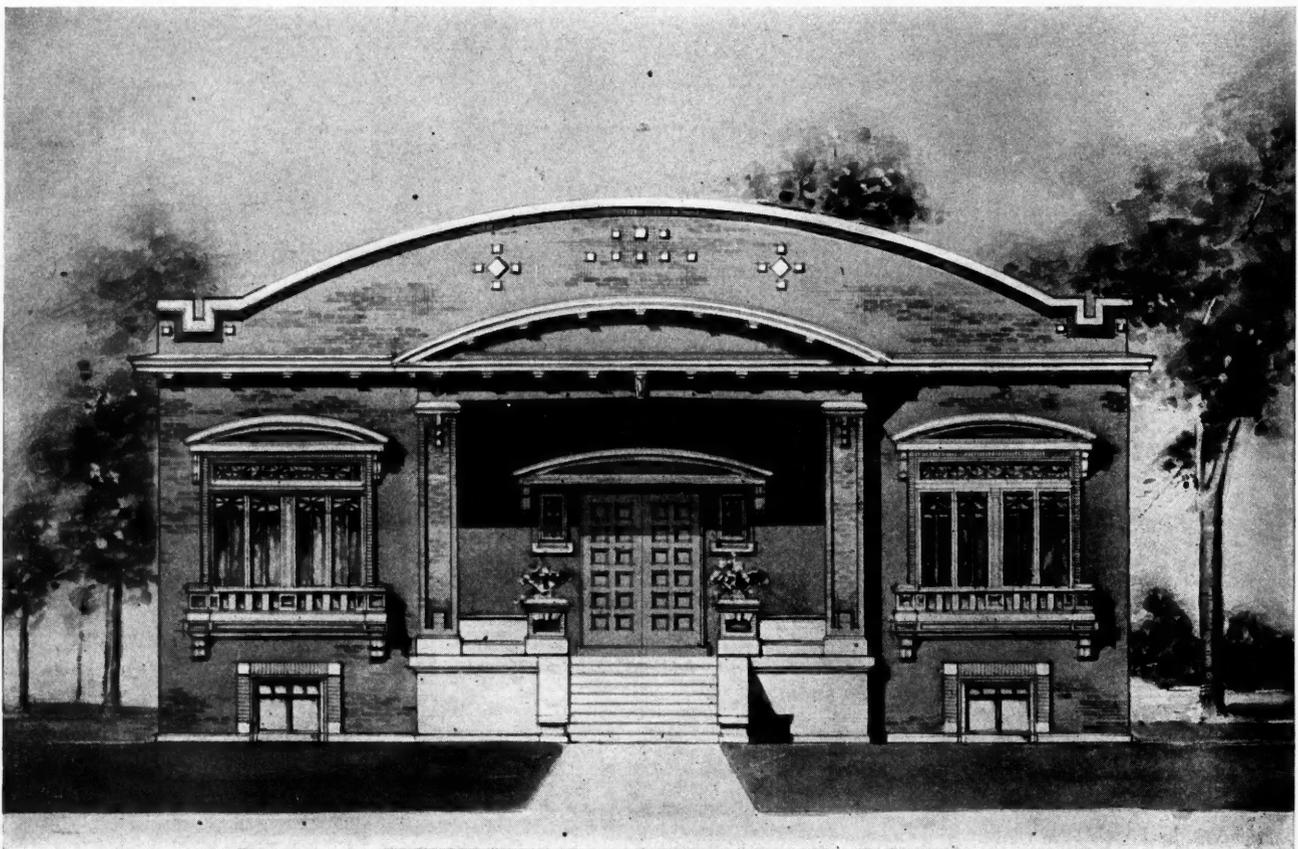
This building can also be used for local lodge meetings, neighborhood clubs, social organizations, and with stage and dressing room accommodations, amateur

theatricals and public lectures can be staged. The dressing rooms will serve as storage space for collapsible chairs which must be removed when gymnasium floor is in use.

The walls of this building are constructed of hard burned common brick with front veneered with a good quality buff face brick with pure white terra cotta or cut stone trimmings.

The gymnasium floor is spanned overhead with bow-string lattice trusses constructed of either steel or wood as illustrated in the November, 1915, and May, 1916, issues of the AMERICAN CARPENTER AND BUILDER

Four galvanized iron skylights are constructed on the roof to admit light to the inside area of gymnasium floor, and fitted with ventilators for exhausting the foul air.



Attractive Front View of Community Club House and Gymnasium. Size, 50 by 123 Feet. Front is Constructed of Buff Pressed Brick, Trimmed with White Terra Cotta. Design No. 6822.

The gymnasium floor has a clear height from floor level to under side of trusses of 16 feet; the trusses being 6 feet high, giving a total ceiling height to underside of roof rafters of 22 feet. This will give ample ceiling height for all athletic apparatus.

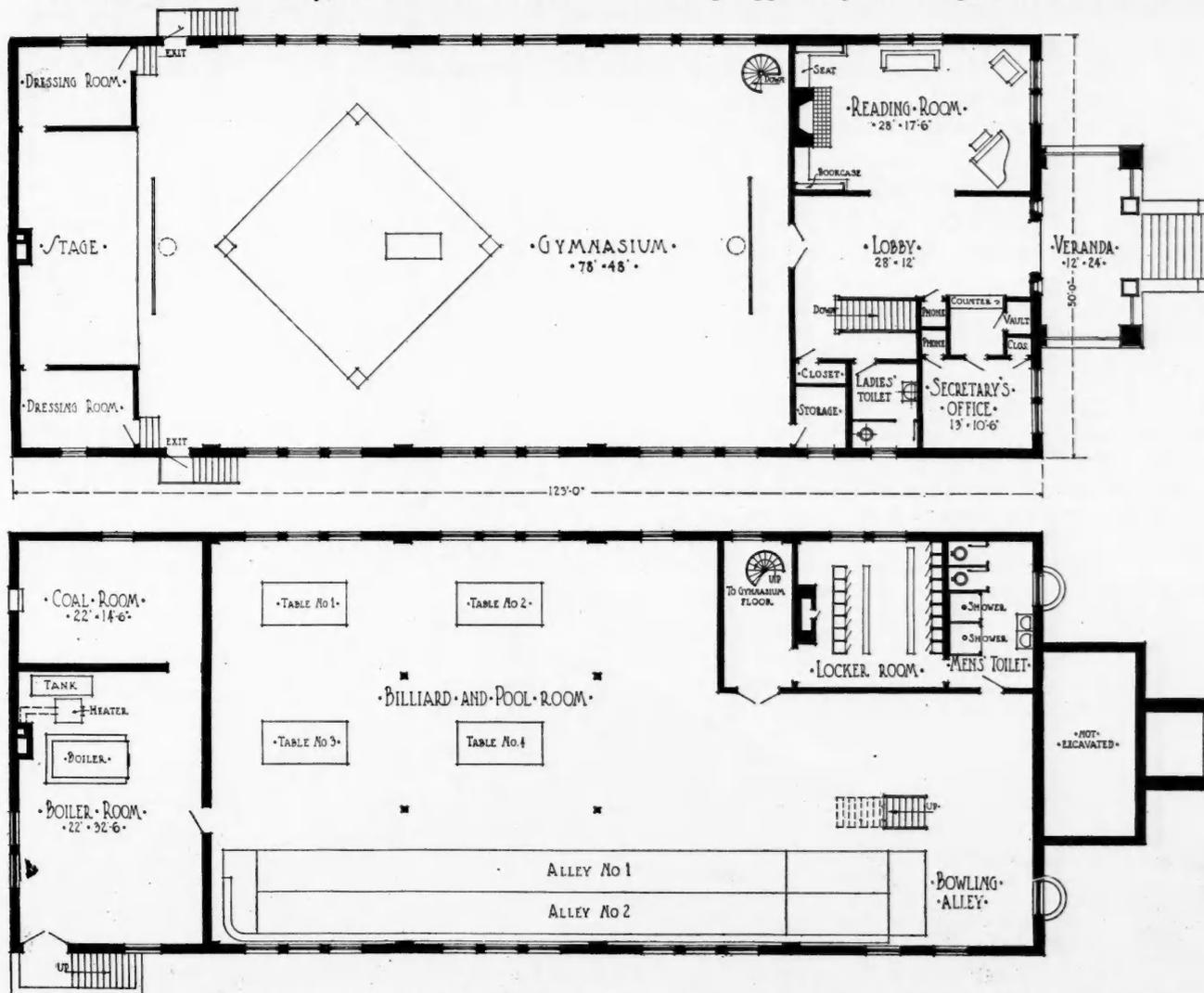
The gymnasium floor provides ample room for relay races, basket ball, indoor ball and hand ball. The basement floor contains two bowling alleys, billiard and pool room with men's locker room, toilet and shower bath accommodations directly leading from spiral stairway easily accessible from gymnasium.

From the main floor lobby, access is to be had to

## Spontaneous Combustion

Here is an experience that should be of interest and practical value to all builders and painters.

After finishing a job of Tiffany wall glazing recently, the pieces of cheesecloth used for stippling and blending were gathered up with the pots and other tools and placed on the back porch. A little later a drop cloth was thrown down, covering the pieces of cheese cloth which were, of course, saturated with the glazing liquid composed of linseed oil, benzine and a little drier. Shortly afterward the rags and drop cloth took fire and blazed up, apparently due to spontaneous combustion,



Basement Floor Plan and Main Floor Plan of Community Club House and Gymnasium, Design No. 6822. Illustrated on Opposite Page.

public information counter, public reading room, public phone booth and stairway leading to basement floor. Thus the interior plan arrangement and the dignified and enhancing appearance of the exterior design of a building of this character is a public asset and is of the greatest usefulness next to our public schools, libraries and hospitals.



"My dear girl," said her mother-in-law, "any woman would be satisfied with what John says he gives you."  
"So would I."—Puck.

as there were no lights or fire anywhere near.

Being curious, an attempt was made the next day to prove this theory of the cause of the fire. Other rags soaked with the same mixture were rolled up tightly in a piece of newspaper and placed out in a lot alongside of the house. An old piece of carpet was thrown on top of the pile. The time was noted and exactly one hour and five minutes later smoke was seen and the rags found to be ablaze.

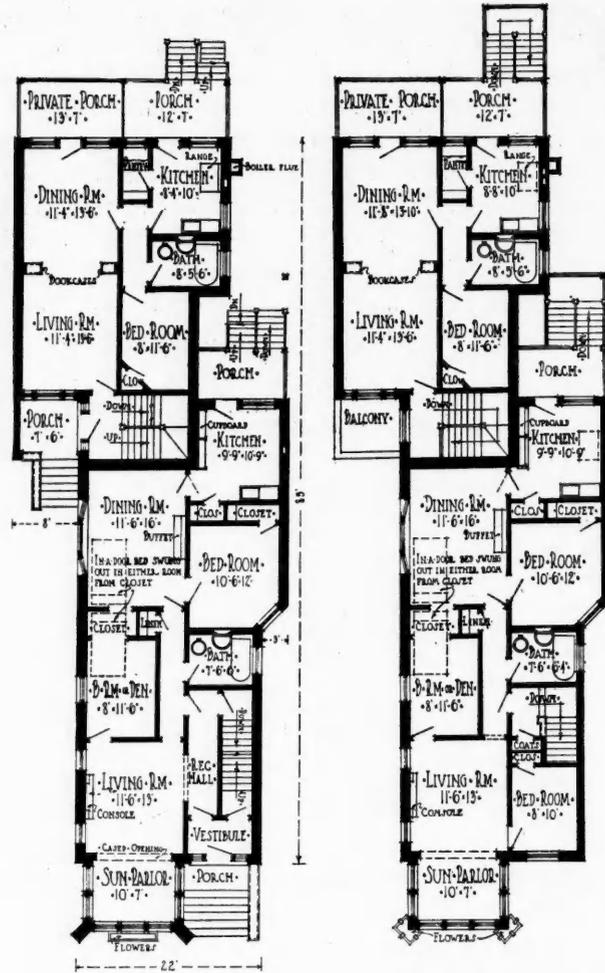
Painters had better keep an eye on all rags, waste and rubbish piles, as well as benzine and turps.—F. N. V., Chicago, in *The Carter Times*.

**Ell-Shaped Four Family Flat**

There is no doubt that the first impression formed in the mind of the prospective renter by the outside appearance of a flat building is of considerable importance to the owner. It is therefore necessary that this type of building should have special attention paid its exterior design. The perspective shown here illustrates a building which very thoroly meets the requirements mentioned. It is of L-type construction with a pleasing effect produced by the arrangement of the facade details. The three built-in receptacles for flowers or other vegetation and the tile covered canopy over the front entrance add distinction to this building.

The back flats have four rooms each with the built-in bookcases and the private porches as especially pleasing features. In the base of the L the upper flat has a neat balcony and the lower an entrance porch. The kitchen of each of these flats has a generous adjoining pantry with two sets of shelves.

The front flats are larger and have several features of marked distinction. Special arrangements have been made for extra sleeping room without using unnecessary floor space. In the closet between the dining room and den is placed an In-a-Door bed which may be swung in either direction. The front of these flats has been given special attention. A wide framed opening makes the living rooms and the sun parlors almost seem to be one large room. There are seven windows in each of the sun parlors. A cased opening also leads from the living rooms into the reception halls.



First Floor Plan.

Second Floor Plan.



Artistically Designed Four-Flat Building. Size, 30 Feet by 85 Feet. We can Furnish Complete Set of Blueprinted Working Plans and Typewritten Specifications for Only \$20.00 Per Set. When Ordering, Ask for Design No. 6823.

# 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

## What Do You Think of This?

To the Editor: Vineland, N. J.

Here is something that might interest your readers:

Put a sash cord in for an old lady out in the country. When finished she said: "Is that all?" I assured her it was. She said: "How is it I do not have to have any plastering done?" I asked her what she meant. She said the last man that put a cord in had to take off the moulding, and it took him nearly a day, besides the plasterer who came to repair the wall. On examination I found this to be a fact—that the gifted soul who put the last cord in tore off the trim to get at the weight box, and of course considerable plaster. The mystery of the pocket covers, mouse, etc., evidently was a sealed book to him!

JAMES G. NEWLAND.



## Makes Large Use of Trailer

To the Editor: Fort Madison, Iowa.

We are sending you under separate cover photograph of our work car with one ton trailer attached—loaded with inside furnishings. We have been using trailer since September, 1915, and find same a quick way of getting our shop material on the job.

W. C. MARSH,

General Contractor and Manufacturer.

## Blacklidge Defends His Rafter Table

To the Editor: San Rafael, Cal.

Regarding John Parkhill's criticism of my rafter lengths, page 114 of the May number, I have gone over a lot of the figures in the first half of the table and cannot yet find any that are more than one-tenth inch off. As he says, "If used to get the length for a run of twenty feet, etc., etc.," it would be way off. But, if one is going to do that, why have the table? Isn't that just the idea of the table, to save that work? The table was not made by finding the length of the shortest and then multiplying to get all the rest. Each length was figured separately. And I do not believe that any hip rafter (or any other rafter either) will ever cause any trouble by being one-tenth of an inch too long or too short—unless it were used to find a longer rafter by multiplication.

I suppose Mr. Parkhill, being a manufacturer, must have his figures exactly right, perhaps down to hundredths of an inch. But we on the job are not worrying over anything as small as tenths.

H. J. BLACKLIDGE.



## Wants Ice Box Details

To the Editor: Mayfield, Ky.

I would like very much if some brother would give us a detail of an ice box.

J. R. N.



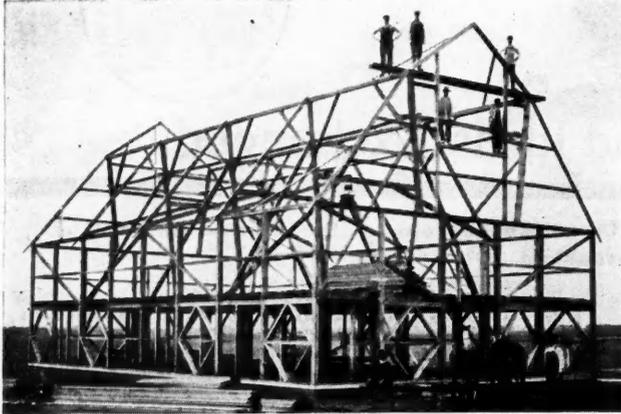
One Ton Trailer Used by W. C. Marsh to Get Shop Work on Job Quickly.

**Solidly Framed Barn**

To the Editor: Wilmont, Minn.

I am enclosing a photograph of the framing of a barn I built for Fred Recker of Lismore, Minn., which you may use in the Correspondence Department of the AMERICAN CARPENTER AND BUILDER.

This barn is 40 feet in width and 64 feet long, with 16-foot



Solid Timber Frame of Lismore, Minn., Barn Built by Wm. G. Bruns.

posts. The framing was very solid and I think the photograph will show my method of construction plainly to fellow readers. The barn is to be used for feeding live stock.

WM. G. BRUNS.

**Trussed Joist for Wide Spans**

To the Editor: Williston, N. Dak.

I would like your opinion in regard to the strength and suitability of the lattice roof truss, and also of the trussed joist indicated in the accompanying sketches. They are intended for a school house on a span of 33 feet unsupported. We plan to space the floor joists 20 inches on centers, and use three double rows of bridging. As the schoolroom seats are to be fixed I understand that a live load of more than 40 to 50 pounds to the square foot will never be imposed upon this floor.

This lattice roof truss is one of my own design that I have used for a number of years on garages. E. JUELSON.

*Answer*—Your drawings of roof truss and of trussed floor beams as submitted are of somewhat novel construction, making it difficult to figure out the relative strength of each individual bearing member; however, they should both be

good for the loads that will come upon them in a 33-foot span. Notice that in the roof truss, the roof and ceiling 2 by 8-inch joists are latticed together with 1 by 4-inch braces, making a light but strong truss every 16 inches. The depth of this truss is 2 feet 6 inches. For a wider span this depth would be increased, as for instance, 3 feet deep for a 50-foot span.

The trussed floor joists are built up of four 2 by 12's reinforced with a 3/4-inch diameter steel truss rod passing over cast iron queen-post shoes, and held at the ends by means of a 6 by 6 by 1/2-inch steel plate washer. These floor beams are spaced 20 inches apart on centers. EDITOR.



**Laying Enameled Tile Brick**

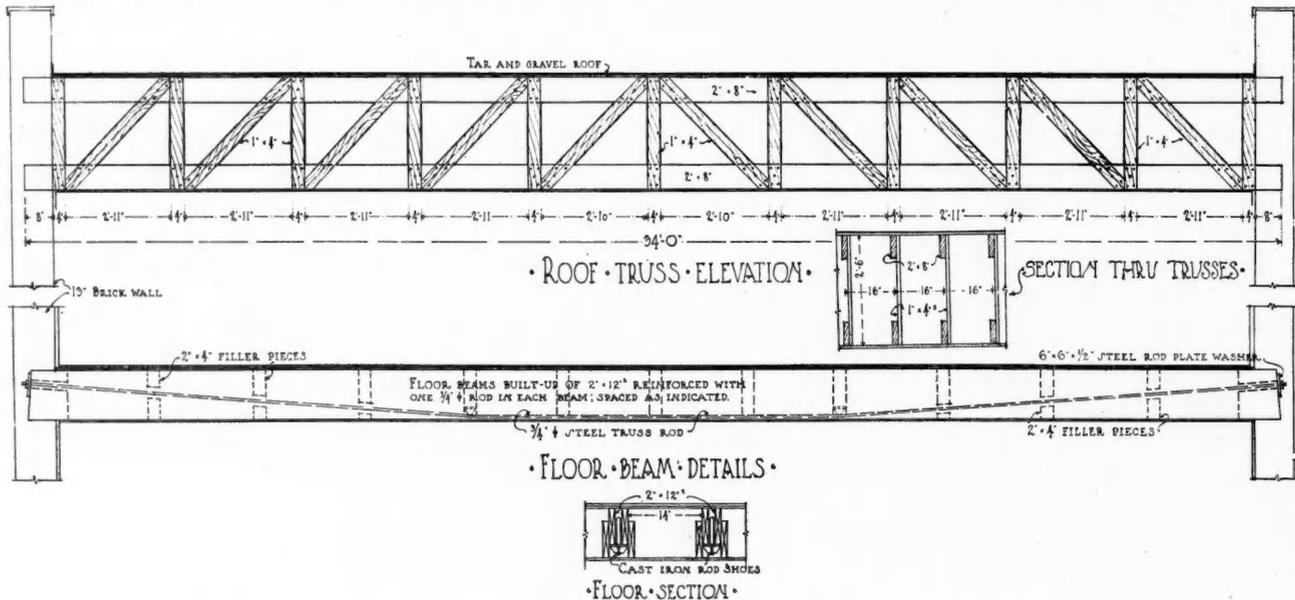
To the Editor: Grays Lake, Ill.

I would like to ask your advice about laying enameled tile or brick. What I would like to know is: What is the best way to lay them, kind of mortar to be used, and how to make them stay in place. C. F. C.

*Answer*—Where wood studding is to be used in a building in which enameled tile is to be placed on the side walls, the studding should be braced about every 20 inches with horizontal strips to prevent vibration, and covered with expanded metal lath. Scratch coat on metal lath should be 1/2 inch thick, or sufficient to make even and true surface within 7/8 inch of intended finished surface of tile when tile 3/8 inch thick are used. The scratch coat should be roughened before placing the tile.

The scratch coat should consist of one part Portland cement, two parts clean sand. Mix the cement and sand thoroly dry and add sufficient water to form a thick mortar. The scratch coat should be allowed to harden for at least one day before commencing to set tile, thoroly brushed to remove all dust, and well wet, brushing on thin coat of pure liquid Portland cement before putting on cement mortar for setting tile.

Cement mortar should consist of one part best quality Portland cement, two parts clean, washed, sharp, sand, thoroly mixed. If any lime is mixed with cement mortar to prevent it setting too quickly, it should never exceed 10 per cent and great care should be used to have lime well-slacked and made free from all lumps by passing thru a fine sieve to guard against "heaving" or "swelling" and thus "loosening" or "lifting" tiles. White rock finish can be used as above in place of lime. Before setting tile and after carefully placing last coat of cement mortar to receive tile, place over it with



Roof Truss and Floor Beam Details for a 33-Foot Span Suitable for Use in a School House.

a plasterer's trowel, a very light coat of pure cement mixed to a consistency of thick cream.

Joints should be grouted with Keene's white cement or with pure light gray Portland cement if more character is desired to tile work.

All tiles should be thoroly soaked in clean water before placing on the wall. Dirty water or water off of cement will stain tile, causing variation in shade and making an unsatisfactory job.

EDITOR.



**Boston Hips and Gables**

To the Editor:

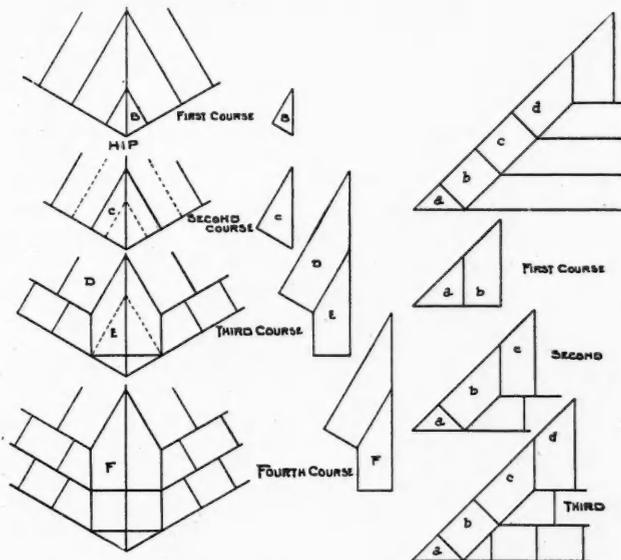
Nucla, Colo.

The Boston Hip is practically an extra course of shingles laid up the hip with the grain running parallel with the hip; but it is laid at the same time as the rest of the roof is laid, and not over it.

I use the same method in finishing up a gable, and I have never seen any one else do so. I think it makes a much more satisfactory finish, and it can be used with or without a frieze board. Also there are no small corners to split off.

It is rather hard to show by drawings, but I think the sketches showing the different shapes spread apart will make it clear. The shingles marked F lap over the course below in each case. Similar numbers refer to the same shingle to show the shape.

The short side of the hip shingle is the length of the course, and the hip shingles should all be the same width. The same



Details Showing Each Course in the Shingling of Boston Hip and Gable.

style can be used on the uneven coursed roofs now in use, but require a different pattern of hip shingle for each different spacing.

In the gable finish the grain of the finishing shingle runs parallel with the frieze board or plancer if no frieze is used.

S. M. PRESTON, of the Nucla Planing Mill Company.



**Wants Combination Woodworking Machine Kinks**

To the Editor:

Butte, Mont.

Would like very much if the magazine contained more kinks written on combination woodworking machines, methods of doing different kinds of work by some of the mill hands.

Am in the contracting and building business and hand power has gotten to be too slow for us at this day and age of the world.

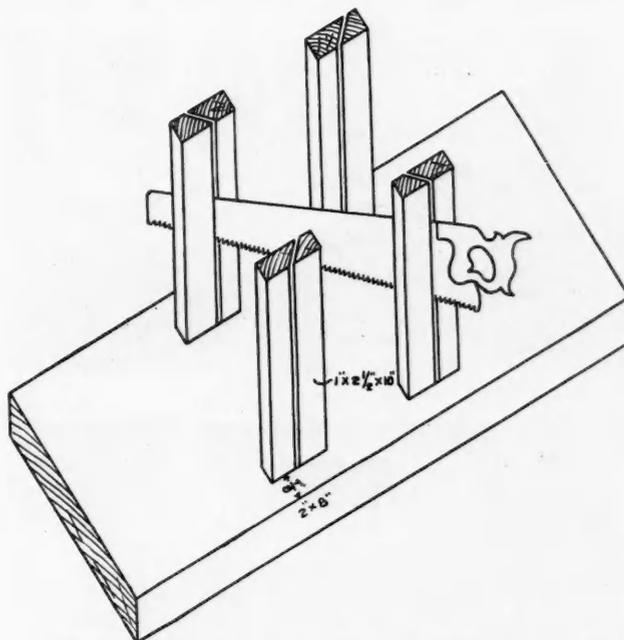
A. P. STONE.

**Nailless Mitre Box**

To the Editor:

Carbondale, Ill.

Find enclosed drawing of a nailless wooden mitre box. My experience with the mitre box where the sides are nailed on is that the sides soon break off and warp, rendering the mitre box a total loss. Not so with a box made like this,



Novel Nailless Mitre Box Used by J. A. Williams to Avoid Trouble Due to Warping in Side-Nailed Boxes.

because the 1 by 2½-inch uprights are mortised tightly thru the 2 by 8-inch and the sides cannot warp because the grain of the 1 by 2½ by 10-inch is straight up and down, or opposite to the old style of box. These 1 by 2½-inch strips will last twice as long as ordinary sides and when they get old and worn then can be knocked out and new ones inserted in the 2 by 8-inch. Set the 1 by 2½-inch upright into the 2 by 8-inch 7/8 inch from edge.

J. A. WILLIAMS.



**Bay Roofed With Dormer**

To the Editor:

Rouleau, Sask.

I notice in the March number that a brother carpenter, Mr. J. B. Sydleman, asks for information regarding his bay window which he says terminates into a dormer window on the roof.

I am inclosing a photo of a house that was built by me the summer of 1913; and I hope that you will reproduce it in your valuable magazine, as I trust that it will give the above party the idea that he is looking for.

Altho I am now manager of the Imperial Elevator & Lumber Company's lumber yard at this place, I am as deeply interested in the problem of brother carpenters as when I was contracting.

I have taken the "A. C. & B." for several years and must say that I have found it most helpful at all times.

CHAS. MCPHERSON.



Method Used by Chas. McPherson to Handle Bay Roofed with Dormer.

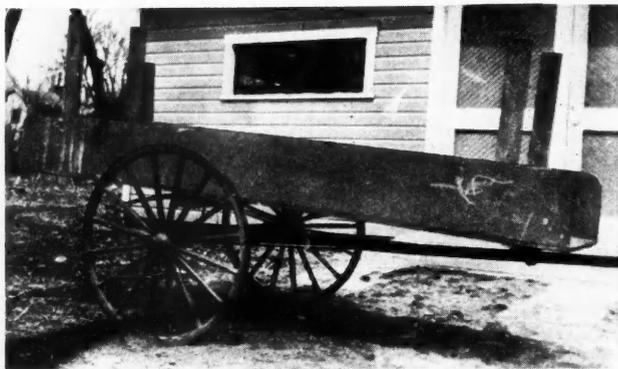
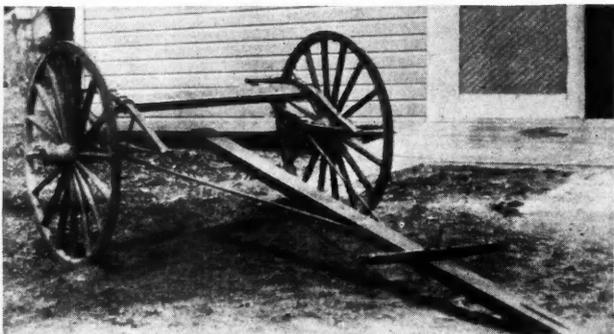
### Home Made Trailer

To the Editor:

Ashton, Iowa.

I am inclosing two pictures of my home-made trailer where the workbench answers the purpose of a box to carry the load. The bench is bolted on with three bolts.

B. DE VRIES,  
Contractor and Builder.



Two Views of Home Made Trailer Using Work Bench for Box,  
Made by B. DeVries.

### Two Good Questions

To the Editor:

Lost Creek, Ky.

I am a reader of your valuable magazine and would appreciate answers to the following questions thru its columns.

1. I would like to have a plan for a field gate that can be opened and closed without the operator alighting from a horse or rig.

2. Would like a good plan for bracing corner posts of wood in a wire fence.

I am a carpenter and find your magazine very helpful.

G. R. PETERSON.

### Dark Oak Finish for Yellow Pine

To the Editor:

Sawyer, Kansas.

I have made a study table of yellow pine material, and I want to finish it in what you call a flat finish in a dark oak stain. I would like if you or some of your readers would tell me just how to go at it.

I think the AMERICAN CARPENTER AND BUILDER is great, every issue teaching me something new.

CHAS. FLORY.

### Index to Building Journals

To the Editor:

Columbus, Ohio.

We frequently find it quite convenient to refer to some article in a building journal in regard to the best method of construction. If there is not some system used, it is usually a case of looking through the journals from January to December before the desired information is found. To remedy this, a loose leaf notebook is used, and each article indexed, giving the name of the journal, the year, month and

page. This makes it an easy matter to find just what is wanted.

If the journals are bound, it saves time also.

Enclosed is a sample page of the index.

J. D. DEBRA,  
Columbus Trade School.

#### CHORDS (TO FIND THE LENGTH OF)

A. Nov., 1912, p. 93.—W. C., Dec., 1910, p. 96.—

#### CONCRETE BLOCK AND VENEER CONSTRUCTION

A. Feb., 1911, p. 40.—N., Nov., 1913, p. 73.—

N. Dec., 1913, p. 50.—

#### CONCRETE FORMS AND COLUMNS

A. Apr., 1911, p. 42.—N., Nov., 1914, p. 60.—

N. Aug., 1913, p. 76.—A., Feb., 1913, p. 74.—

#### CONCRETE ICE HOUSE

A. Aug., 1915, p. 82.—

#### CONCRETE HOTBED

A. Nov., 1915, p. 84.—

Key—

A.—American Carpenter and Builder.

C. W.—Cement World.

N.—National Builder.

W. C.—Wood Craft.

B. A.—Building Age.

W. W.—Woodworker.

Etc.

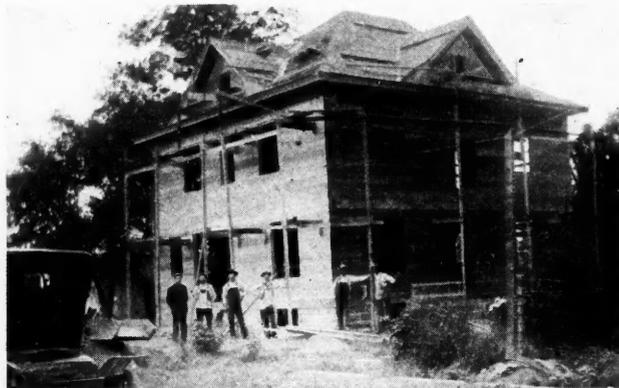


### Seven Days' Work

To the Editor:

Aurelia, Iowa.

I am sending you a picture of what the Diercks crew can do in seven days. I am a member of this crew, and I tell you we go some. Work has been a little slow this spring, but is now picking up. Mr. Wm. Diercks has worked a crew in



Result of Seven Days' Work by Wm. Dierck's Crew, of Aurelia,  
Iowa.

this locality for 30 years and is well liked.

The Steel Square and Correspondence departments are just fine, and the AMERICAN CARPENTER AND BUILDER is O. K.—just the place to go when in doubt about any part of the work.

FRANK FREAR.



### An Estimating Sheet

To the Editor:

Cincinnati, Ohio.

Enclosed find one of my estimating sheets. It is original with me, and covers everything. Prices must be made to suit localities. I hope it won't bother your printer as much as it did us in ruling the paper.

If this is too big a job for you to publish, hang it in your office and invite visitors to look at it.

GEO. M. BARNES.

Note: We attempted to make a photographic zinc etching of this sheet, but the ruled lines were not strong enough to show. This plate, therefore, gives only the headings, and

# Correspondence Department

Date 191

Owner \_\_\_\_\_

## ESTIMATES FOR

Location \_\_\_\_\_ Architect \_\_\_\_\_

FIRST FLOOR JOIST	SQUARE FT. SURF PINE SUB	SECOND FLOOR JOIST	SQUARE FT. SURF PINE SUB	ATTIC FLOOR JOIST	SQUARE FT. SURF PINE SUB	PORCH FLOOR JOIST	SQUARE FT. CONC WOOD TILE	DECK FLOOR JOIST	SQUARE FT. CANV COMP TIN
PORCH	SQUARE FT. SLATE	MAIN	SQUARE FT SLATE	DORMER	SQUARE FT. SLATE	GABLE	SQUARE FT SHING	OUTSIDE	SQUARE FT SHING
ROOF	SHING.	ROOF	SHING.	ROOF	SHING	WALL	STUCCO	WALL	STUCCO
RAFTERS	TILE	RAFTERS	TILE	RAFTERS	TILE	STUDD	SIDING	STUDD	SIDING
CONCRETE FORM STUDD	SQUARE FT. PLAIN STRIP PANEL	CELLAR PARTITION STUDD	SQUARE FT SHTG. BEADE PLAST	ATTIC CEILING JOIST	SQUARE FT PLAS. CEIL. BOARD	WAINSCOT NAIL TIES	SQUARE FT. PANEL SHTG. BEADE	PORCH CEILING JOIST	SQUARE FT CEIL. PLAST OPEN
GIRDER	SILL	LINTLE	WALL-PLATE	PART-PLATE	RIDGE	LOOKOUTS	BRACE	STUDDS	POSTS
INSIDE PARTITION		LIN. FT.			EXCAVATING				
INSIDE BASE		" "			CONCRETE WORK				
PICTURE MOULD		" "			STONE WORK				
BEAM CEILING		" "			IRON WORK				
PLATE RAIL		" "			BRICK WORK				
PORCH RAIL		" "			CARPENTER WORK				
PORCH CORNICE		" "			MILL WORK				
MAIN CORNICE		" "			LUMBER				
DORMER CORNICE		" "			STAIRS				
GABLE CORNICE		" "			FREE STONE				
BASE GROUNDS		" "			PLUMBING				
LATTICE		" "			GAS FITTING				
JOIST BRIDGING		" "			HEATING				
PARTITION BRIDGING		" "			ELECTRIC WORK				
CELLAR DOORS		" "			PLASTERING				
OUTSIDE DOORS		" "			ROOFING				
INSIDE DOORS		" "			FINISHED HARDWARE				
FLY DOORS		" "			ROUGH HARDWARE				
SLIDING DOORS		" "			NAILS				
SIDE LIGHTS		" "			DOOR TRACK				
CELLAR WINDOWS		" "			DUMB WAITER				
BOX WINDOWS		" "			MANTELS				
CASEMENT WINDOWS		" "			CLOTHES SCHUTR				
CASED OPENINGS		" "			METAL SPLINES				
COLONADES		" "			METAL COLUMNS				
MEDICINE CABINETS		" "			GAS FIXTURES				
CHINA CASES		" "			TILE MARBLE				
CLOTHES CLOSETS		" "			ART GLASS				
ROOF SCUTTLE		" "			PAINTING, GLAZING				
HOODS		" "			PAPER				
CORNICE BRACES		" "			PLAN				
WINDOW SEATS		" "			CEMENT WORK				
WALL PANEL		" "			GRADING-SODDING				
PROTECTING FLOORS		" "			ENCLOSING BUILDING				
SETTING FRAMES		" "			CORKING OPENINGS				
CEDER CLOSETS		" "			GAS SERVICE				
HOUSE FINISH		" "			INSURANCE				
FINISH		" "			BUILDING PERMIT				
JAM LININGS		" "			STREET PERMIT				
WINDOW BOX		" "			EXTRA				
OUTSIDE STEPS-TREADS		" "			TOTAL				

Headings for Estimating Sheet Used by Geo. M. Barnes. Due to Their Faintness the Column Lines Did Not Come Out in Reproduction.

anyone desiring to use it will have to work out convenient column rules to suit himself. EDITOR.



### A Silo for Chickens

Detroit, Mich.

To the Editor:

Every farmer is more or less familiar with the silo as used for cattle, but its use to supply chickens with green food is comparatively recent. Among those who have given it a trial is a school teacher in the Upper Peninsula of Michigan. This man is a chicken enthusiast, and has a back yard poultry plant that nets a considerable income each year. The chicken business with him is a science. Before starting in the business four years ago, he knew almost nothing about the business, but several years' experience as a teacher had given him an investigating turn of mind. So, before starting, he investigated the subject thoroly, with the result that he has made a big success from the start.

Perhaps the greatest obstacle in growing chickens in the city at a profit is the feed question. It is quite a trick to make the ledger show a balance on the right side when all the feed has to be bought. Among other feds, chickens in order to produce eggs in winter must have plenty of green stuff. This man has an oat sprouter which he has used to supply his flock with green feed, but the work of sprouting oats for a big flock required considerable time and was very tedious. So he studied and investigated for a long time how to supply green feed in quantity without too much labor. One day he picked up a farm paper in which he read an article on the value of ensilage for cows. While reading, the thought came to him, "Would not ensilage be good for chickens?" His thought soon took action in definite form and he built a silo on purpose for his chickens.

The silo is 3½ feet in diameter and 8 feet high, 3½

feet being in the ground. The bottom is of cement. The framework is made of 2 by 2's set vertically one foot apart. To these, laths are nailed diagonally inside and out. A coat of hair plaster is applied on each side and over this a coat of cement. The roof is made of thin boards covered with tarpaper roofing, and is removable. A small door near the top affords a way to take out the ensilage. The entire cost of material and labor was \$15, but this can be considerably reduced in most localities as labor is high in the Upper Peninsula.

The ensilage used consisted of lawn clippings and sweet corn cut green. The corn was cut up with an ordinary hand cutting box. It was grown for the regular table supply of corn, which it furnished all summer, but there was considerable corn left on the stalks when they were cut.

The ensilage was made, therefore, from two products that would ordinarily have been wasted, but, which, treated in this way, became a source of profit. There was enough to supply the flock for a long time, feeding all they would clean up each day. Altho this man had made big profits heretofore, by utilizing these waste products, he increased them materially. The success of his experiment having proved, he now figures on building a larger silo this season.

HARRY L. SPOONER.



**Trussed Porch Soffits**

To the Editor: Persia, Iowa.

I have a porch to build that is 30 feet long, and posts at the corners only. I would like to make the top or the box not to exceed 12 inches square, and would like to use two 2 by 12's edgewise. How should I build in between them so it wouldn't sag? This porch has only its own roof to hold, as it is a bungalow.

THOS. E. COLLINGS.

*Answer*—We are submitting two types of porch roof girders for your selection; the one a flitch plate girder and the other a trussed girder, both of which are commonly used for porch roof soffits.

For spans of this length it is necessary, where a beam depth of only 12 inches is desired, to use steel reinforcement of some-kind to prevent any possible sagging.

Timber for girders of this construction should be sound and of best quality long leaf yellow pine, properly fitted and securely nailed or bolted together.

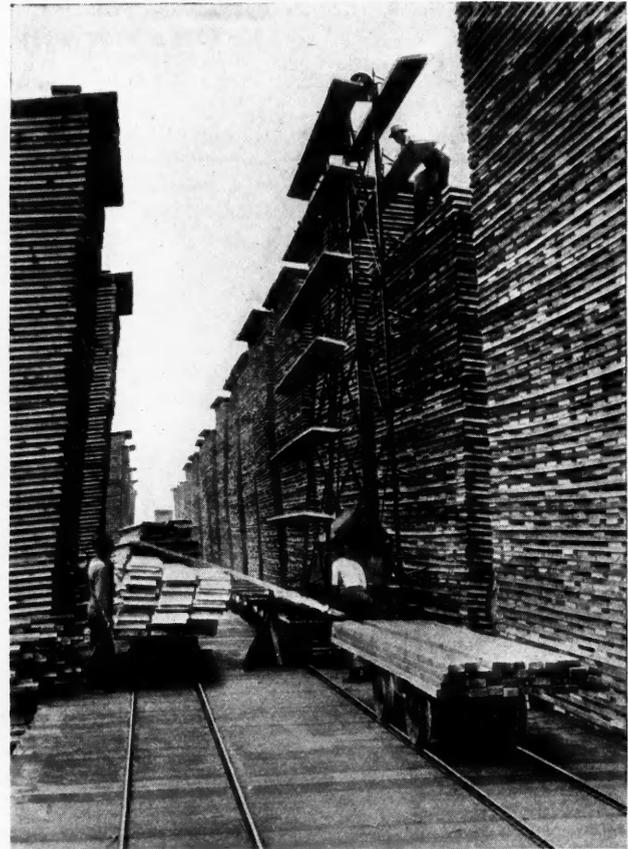
EDITOR.



**New Power Lumber Piler**

To the Editor: Buffalo, N. Y.

The accompanying illustration shows a novel lumber piler developed at Seattle, Washington. These machines are operated by gasoline engines or electric motors. This portable lumber piler was designed and constructed to save labor and yard room. It is equipped with a continuous chain elevator, which lifts the lumber up on one side and lowers it on the



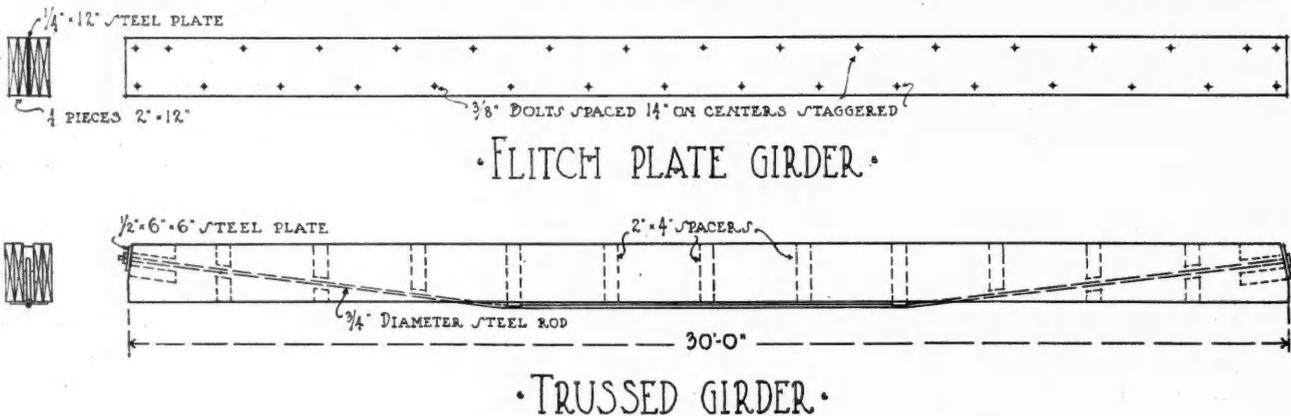
Gasoline Power Lumber Piler Used to Reduce the Cost of Piling and Unpiling Lumber. Capacity is Claimed to be 10,000 Feet of Lumber per Hour.

other, where it is taken off at any height desired by the men building the pile. When the time comes to take the lumber down from the pile, this machine lowers it with the same facility and speed that it piles it. The piler will also do equally good work when placed alongside of a planing machine, taking the lumber from the dry kiln transfer car or truck and depositing it on the automatic feed table of the planer.

The conveyor chain runs continuously at an approximate speed of 30 feet per minute. The results obtained by those who are using these machines have shown beyond any doubt that this is the latest and most efficient method of handling lumber economically, and that by employing these pilers, millmen and lumber yard men are enabled to pile and unpile their lumber at the lowest possible cost.

It is claimed that one machine will pile over 10,000 feet of lumber per hour, to any height desired within the maximum height of the piler in use.

FRANK C. PERKINS.



Details Showing Two Types of Girders Suitable for Use in Porch Roofs.

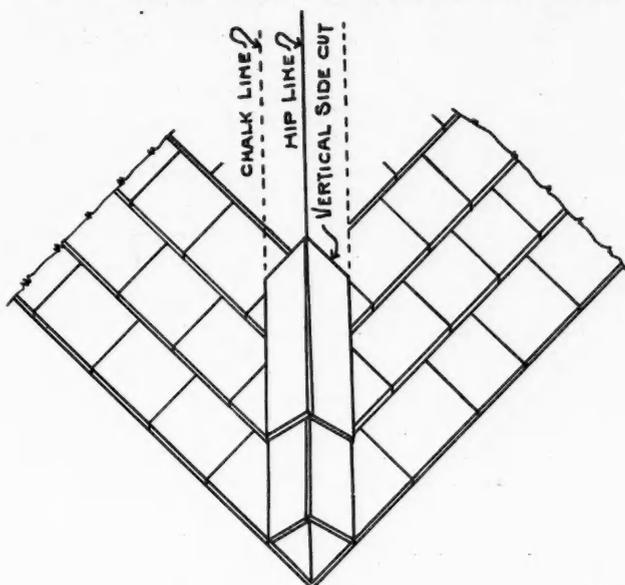
**Laying the Boston Hip**

To the Editor: Youngstown, Ohio.

Though a reader of your great publication for only a short period, I feel it my duty to answer thru your valuable Correspondence columns the question desired by Mr. L. A. Trittenbach, concerning the "Boston Hip."

The method of shingling known as the "Boston Hip" is very effective and neat and is sufficiently weather tight for all purposes, especially on a steep roof. This method is applied to the hips of roofs, giving a neat and attractive appearance.

Shingles of a uniform width must be selected; say, for instance, we select them to be 5 inches wide. Now we take a chalk line and snap it on each side of the hip about 4½ inches from its center and parallel to it. The slope shingles of the main roof are carried now up to this line, stepping back to allow the hips to be laid last. Lay the bottom shingles of the hip first, with their edges at, and parallel to the hip line, and the lower corner of their butts just touching the



Detail Showing Method of Shingling the Boston Hip.

butts of the shingles below. Now we draw a line across each hip shingle at right-angles to the eaves for the vertical side cut. The side of every other shingle of each alternate course must be slightly tapered to obtain a close fit at the intersection. Fit the hip shingle to the side of the main roof shingle and then nail in place.

By using the "Boston Hip" a great advantage is obtained as the grain of the wood runs with the hip and the curling tendency is taken away from the line of the hips to the side of the shingle.

This is the proper way to shingle the "Boston Hip," which after a little study will become an easy and clear matter to any AMERICAN CARPENTER AND BUILDER reader.

EUGENE L. SCHNEIDER.



**How to Build a Homestead Shanty**

To the Editor: Norwood, Colo.

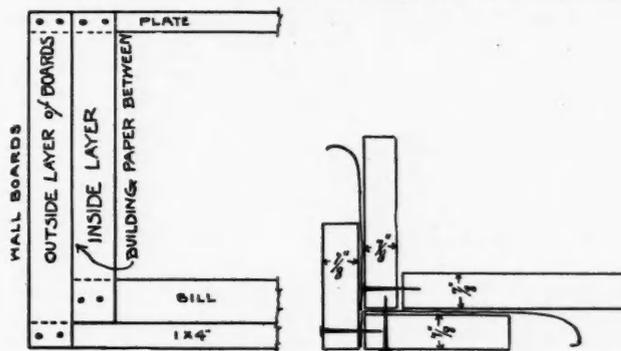
Have been reading the AMERICAN CARPENTER AND BUILDER since its birth and have every number on file and could not possibly get along without it.

Here is the way I build homestead shanties, also granaries, using two thicknesses of boards. It makes it mouse and wind proof by nailing a 1 by 4 inch on the sill, then let first layer of boards rest upon this. Use no girths, or studs, simply the upper plates and floor sills. After the walls are boarded up, shower-nail them with 6d. common nails and clinch

same on inside. Building paper is used between boards to keep out this crisp mountain air.

You will note, the outside boards are cut 4 inches longer than inside ones. Corners are double lapped, as per sketch.

Our lumber here is cut and sawed direct from the forest,



Detail of Construction Method for a Wind-Tight Homestead Shanty.

as we use it, and has no chance to dry out; therefore, being very wet and full of sap, it is very bad on shrinking. A 12-inch board will shrink 1 inch each year for thirteen years.

Hope this will help some poor "Claim Shooter" to endure the cold and stay with his claim.

L. E. BRUNDAGE.



**Good Brick Construction**

To the Editor: North East, Pa.

Inclosed find \$2.00 money order to renew my subscription to AMERICAN CARPENTER AND BUILDER. I find the AMERICAN CARPENTER AND BUILDER very helpful and would not part with it.

Am sending you a postal photo of a brick veneer house and solid brick garage that we erected last year. Both were built of "Tapestry" brick. It is looking very good here in the building line for this summer.

M. W. MEEHL,

Of Meehl Brothers, Contractors and Builders.



Brick Veneer House and Solid Brick Garage Well Handled by M. W. Meehl.



**Who Knows About Dance Floors for Theatres?**

To the Editor: Fryburg, N. Dak.

Would like to know if you can give me some information how to build a sectional floor. What I mean is a floor used in a theater that is raised at one end and can be removed when the level floor is to be used for dancing.

I have heard of them, but have never had the chance to see one, nor have I seen the plans of any such.

Any information that you can give me on this will be greatly appreciated.

M. BROTTEN.

### Something for the Boys—a Genuine Norway Coaster

To the Editor: Twin Valley, Minn.

Mr. Lefroy in December number suggests a Boy's Department. I am enclosing description of a sled that I think some of the boys would like to make. While you may not find space for a continuous Boy's Department, wouldn't it tickle them to find an item now and then? Many of them are the coming carpenters; but most of the items in a building paper would be too intricate, or else not of interest to them.

First is the runners to make. Use oak or any tough hard wood that can be bent. Make them  $\frac{7}{8}$  by  $1\frac{1}{4}$  by 4 ft. 4 in. finished. Bend so as to be about 12 inches from floor line. Next is "b," the knees, which should be  $2\frac{1}{2}$  at the top and  $2\frac{3}{4}$  in. at the bottom, 5 in. long by  $\frac{7}{8}$  thick, or of same thickness as runner "a." The knee "b" is curved along edges so as to spring dowels or pins "e" and edges of knees are hollowed out or grooved to fit pins "e" (which hold knees "b" in place).

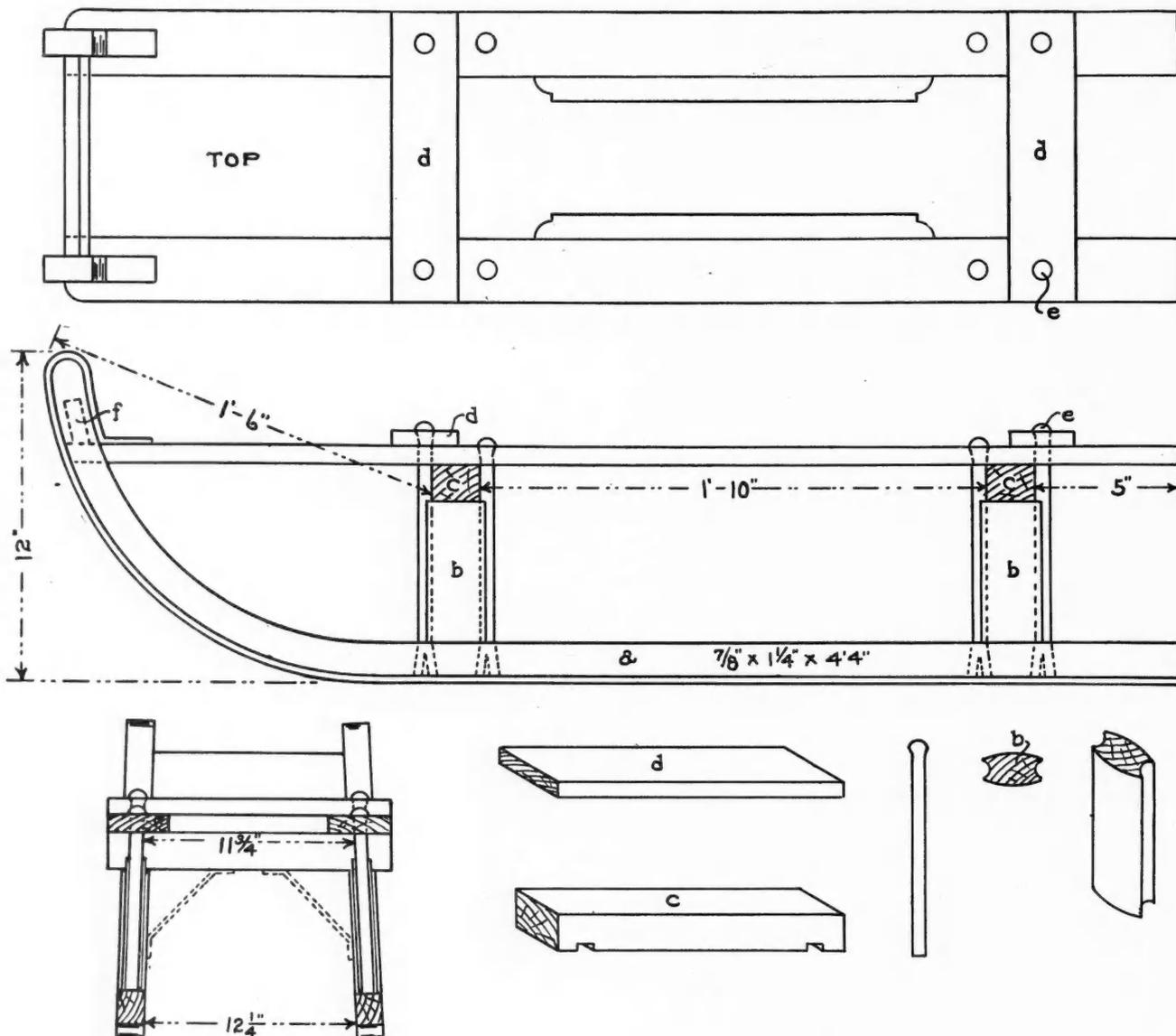
Probably the best way to groove out for pins "e" is to make knees "b" of even width, i. e.,  $2\frac{3}{4}$  in.; then gauge the exact center of the edges; saw along the gauge-mark, about  $\frac{1}{16}$  in. deep; place two knees, edge to edge, so as to have saw cuts even at both ends of knees; clamp firmly together and bore with a half-inch or nine-sixteenths bit (according

to size of pins "e" you wish to use). The saw cut will guide the point of bit and the result is two half-round grooves.

After boring, gouge the groove down  $\frac{1}{8}$  in. on each side, of one end only, which will be the upper and finish the edges in proportion; also round off flat side towards the groove; but not very sharp; "c" is the bench or beam, about  $1\frac{3}{8}$  by 2 in. and  $14\frac{1}{2}$  in. long, or of the width you wish to make the sled; "c" is gained out for the knees. The gain is made  $\frac{3}{4}$  in. from end of beam,  $\frac{1}{4}$  in. deep and should be of the same width across the grain as the thickness of knees.

If the grooves, inside measure, at upper end, are not 2 in., or the width of beam, then the beam should be made to match. The strips "d,"  $\frac{1}{2}$  by  $1\frac{3}{4}$  in., are placed over the beams, one forward, the other back enough to allow pin "e" to pass thru the center of strips "d," which are across boards to hold them intact. Pins "e" are made of strong, straight-grained hardwood,  $\frac{1}{2}$  or  $\frac{9}{16}$  by 10 in. Make heads countersunk, somewhat like a sleigh-bolt, only rounded on top.

Holes in strip "d" should be countersunk to match pins "e"; same in the bottom of runner. If you have a lathe, pins "e" are not so hard to make; but to get them out by hand takes longer. They should fit snug in runner and after being driven in place must be wedged; drive wedge across runners, or it may split them; "f" is a footboard, 2 in. wide by  $\frac{5}{8}$ ths thick; ends are mortised thru runners. Boards should be screwed



Construction Details for Norway Coaster Such as the Young Coming-Carpenter Can Make.

to under side of strip "f"; if nailed, they are liable to come loose.

I would advise putting on 3/16 by 1-in. irons, as per double dotted lines. This would Americanize it somewhat. The boards for top of sled may be about 5/8 in. thick by 3 1/4 or 3 1/2 wide by 4 ft. for sides and 8 in. or so for center. Hand holes are cut out of center piece. Best shape of shoe for a coaster is half-oval, which lets go of the snow easily. Shoe should be fully as wide as runner so as to protect the wood. Paint between shoe and runner. Fasten the shoes with 3/16-in. tire bolts or No. 10 screws.

A. O. STIEN.



**Big Bunch of Questions**

To the Editor:

Sterling, Ill.

Will some of the Brother carpenters give plans for bird houses; the size and plan of a modern kitchen; a quick method of squaring the ends of a post that is larger at one end than the other; some kind of a rack so I can use the power of my Ford car to run light machinery; also how to build porch piers and fireplaces out of "nigger heads" or field stones? I can get any size stones I wish.

Could not do business without "A. C. & B." It helps me in many ways.

S. P. MORRIS,

Building Contractor.



**Area of An Ellipse**

To the Editor:

McConnellsville, N. Dak.

Please give in your next issue a rule for finding the area of an ellipse. The one in questions is 30 by 50 feet.

L. E. M.

Answer—Here is the Rule:

Area of an ellipse equals product of the two diameters times .7854. As in this example  $D = 50$ ;  $d = 30$ .  $Area = 50 \times 30 \times .7854 = 1178.1$  square feet, answer.

EDITOR.



**Combined Bed and Wardrobe**

To the Editor:

Indianapolis, Ind.

Sleeping porches are usually too small to allow room comfortably for furniture in which wearing apparel can be kept. To overcome this difficulty, I recently built in my sleeping porch the combination bed and wardrobe shown in the accompanying sketches.

Fig. 1 is a front elevation showing the bed when finished, sheathed with wall board, and having four drawers and a door opening into a small closet for trunks, suit-cases, etc. The drawers are 17 3/4 inches wide by 6 inches deep and 28 inches long.

Fig. 2 shows the frame details in which the supporting strips for the drawers, 1/2 by 1/4 inches, are marked "B" and the 1/4 x 1 inch guide strips "P." The boards "S" are of one-inch stock, and are supporters for the springs, which can be obtained at a furniture store or from an old bed. The pieces "X" are 1 1/2 x 3 inches, and the rail 1 by 8 inches. There are 1 x 4-inch blocks, "F," nailed to the walls for supporting the boards "S," and 1 x 1 1/2-inch plates "H," fastened to the side rail for the same purpose.

A bed of this sort is not only very comfortable, but saves considerable expense in furniture and about fifteen square foot of floor space.

Fig. 3 shows a special type of window for a sleeping porch. It operates much like the windows of a street car. When open, the sash "B" is lowered into space "A" by first lifting the sash and then throwing over the plate "C" pivoted at "D." This type of window has all the advantages of the casement window without the many disadvantages.

F. B. HAYS.

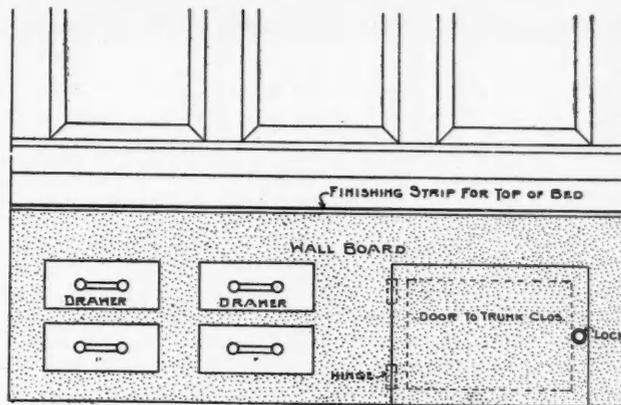


FIG. 1. ELEVATION OF BED IN SLEEPING PORCH.

Front Elevation of Combined Bed and Wardrobe.

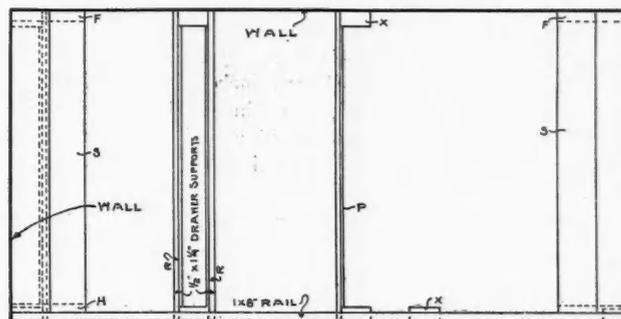


FIG. 2 SECTION.

Construction of Combined Bed and Wardrobe as Shown in Section.

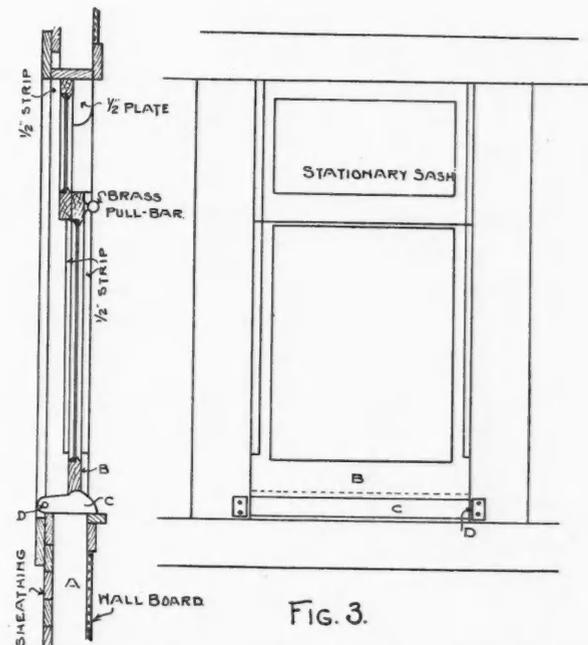


FIG. 3.

Details of Special Window for Sleeping Porch.

**Dialect Stuff About a Work Bench**

To the Editor: Toronto, Ont.  
 I aint no high flown talker and mebbly I aint no mechanic neither, but b'gosh I reckon a feller's got t'be an awful fool as don't know nothin'.

Here's a little idee as struck me a while ago. I had t' go considerable distance t' hang a couple of storm doors and do some other tinkerin'.

I chucked some tools into my carpenter's basket an' struck out.

Wall, I reckon I must a jumped some, so's to jumble my tools up and make them sit up and take notice, fer when I got t' the job, durned if they hadn't all got their "sharp" feechers together, an' any fool knows what that means, so I reckoned again and 'lowed I'd have t' make a box t' carry 'em in.

But that wan't all—when I started to hang them doors, by hickory, they wuz about 3/4 of an inch t' rip off the side, an' I hadn't nothin' t' work on but a rickety old box as laid alongside the fence, so I calkilated they wuz some way t' make a box as would do fer a trestle, too, (with a tool tray un'neen it).

So I takes a 12-inch board about 7 inches longer'n my saws an' 2 inches from each end I gains in a piece of 7/8 by 10 inch 2 feet long. The 12-inch board makes the top, an' the 10-inch the ends of the box and likewise legs of trestle.

Three-eighths inch from each edge of them leg pieces I plows a groove 1/2 inch wide and 19 1/2 inches long, and 11 inches from the top I cut a groove 1/2 inch wide across the board betwixt the other two grooves.

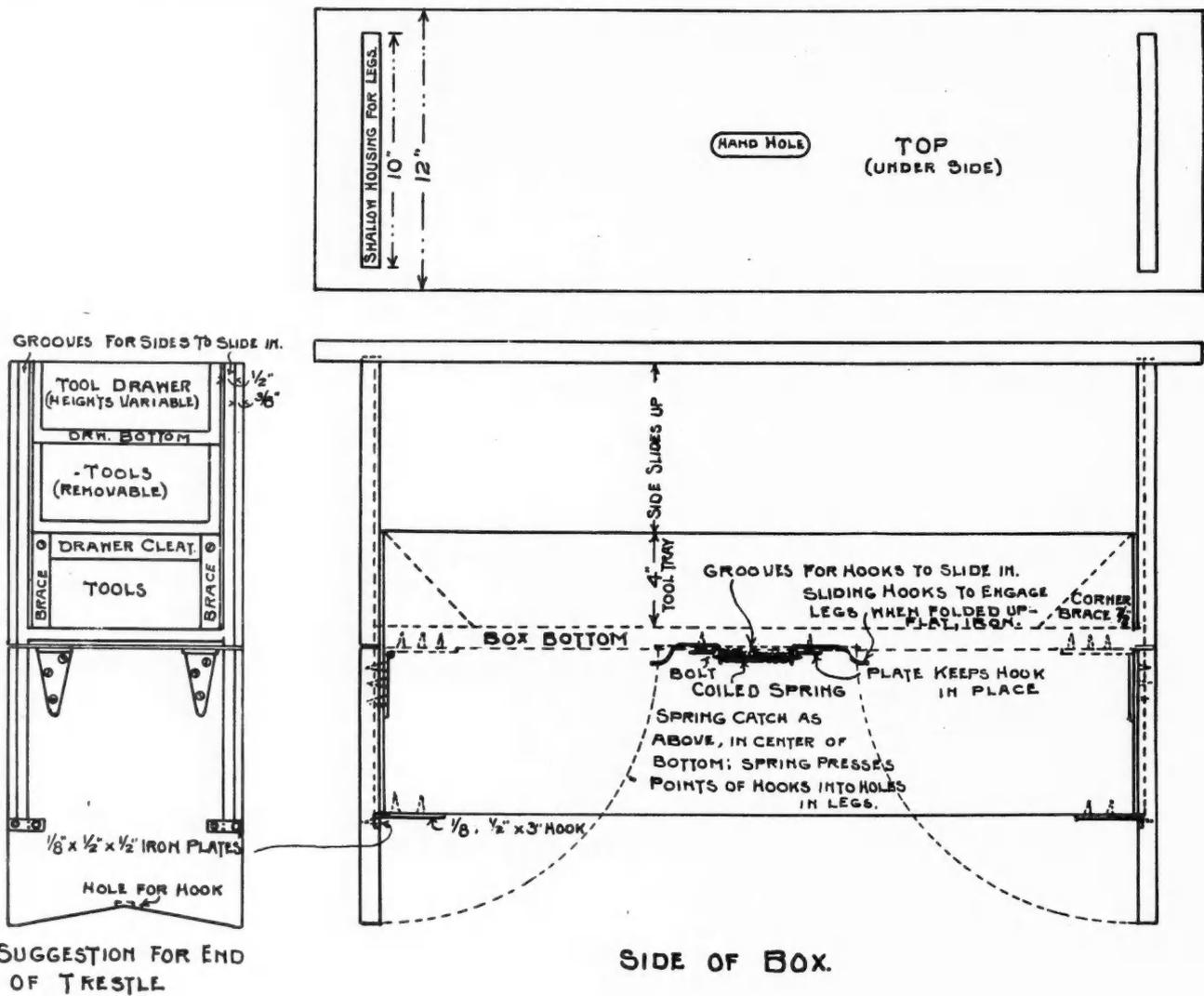
This last is fer the bottom of the box t' be rabbited inter, arter it's ripped out the exact width betwixt the other grooves, so's the sides kin slide up and down past it. Screw 7/8-inch wooden brackets into bottom corners of box fer braces.

The sides is made of 7/8-inch stuff 12 inches wide, rebated so's t' fit inter them 19 1/2-inch grooves, and come flush on the face with the edge of the legs. At the bottom of each groove I lets in a piece of iron about 1/8 by 1/2 by 1 1/2 inches flush with the wood an' acrost the bottom 1/2 inch of the groove, fastening them with 2 screws apiece.

On the bottom of the side pieces at each end I puts a hook so's when the sides is down them hooks hook behind the other irons and keeps the bottom of the legs from spreadin'. The're made of 1/8 by 1/2 by 3-inch iron.

The legs is hinged t' the bottom of the box (3-inch strap hinges), so's when the sides of the box is slid up they kin be folded under and fastened and when the're catched inter their place the sides is fastened b' them, be durned keerfull you don't make the spring catch so it'll come below the folded legs er all the kids 'll be usin' the box fer a rockin' horse.

GEO. H. JACKSON.



Ingenious Combination Work Bench and Tool Case as Made by George H. Jackson. The Legs Fold Underneath when the Box is Being Carried. Compartments are Provided for the Various Tools as Shown.

# *This Medusa Waterproofing Booklet is Yours for the Asking*

**I**T'S full of ideas that will help you on your next concrete job. It shows how MEDUSA WATERPROOFING has been successfully used in the construction of tunnels, reservoirs, municipal waterworks, United States Government structures, silos, feeding floors, basements, block houses and in many other building operations. It shows what successful contractors think of Medusa Waterproofing as a means for making concrete absolutely damp-proof—and for keeping it that way *permanently*. In addition it contains articles on waterproofing by men who know the subject thoroughly. You will find this booklet not only helpful but extremely interesting. Write for it today and profit by the experience of others.



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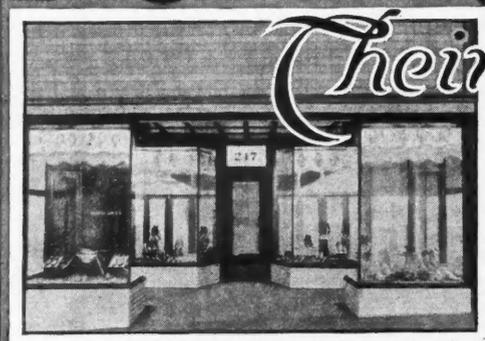
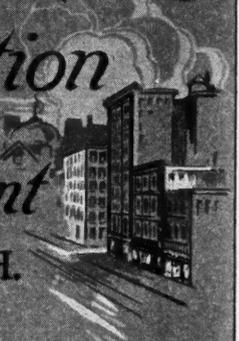
Street.....

Town and State.....

# MODERN STORE FRONTS

*Their Design and Construction*

By  
**Francis J. Plym, President**  
of **KAWNEER MFG. CO., NILES MICH.**

IN 17 PARTS, PART 6. (SEE FEBRUARY, MARCH, APRIL, MAY AND JUNE ISSUES FOR OTHER DETAILS.)

NOTE: Mr. Plym desires this Department to be of greatest practical benefit to contractors and builders. He will gladly answer letters of inquiry, giving any special store front information desired. He has also prepared a very instructive illustrated booklet on modern store fronts which he will mail free of charge to any architect, contractor or builder desiring a copy. Under this heading is appearing a series of 17 typical store front designs, also a series of 17 plates of half size details of Kawneer store front construction.



TYPE N°60

TYPICAL ELEVATION OF HARDWARE STORE

COPYRIGHTED BY KAWNEER MFG. CO.

THIS front is designed for a business that is more in need of new fronts than any other retail line. From coast to coast there are only a very few good hardware fronts. Too many hardware dealers seem to believe hardware can be sold in a cellar.

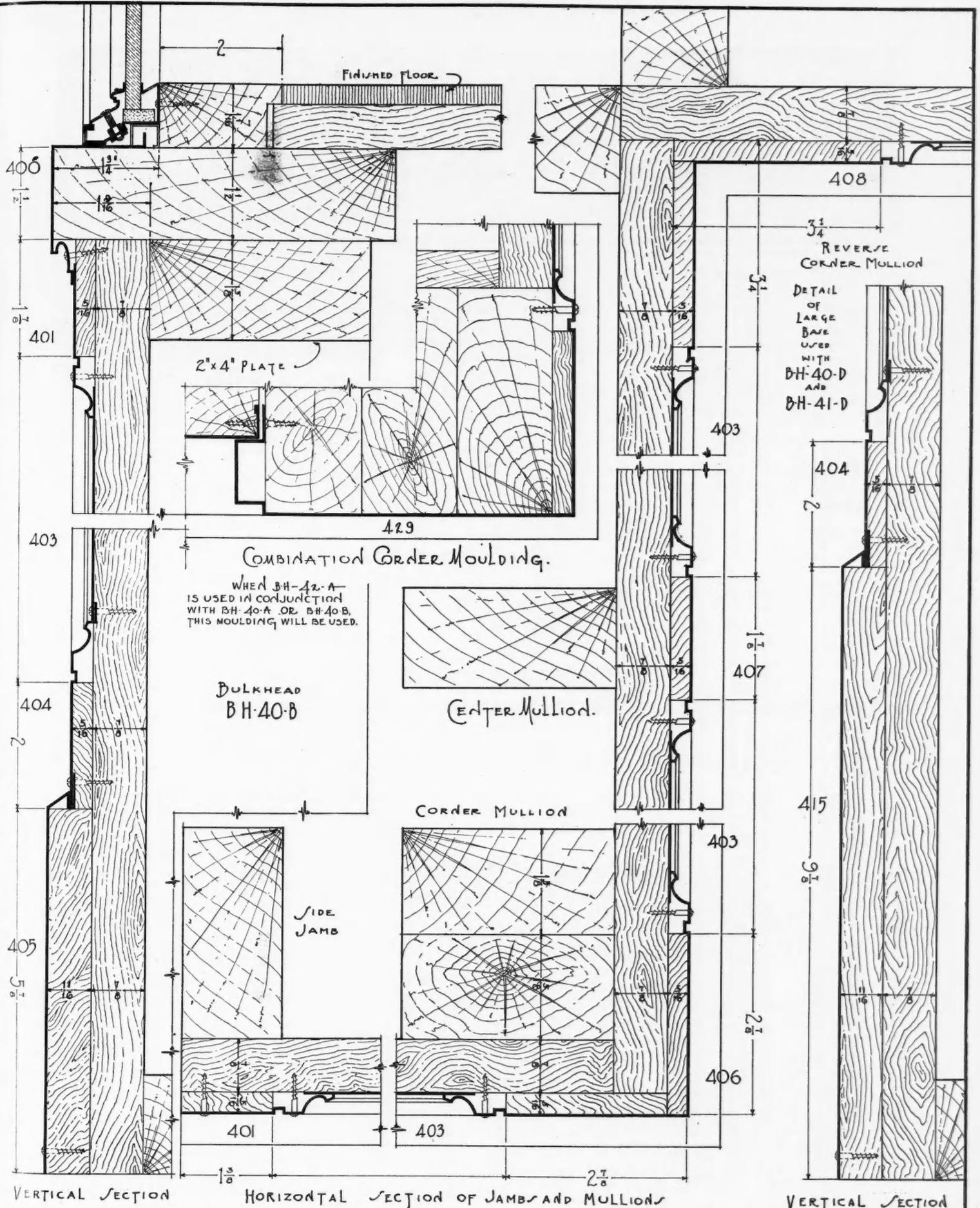
A hardware store has large articles and small ones to sell and needs a modern front to sell them. This front will do that.

Note the small cases for pliers, hammers, nails, compasses, rules, etc. The large windows will show ranges, plows, washing-machines, etc., to advantage, and sell them.

The inviting vestibule, the transom glass treatment, etc., will all help to make this a front that will pay.

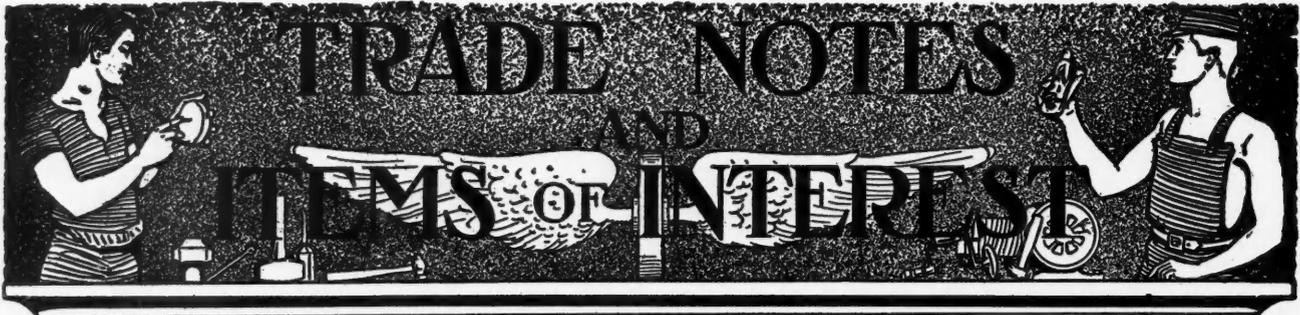
The Kawneer Manufacturing Company will show "up-to-date" KAWNEER STORE FRONT designs for various other types of business, such as Grocery, Millinery, Haberdasher, Candy, etc.

The details on the opposite page, drawn half full size, show some of the members which constitute KAWNEER STORE FRONTS. Readers are asked to cut these out, as they will prove to be a valuable reference asset to them in the future.



**PLATE No. 6**  **KAWNEER MFG. CO. — NILES, MICH.**  **Kawneer**  
 MANUFACTURERS OF KAWNEER PATENTED STORE FRONT CONSTRUCTION. **STORE FRONTS**

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER



**T**HROUGH 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. These items are offered here as interesting information for our readers; they are not advertising. Take full advantage of the Bargains offered. Write for catalogs and booklets, and become thoroly familiar with these Improvements and New Goods.

## Proper Methods for Laying Oak Flooring

AUTHORITATIVE INFORMATION ON PREPARING WORK, LAYING, NAILING, AND SCRAPING

By W. L. Claffy



**T**ODAY by improved machinery, equipment and quantity manufacture, the cost of making flooring has been so reduced that beautiful oak floors are now within reach of everyone.

Oak flooring is generally laid by a profession commonly known as floor layers, who specialize in the laying of hardwood floors. These floor layers may be divided into two classes—good workmen and a class that are careless. The expert floor layer obtains his

reputation by the high class and perfect work that he turns out. It is practically his only asset in the game. Many large and prosperous floor laying concerns have reached their prosperous condition chiefly thru conscientious workmanship in their earlier days. The floor layer that is careless in his work will never succeed.

It is not necessary to be an expert to produce a good floor laying job, but it is very essential that considerable care should

*(Continued to page 94.)*

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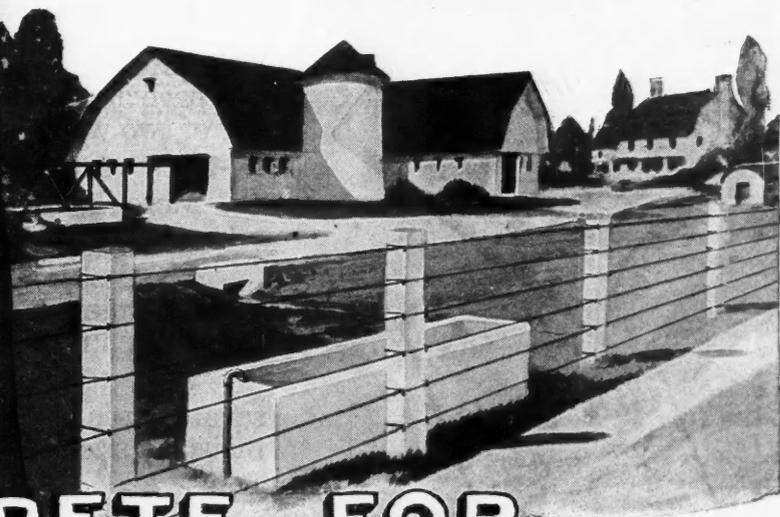
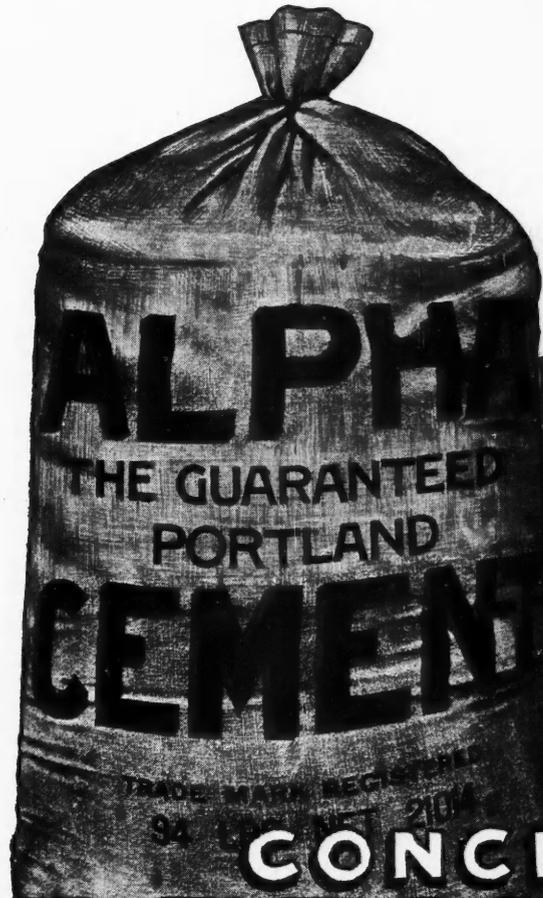
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| <input type="checkbox"/> Garage         | <input type="checkbox"/> Dam         |
| <input type="checkbox"/> Driveway       | <input type="checkbox"/> Green House |
| <input type="checkbox"/> Walls          | <input type="checkbox"/> Steps       |
| <input type="checkbox"/> Foundation     | <input type="checkbox"/> Porch       |
| <input type="checkbox"/> Barn           | <input type="checkbox"/> Meat House  |
| <input type="checkbox"/> Silo           | <input type="checkbox"/> Milk House  |
| <input type="checkbox"/> Poultry House  | <input type="checkbox"/> Ice House   |
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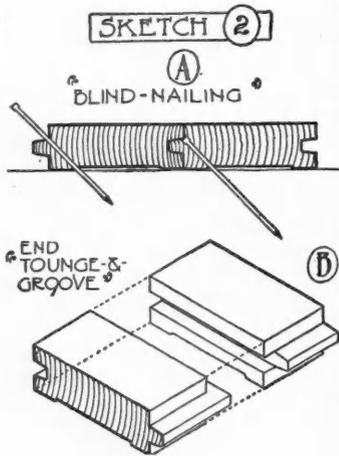
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# CONCRETE FOR PERMANENCE

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER



**OAK FLOORING**  
Details of Floor Nailing.

be exercised and all the details from the very start to the finish should be carefully studied before the floor laying work is taken in hand.

Before starting to lay oak flooring, the stock should be examined to ascertain if it has absorbed any moisture while at the lumber yard, on the wagon, or at the job, as usually during rainy weather oak flooring will absorb considerable moisture, mostly at the ends—thereby causing it to swell as much as one-sixteenth of an inch. If this condition is not discovered before the floor is laid, unsightly crevices will appear in the floor.

The sub-floor, as well as the plaster work, should be thoroly dry before starting to lay oak floors. If in winter, the room should have a temperature of about 70 degrees, to insure the best results and the oak flooring bundles should be in rooms at least ten days to thoroly dry out in case the stock has been subjected to any moisture before the main work is started.

Oak flooring leaves the mill in perfect physical condition, but is very often abused by improper handling before it reaches the job. There are many lumber yards and contractors that almost treat oak flooring like rough lumber. This is a mistake.

The sub-floor should be thoroly swept and it is well

to use a damp-proof paper and where sound-proof results are desired, a heavy deadening felt is recommended.

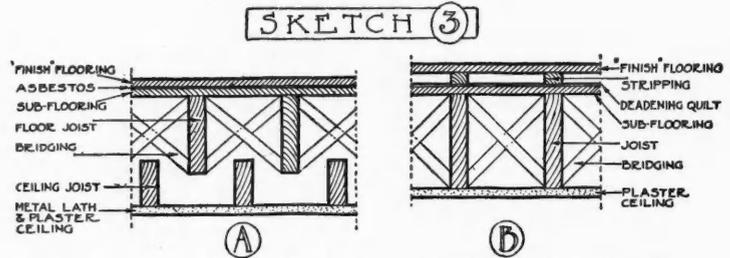
The sub-floor should be of serviceable wood, but not less than 7/8 inch thick, dressed one side to an even thickness. Sub-floors should be nailed securely to the joists, but not driven too tight together so as to permit it to swell, then bulging; 4 to 6-inch strips are preferred widths for sub-floors.

When starting with the first oak flooring strip, it is well to leave at least 3/8 inch for expansion space between the first strip and the baseboard, and likewise at the other end of the room, as there is more or less expansion and contraction in all kiln-dried oak flooring.

Oak flooring should always be laid at an angle to the sub-floor, and after laying and nailing three or four pieces use a short piece of hardwood, 2 by 4 inches, placed against the tongue and drive it up with a heavy hammer.

The nailing of oak flooring is very important. All tongued and grooved oak flooring should be blind-nailed. The best flooring made can be spoiled by the use of improper nails. The steel cut variety is recommended for 13/16-inch stock—use 8-penny nails every 16 inches; for 3/8-inch flooring use

(Continued to page 96.)



**TWO WAYS TO DEADEN A FLOOR**



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*Every contractor and builder will find this pocket size time book very convenient and useful.*

THERE is room for twenty-two names to the page and space after each name for the checking of two weeks' time and there are sixteen time-keeping pages in the book.

More than that, it contains two very valuable sets of reference tables.

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The other is a table for figuring the number of square yards and feet of plastering surface in several thousand size rooms.

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Photo by Mary H. Northend, Salem, Mass.

JOHN WARD HOUSE  
at Salem, Mass. Built in 1684.

Words could not portray the lasting qualities of White Pine as graphically as this remarkable photograph. The exact date of the unpainted, weather-beaten siding is not known, but it is certain that the siding on the main portion of the house is from 150 to 200 years old, and stands now as originally built, with practically no repairs. The siding on the lean-to is of a considerably later date, but it will be noted that there is no appreciable difference between it and the siding on the main portion of the house. Both are in splendid condition today and good for service for many years to come.

**F**OR the outside covering of a building exposed to the attack of time and weather, no other wood gives such long and satisfactory service as

## WHITE PINE

Every carpenter knows that from his own experience. But every carpenter does not know that he can get White Pine today, for in some way the impression has gained footing that the supply of White Pine is practically exhausted.

The fact is — White Pine is still abundantly available today, as it always has been, in all grades and in any quantities desired, and can be purchased in all markets at reasonable prices, when considering its value as a structural wood.

If the Lumber Dealers supplying the material for those for whom you are building are at any time unable to furnish it, we would appreciate the opportunity of being helpful in securing it.

### A Free Magazine for Contractors

The first issue of the bi-monthly architectural White Pine Magazine has been mailed to contractors. Every issue will be full of valuable and helpful information for contractors and builders.

If this magazine does not reach you, kindly advise and we will be pleased to place your name on our mailing list.

Representing  
The Northern Pine Manufacturers'  
Association of Minnesota, Wisconsin  
and Michigan, and the Associated  
White Pine Manufacturers of Idaho

Address, *WHITE PINE BUREAU,*  
*1735 Merchants Bank Building, St. Paul, Minn.*



## A Convincing Demonstration of North Carolina Pine Utility

The above is an excellent illustration of the North Carolina Pine Bungalow, a full size 8-room house, built as an exhibit, at the Country Life Permanent Exposition, Grand Central Terminal, New York City.

It is built throughout from ground to roof, of North Carolina Pine, and, as it stands, constitutes a more powerful argument for the rare beauty and sterling quality of this wood than any words could possibly convey.

When you visit New York, we invite you to inspect this delightful example of comfort, refinement and architectural perfection. You will find it of distinct and practical helpfulness. No admission fee is charged and no obligation incurred.

Write for our Free Reference Book A, which tells more about this splendid wood. A postal will bring it.

**North Carolina Pine Association**  
Norfolk, Virginia

# NORTH CAROLINA PINE

3-penny wire finishing nails every 10 inches. If even better results are desired, the nails can be driven closer.

The floor layer should use discretion in regard to certain strips that do not blend in color with the majority of strips. A few badly discolored pieces in a room will mar the appearance greatly. Badly discolored pieces should always be set aside and used in closets and other out-of-the-way places. Where there is a wide variation in color, it is good policy to separate the pieces before they are nailed down. This insures a more regular run of color and blends better together than if scattered thruout all the rooms. Every floor layer should watch this feature of his work closely, as it is the appearance of the floor after laid that counts.

Oak floors with some care should last a lifetime and it is for this very reason that all floor layers should be very particular when they lay oak flooring. The wood itself practically is never permitted to wear—that is, in the better grades that are used in homes. It is the wax or varnish finish that wears, which is always replenished. Honest and careful workmanship on the part of the floor layer spells success. A good job of floor laying is the best of advertising, while a poor job gets nothing but kicks and no reward.

Scraping oak floors is always done in the better grades, or in all homes where people dwell. In order to get the best results for a nicely finished surface, it is best to scrape it. This scraping process can be done by the ordinary scrapers, such as used by cabinet makers, or by one of the many types of power or hand machines that are generally used by contractors and carpenters. Always scrape lengthwise of the wood and not across the grain. A floor properly scraped looks very smooth, but it should be thoroly gone over with No. 1½ sand paper to obtain the best results in finishing. After this the floor should be swept clean and the dust removed with a soft cloth.

The floor is now ready for the filler, which should be put on as soon as possible after the laying work is finished, as the filler fills up the pores of the wood and keeps it from shrinking.

### Advantages of "Star" Ventilators

With the four different types of ventilators made by the Merchant & Evans Company, they maintain that they are equipped to meet every ventilation problem which any contractor or builder may run across.

In the "Star" Fire Retarding Ventilators the fire hazard is reduced to a minimum by means of dampers contained within the body of the ventilators and held open against gravity by fusible links. In case of fire the dampers automatically close and cut off the exhaust of air from the structure. When the fire is extinguished a chain device permits the ventilators to be opened, clearing the building of gases.

If a skylight ventilator is desired there is a "Star" which combines the fire retarding features with a light distribution feature by means of a section of heavy wired glass.

The details in regard to these ventilators may be obtained from Merchant & Evans Co., Philadelphia, Pa.

### A Handy Screen Door Hinge

Perhaps the contractor or builder does not give as much attention to the hinges used on the screen doors of the buildings he erects as he would if he could be present some time later when the owner, in bringing out his screen doors, finds that the screws are lost or that someone has borrowed his screw driver.

A hinge called the Jiffy Screen and Storm Door Hinge has been placed on the market as the result of a determination to eliminate the troubles associated with the ordinary type of

(Continued to page 98.)



*Spells*  
**"SERVICE"**

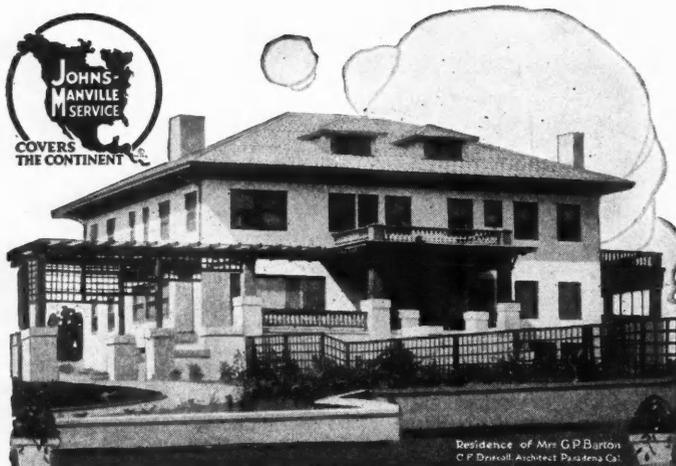
—for You, for the Man you build  
 for, for Everyone concerned  
**RITE-GRADE**  
**RED CEDAR SHINGLES**

spell the best kind of practical investment service. The fullest value in every bundle of Rite-Grade. Inspected for quality, for selection, for thickness, by Inspectors who mean business, who know that Rite-Grade must stand for "up-to-grade," for "up-to-specification." Rite-Grade Red Cedar is the best that Nature's forest has to offer, and Rite-Grade Shingles are the best that Man can make.

**Mr. Carpenter:**  
 Free to you if you send a 2-cent stamp for each book to de-fray mailing:  
 (1) **Bungalow Homes Book**  
 (2) **Distinctive Homes Book**  
 (3) **Farm Buildings**  
 (4) **Boy's Builder and Garage Book**  
 These little volumes are full of important information, designs, costs, etc., etc.

**Mr. Dealer:**  
 Rite-Grade Red Cedar shingles make a good proposition for you; shall be glad to have you write us. We will show you what Rite-Grade can mean to you and your community. Signs, Electros, and other important dealer helps free.

**SHINGLE BRANCH, WEST COAST LUMBERMEN'S ASSOCIATION**  
**SEATTLE**                      1022 White Building                      **WASHINGTON**



When you are asked  
about a fire-proof  
roofing recommend

### J-M Transite Asbestos Shingles

It is alarming to note the thousands of buildings with inflammable roofs throughout the country, each a waiting victim of a stray spark from its own or a neighbor's chimney.

More and more attention is being devoted to safe roofing materials that have all the flexibility of treatment of the more inflammable type.

J-M Transite Asbestos Shingles solve that problem. They are absolutely fire-proof, because they are made of indestructible materials—Asbestos (rock) fibre and cement (rock).

They actually toughen with age and will not crack, rot, split or warp under the most severe climatic conditions.

Made in two thicknesses, in three shapes and several sizes, and with rough or smooth edges—thus affording a great variety of effects in application.

J-M Transite Asbestos Shingles are examined, approved and labeled by the Underwriters' Laboratories, Inc., under the direction of the National Board of Fire Underwriters. Laid American Method, they are given Class "B" rating. Laid French Method, they are given Class "C" rating.

J-M Transite Shingles are furnished in three soft tones—Indian Red, Mottled Brown and Cement Gray.

Ask for literature showing where and how the shingles have been used.

### H. W. Johns-Manville Co.

Boston  
Chicago  
Cleveland

New York  
Philadelphia  
Pittsburgh  
Toronto

St. Louis  
San Francisco  
Seattle

screen door hinge. With this hinge installed, the process of placing or removing the door is accomplished by simply moving a small lever. There are no loose parts to be misplaced and the labor of installing the screen doors is materially reduced.

Prices and a free sample are being given to our readers by addressing the Rock City Mfg. Co., Wabash, Indiana.

### Statement of the Ownership, Management, Circulation, Etc., Required by the Act of Congress of August 24, 1912

Of AMERICAN CARPENTER AND BUILDER, published monthly at Chicago, Ill., for April 1, 1916.

State of Illinois }  
County of Cook } ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared E. L. Hatfield, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the AMERICAN CARPENTER AND BUILDER and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 443, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, American Carpenter and Builder Company, Chicago, Ill.

Editor, Wm. A. Radford, Chicago, Ill.

Managing Editor, Bernard L. Johnson, Chicago, Ill.

Business Managers, E. L. Hatfield, Chicago, Ill.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock).

Wm. A. Radford, 5341 Hyde Park Boulevard, Chicago, Ill.; H. M. Radford, 5341 Hyde Park Boulevard, Chicago, Ill.; Roland D. Radford, 5341 Hyde Park Boulevard, Chicago, Ill.; Wm. A. Radford, Jr., 5341 Hyde Park Boulevard, Chicago, Ill.; G. W. Ashby, Berwyn, Ill.; E. L. Hatfield, 1321 Hood Avenue, Chicago, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities: (If there are none, so state.)

There are no bonds, mortgages or other securities outstanding against the American Carpenter and Builder Company.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholders or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

E. L. HATFIELD.

Sworn to and subscribed before me this 22d day of March, 1916.

JEANNETTE A. NICHOL.

My commission expires July 6, 1919.

# THIS 112 PAGE ROOFING CATALOG IS YOURS FREE



The *Rex Products* catalog contains 112 pages and more than 180 pictures and illustrations. Besides complete instructions for laying all styles of asphalt shingles and prepared roofings, you will find in it a full description of each one of the 27 different *Rex Products* which we manufacture. You will also find much helpful information about slate, tile, asbestos shingles, tin and corrugated steel roofings.

*We will send you this splendid catalog and a set of samples without cost or obligation to you. Write—*

## Flintkote Manufacturing Co.

90 Pearl St., Boston, Mass.  
1102 Equitable Bldg., New York, N. Y.

659 Peoples Gas Bldg., Chicago, Ill.  
Hennen Bldg., New Orleans, La.

### REX STRIP SHINGLES

Will not blow up in the wind because the spaces between the shingles do not extend under the shingles in the course above, and so there is no opening for the wind to get under them and lift them. This is why Rex Strip Shingles make a *tighter* roof than any individual shingles.



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER

### Improved Garage Door Hinges

There seems to be considerable discussion about the proper method of opening heavy garage doors. With over two million pleasure automobiles in daily use in the United States, any problem about garage construction should prove particularly interesting to every builder, contractor, carpenter and architect.

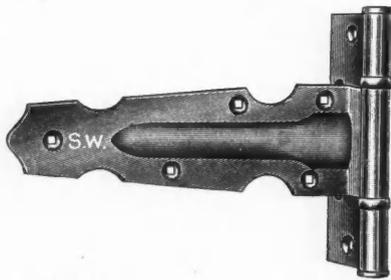
The first garages were built with their doors swung on hinges. The hinges then on the market were rather roughly finished. An old fashioned strap or T hinge, strong enough to swing a heavy garage door, did not add very much to the general appearance of the building. Moreover, at that date, there was nothing on the market to prevent the door slamming on a machine coming in or going out of the garage.

the wheels of the automobile.

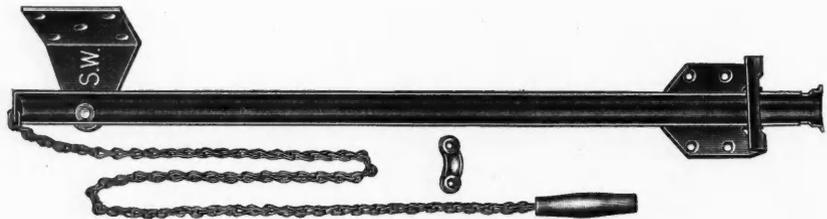
Doors hung on garage door hinges close snugly—as weather-tight as the front door of a residence. They are said to cost less to buy, and less to apply than any other device for opening a garage door. Swinging doors may be safely and easily locked. It is easy to swing garage doors open. There is nothing about the garage door hinge to adjust or to get out of order, and with them any carpenter



Model Showing Garage Hardware Applied.



Stanley No. 1457 Garage Door Hinge.



Stanley No. 1774 Garage Door Holder.

Now there are specially designed door holders and hinges specially constructed for garage use. These hinges are made heavy and strong, neat in outline and carefully finished. In fact, these garage door hinges add materially to the architectural appearance of the entire garage. These garage door hinges are equipped with ball bearing washers, so that the door in opening does not grind together the wearing surfaces of its hinges; they literally glide over ball bearings like

who can hang a house door can produce a good looking, easy working job.

To prevent the doors from slamming, one progressive hardware manufacturer, The Stanley Works, New Britain, Conn., recently placed upon the market a garage door holder—an arm of steel which holds garage doors open against the strongest wind. The holder automatically locks the garage door open. It is released by a pull of a chain.

**T**WENTY workmen had a narrow escape from death. The roof caught fire first, and within a few minutes the entire fourth floor was a mass of flames."

Reprinted from news item, May 6th, of disastrous fire in Philadelphia. Another reminder that inflammable roofings are dangerous to life and property. Cover your buildings with

## KEYSTONE COPPER STEEL

### Roofing Terne Plates



and secure absolute and lasting protection from fire and weather. Grades 8 to 40 pounds coating. Stamped "KEYSTONE Copper Steel" in addition to regular brand and weight of coating, as indicated by MF brand. Send for our booklet "Copper—Its Effect Upon Steel for Roofing Tin." Use APOLLO-KEYSTONE Galvanized Sheets for all exposed sheet metal work.



## American Sheet and Tin Plate Company

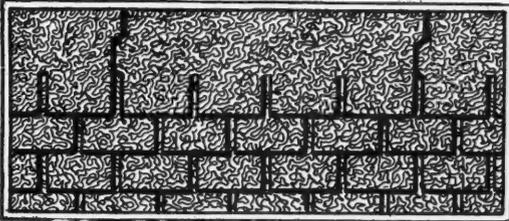
GENERAL OFFICES: Frick Building, PITTSBURGH, PA.

DISTRICT SALES OFFICES:

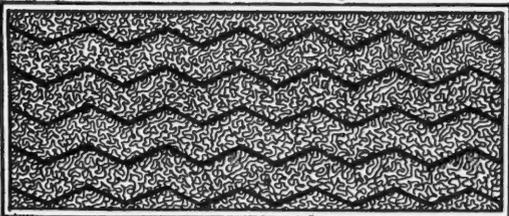
Chicago Cincinnati Denver Detroit New Orleans New York Philadelphia Pittsburgh St. Louis  
Export Representatives: UNITED STATES STEEL PRODUCTS COMPANY, New York City  
Pacific Coast Representatives: UNITED STATES STEEL PRODUCTS COMPANY, San Francisco, Los Angeles, Portland, Seattle

# Vulcanite

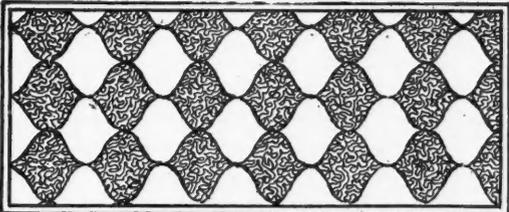
## Ornamental Roofing and Shingles



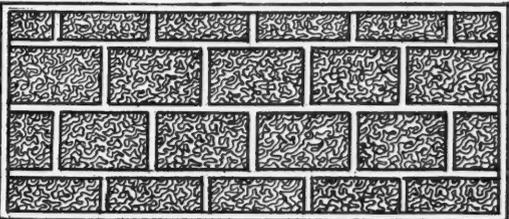
Vulcan Slab Shingles Self Locking in Red or Green 10"x32" or 12 1/2"x32"



Vulcanite Strip Shingle Style B Either in Red or Green



Vulcanite Mosaic Style H Two Colors Red or Green



Vulcanite Mosaic Style K Two Colors on One Roll

For permanency, durability, beauty, economy, fire and weather protection, they have no equal.

Heretofore, lack of something better has necessitated the use of wooden shingles, in spite of the fact that they crack, warp, draw the nails, and burn up like tinder.

But now, **Vulcanite Roofing** furnishes a material that perfectly combines the qualities of safety, comfort and beauty at so low an initial cost as to prohibit such a flimsy, highly combustible and temporary covering as a wood shingle Roof. **Vulcanite** roofing outlives wood shingles, two to one. 'Twenty years' service is a reasonable expectancy.

And you can obtain a most pleasing variety of effects in colors and designs. **Vulcanite** comes in rolls and shingles in several patterns that can be worked into any number of artistic finishes. The colors will withstand sun and rain for any length of time. They are as permanent as the granite itself from which they are made.

*We would like to send you our catalogs and samples; and show how you can use **Vulcanite** to boost your business, and increase your profits.*



### Patent Vulcanite Roofing Company

CHICAGO, ILL.



## MAIN STREET'S BRIGHT SPOT

- ☐ Bright surroundings make people feel gay.
- ☐ Gayety is what playgoers are looking for.
- ☐ Attract the crowds by trimming the theatre you intend building with cheery Midland enamel terra cotta.

## MIDLAND TERRA COTTA COMPANY

1515 LUMBER EXCH.  
CHICAGO, ILLINOIS



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER

### The Stern Floor Scraper

A very neatly constructed and well designed floor scraper is being marketed by the Stern Manufacturing Co. They have attempted to produce a scraper which would combine qualities of careful adjustment of blades and handle with a sufficiently low price so that their product would be within the reach of all.

The result is the machine shown in the accompanying illustrations. This machine is finished in velvet black, trimmed with garnet, the wheels are fitted with solid rubber tires and the handle is of hardwood. The company gives each machine and all of its parts a careful inspection and have expressed their determination to replace any part which shall, at any time, prove defective.

The chief point of interest to the contractor is the careful adjustment of handle and blades which is possible. By turning the small wheel at the top of the handle a brake on the quadrant is released, which allows the handle to be adjusted to any desired height, it being locked in this new position by another turn of the wheel. By means of a screw driver placed in the slot in the center of the quadrant, a fine-pitched screw moves

a block attached to a system of levers which will give an extremely fine adjustment of the blades. The blades may be removed by simply turning the hand wheels on the blade holders, there being no bolts or nuts used in this blade holder.

The blades used in this scraper are not specially designed, but they may be of any shape or size up to 3½ by 7 inches. If not otherwise specified, there are six blades of assorted sizes furnished with the machine.

Hand holds are shown on the sides of the scraper which makes it easy for two men to carry it from place to place.



Stern Floor Scraper.



Adjusting Blades.

Showing Weights Removed.

With the handle in an upright position it is possible for the scraper to be used in narrow rooms and halls where scraping is often found very difficult.

There are two weights of twenty pounds each which may be removed and replaced quickly, according to the requirements of the work being done. The complete scraper with weights attached weighs 125 pounds.

Circulars giving prices and descriptions of these scrapers may be obtained from the Stern Manufacturing Co., Lancaster, Pa.



## How Curtis Service Helps

Curtis Service covers materials, workmanship, delivery.

Every piece of material is carefully selected and continuously inspected throughout every step in its manufacture. A final inspection is made just before it is trademarked.

Every bit of fitting and finishing that can be done at the factory is done. Stairs are more than just material—they are stairway material, all completely machined—ready to put in place. All house bills are sanded. Remember it costs you \$50 to use 75 cents' worth of sandpaper.



1866  
**CURTIS**  
**WOODWORK**



*"The Permanent Furniture for Your Home"*

is delivered in the order you want it on the date you want it. Just arrange the dates for delivery with your dealer.

By recommending Curtis Woodwork you do your client and yourself a favor. You do a better job with less trouble. The home builder is satisfied.

Let us put you in touch with a Curtis dealer or explain to you all the features of this Trademarked Woodwork. Write today.

### The Curtis Companies, Service Bureau

1403-1503 South Second Street, Clinton, Iowa

*Manufacturing and distributing plants at*

Clinton, Ia. Wausau, Wis. Minneapolis Chicago Lincoln, Neb. Detroit Sioux City, Ia. Oklahoma City  
Eastern Offices at Pittsburgh and Washington

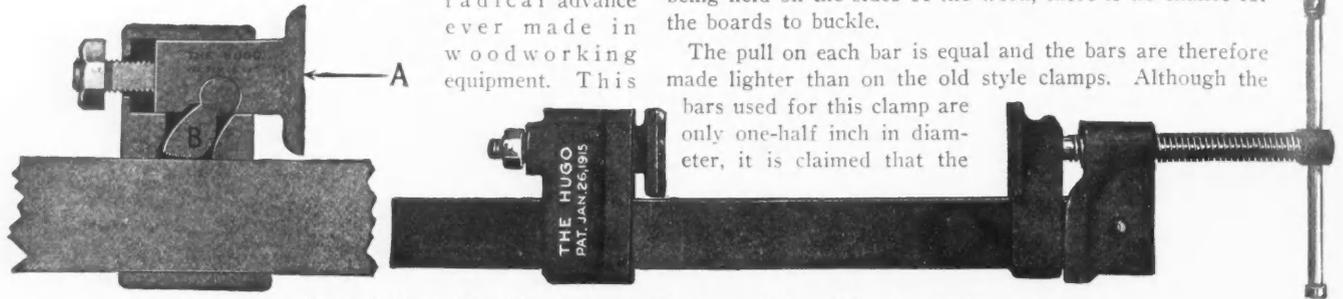
*The Makers of CURTIS Woodwork Guarantee Complete Satisfaction to its Users. "We're Not Satisfied Unless You Are."*

**New Departure in Clamps**

In order to overcome the tendency of boards to buckle when being glued together, the Norfolk Mfg. Co. has begun the manufacture of a new clamp which they claim to be the most radical advance ever made in woodworking equipment. This

surface on each end. In use, the bars lie along the surface of the work and the clamping surfaces squeeze against the end. By tightening a screw on the end, the work may be held as rigidly as desired, and on account of the two bars being held on the sides of the work, there is no chance for the boards to buckle.

The pull on each bar is equal and the bars are therefore made lighter than on the old style clamps. Although the bars used for this clamp are only one-half inch in diameter, it is claimed that the



"Hugo" Single Bar Clamp, Showing Enlarged View of Locking Device.

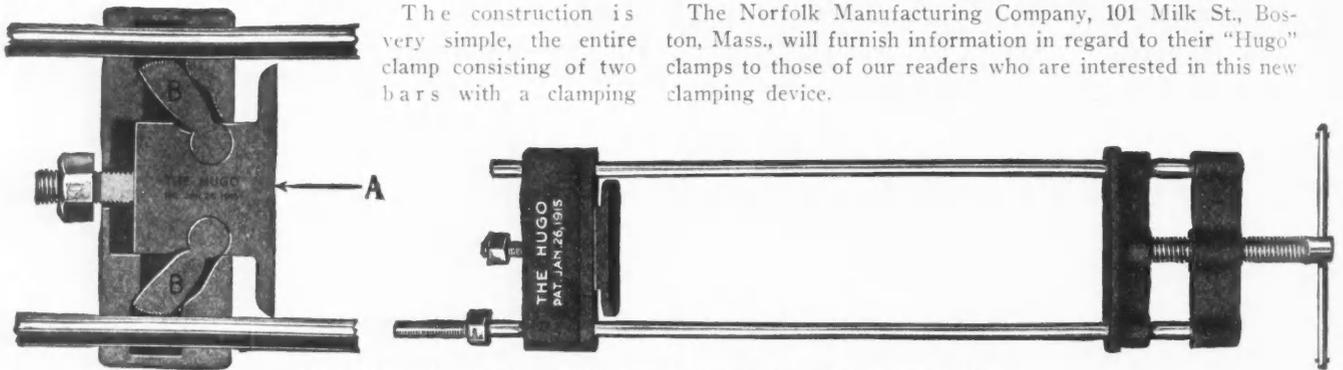
clamp is called the "Hugo" Double Bar Clamp and it was invented by a man who has been a woodworker and cabinet maker for over thirty years.

The construction is very simple, the entire clamp consisting of two bars with a clamping

Double Bar Clamp is stronger than the old style clamp.

This equipment is made in all lengths and with various openings between the bars for different thicknesses of work.

The Norfolk Manufacturing Company, 101 Milk St., Boston, Mass., will furnish information in regard to their "Hugo" clamps to those of our readers who are interested in this new clamping device.



"Hugo" Double Bar Clamp, Showing Enlarged View of Locking Device.

# Fiberlic

## For Walls and Ceilings

**T**HE principle of wall board construction is right. The question for YOU to determine is, what are the NECESSARY ELEMENTS to produce the best results?

It is not only the fibres, but the way the fibres are prepared that YOU must consider.

The fibres of the ROOT of the tree or plant are the strongest fibres. This is universal knowledge—a scientific fact.

The fibres of ROOT with the starchy and other vegetable matters taken out by a chemical cleaning process are the strongest and purest fibres—another scientific fact.

FIBERLIC WALL BOARD made from a ROOT reduced to pure fibre by a chemical cleaning process constitutes the NECESSARY ELEMENTS.

FIBERLIC averages from 25% to 100% stronger than wall boards made from mechanically prepared fibres that still contain their original vegetable matter.

Write for Fiberlic Wall Board samples and compare them with wall board made from the mechanically prepared fibres and prove for yourself the above facts.

## The Fiberlic Company

CAMDEN : : NEW JERSEY

## Traditions Die Hard!

—but the "good old things" must give way to the better things.

Lath and plaster must give way, and is giving way, for the more durable, stronger, stiffer, more economical and altogether more satisfactory



Trade Mark Reg. No. 94745

This is no ordinary wall board—it is a wall board in a class by itself, the **only** wall board with a center core of kiln-dried wood slats, else we would not claim it to be **better** than lath or plaster. It does not have to be paneled, but can be made into walls and ceilings smoother than lath and plaster. Can be decorated by any method—even papering—which other wall boards can not stand.

Are **you** going to stick to tradition or give your customers the more modern and more satisfactory wall lining in their buildings. **Talk to us** about some of the common false notions on the subject of wall boards, and let us make clear to you just what you're overlooking.

## The Compo-Board Company

5777 Lyndale Ave. No. Minneapolis, Minn.

**"This is the  
Winning  
Hand!"**



"It was a lucky day for me when I became the Neponset Man in my burg.

"I am no longer just a carpenter. I'm an honest-to-goodness business man, my standing is growing, my business is growing, and so is my bank account.

"I am not worrying about the future a bit.

"For I am the Neponset Man."

# NEPONSET SHINGLES

will put you on Main street, too.

Send the coupon today; it will bring you booklets, prices, etc., of "the roofing development of the twentieth century"—of the shingles that cost no more when laid than good wood shingles, yet possess the appearance and many of the advantages of slate.

**BIRD & SON** (Established 1795) **East Walpole, Mass.**  
 New York Washington Dept. C  
 Chicago: 1434 Monadnock Building  
 Canadian Office and Plant: Hamilton, Ont.

## NEPONSET WALL BOARD

For Walls and Ceilings

takes care of the rainy days.

"When bad weather comes around, and rain just pours and pours, you don't find me full of gloom, sitting in the shop praying for 'working weather.'

"No, Sir!

"I have a rainy day waiting list.

"Neponset Wall Board jobs keep me under cover in bad weather and odd times, putting up partitions, ceilings, 'phone booths, private offices, etc., etc. People are finding new uses for it every day both at home and in business.

"When you send the coupon (below) you will get full information on Neponset Wall Board, along with the Neponset Shingles particulars."



**BIRD & SON, Department C, East Walpole, Mass.**

Please send me information about Neponset Shingles and Neponset Wall Board. Also a copy of your book "Repairing and Building." This request, I understand, does not put me under any obligation whatsoever.



Name .....

Address .....

## *A Garage is usually wanted in a hurry*

**W**HEN the plans are completed you are asked, "How soon can we have it ready to use?"

All material should, when possible, be obtainable "from stock." In specifying

# Stanley Garage Hardware

you can depend on getting it from the stock of almost any good hardware dealer in the United States: our organization has seen to that.

If he hasn't just what you want, he can obtain it from his jobber in a day or two.

Then there is this advantage of using "Stanley." Its merits have been made known through advertising, and through satisfied customers, to practically all those who contemplate building. The owner will heartily approve your choice when you select it.

*Our book on Stanley Garage Hardware is really interesting, and contains much data of value to you. May we send it to you?*



New Britain, Conn., U. S. A.

100 Lafayette St.  
New York

73 East Lake St.  
Chicago

### **"Estimates, Costs and Profits"**

The above is the title of a textbook, just off the press by F. N. Vanderwalker, who is in charge of the Paint Information Bureau of the Carter White Lead Company. Its purpose is to help painters make a profit on every job by showing them how to estimate the cost correctly. Every small detail needed to estimate on painting and decorating is given in simple language.

The reading of plans and blueprints is fully covered. Plans of a bungalow are reproduced and the estimate for the painting and wood finishing is worked out in detail. An estimate for an average seven-room house is included to explain the method of figuring from the house itself.

There is a chapter on Overhead Costs that will give many a painter the answer to the question: "Where have my profits gone?" There is a chapter on Paint Shop Management with a plan for a modern, time-saving, material-saving, tool-saving paint shop.

Other information given:

Covering capacity of a gallon of paint, varnish, enamel, shellac, size, filler, calcimine, etc., on various surfaces.

Amount of such material a man can spread per hour and per day on all the different surfaces to which these materials are applied.

Correct way to figure price per square or square foot for painting and decorating.

Prices other contractors charge for various kinds of painting and decorating.

Altogether there are one hundred and twenty pages of good practical stuff that will be helpful to any painter who feels that his business methods are not as up-to-date as his craftsmanship.

The book will be sent postpaid on receipt of \$1.00. The publisher says: "Money back if you return the book and say it isn't worth a dollar to you." Address The Text Book Company, 12127 Eggleston Avenue, Chicago, Ill.



### **Compressive Strength of Portland Cement Mortars and Concretes**

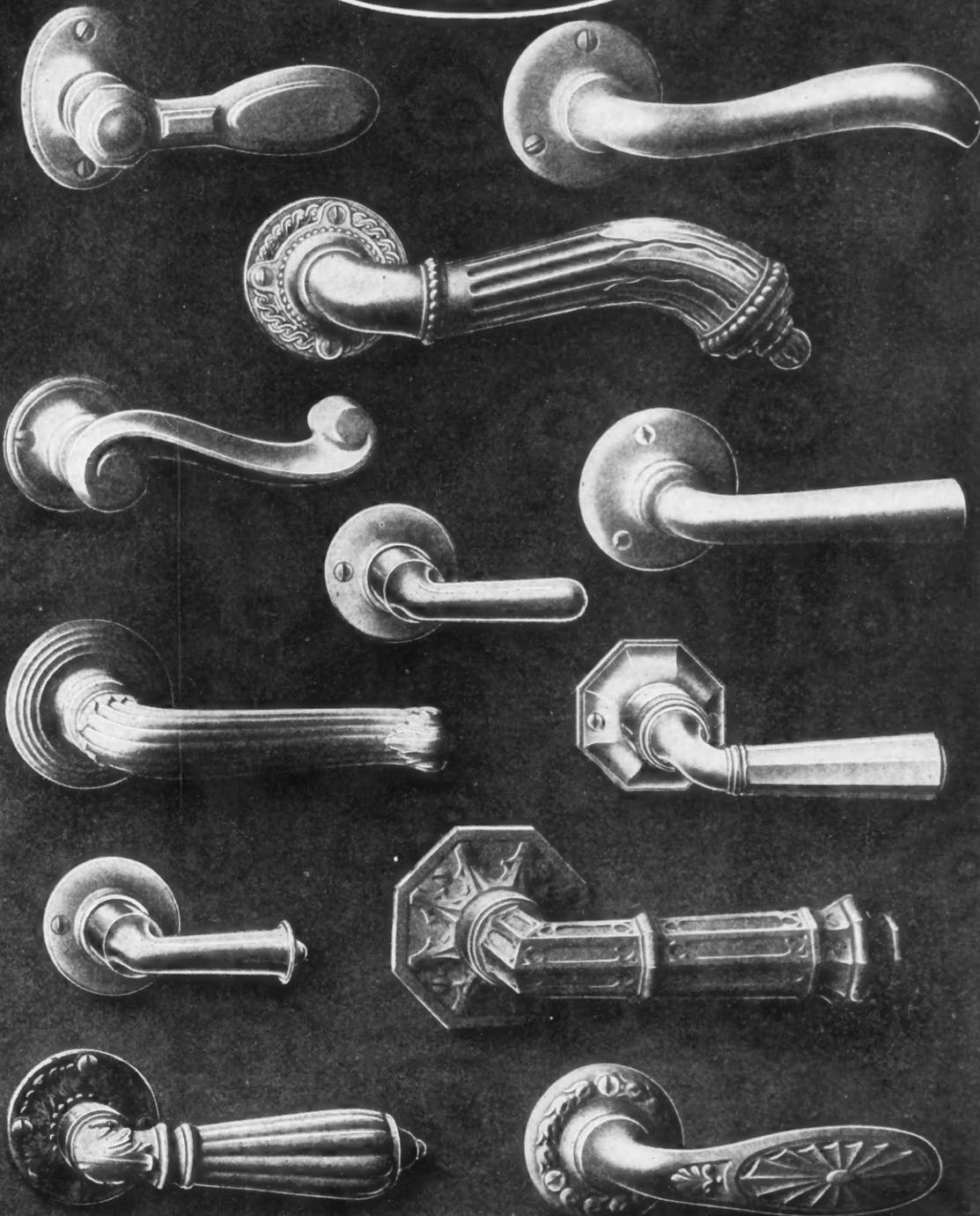
A publication has just been issued by the Bureau of Standards, Department of Commerce, on the "Compressive Strength of Portland Cement Mortars and Concretes," which will be of interest to contractors and engineers and, in fact, to all users of cement.

Concrete differs from most structural materials in that it is not manufactured at a mill or plant, according to chemical formula, under the observation of skilled specialists, subject to rigid inspection and test and such control as to produce a uniformly homogeneous product; nor is the process of manufacture completed in a few hours or days as in the case of steel products. Furthermore, concrete is made from materials obtained from sources differing widely in characteristics which affect its quality. The proportions of the ingredients, the amount of water used in mixing, the thoroughness of mixing, the manner of placing, the atmospheric temperature and humidity, exposure to sun, rain and wind, immersion in fresh water, sea water, or other natural solutions all affect the quality of the concrete.

All these matters are discussed in the Bureau's publication which contains the results of some 20,000 tests. The general effect of variation in the methods of preparing the concrete is shown, and suggestions are given as to the proper methods to follow in order to obtain the best quality of concrete.

Many users of cement believe that the strength of concrete is entirely dependent upon the quantity of cement used in the mixture. This is not true, as a mixture lean in cement but properly made may have much greater strength than a rich mixture improperly prepared.

(Continued to page 108.)


**CORBIN**


### LEVER HANDLES

have an artistic value and an individuality which commend them to people of discriminating taste. They are especially desirable for doors with narrow stiles, French windows and cabinets, and can be used instead of knobs on any Corbin escutcheons. We illustrate a few selections from a large assortment. Full particulars on request.

**P. & F. CORBIN**

*The American Hardware Corporation Successor*

NEW BRITAIN, CONN.

NEW YORK

CHICAGO

While there are not a great many failures of concrete structures, the majority of those which do occur are due to careless methods of preparing and placing the concrete, or ignorance of the effect of variable treatment. Most of the concrete used in building construction work today is mixed with an excessive quantity of water which permits of economic transportation from the mixing plant to the forms by means of chutes and troughs, but this excess of water may result in reducing the strength 50 per cent or more from that which could be obtained by using a lesser quantity of water.

The paper states that certain generally accepted methods of testing aggregates and proportioning mixtures are incorrect and suggests methods of selecting concrete aggregates, proportioning the mixture, mixing, placing and curing.

Copies of the publication, Technological Paper No. 58, may be obtained free upon request to the Bureau of Standards, Washington, D. C.

### ❖ American-Made Mastic Taking Place of Imported Product

"On account of the war" has become a household phrase in America. It is used to explain advances in the prices of commodities as well as our inability to get certain things at any price.

But it is an ill wind that blows nobody good, and one advantage of the situation has been the development of a number of industries that will hereafter be independent of foreign sources of supply. We have also found that custom or habit, rather than economic necessity, has been responsible for considerable foreign trade.

The truth of the latter statement is clearly shown by our former large importations of rock mastic. It required the present cessation of imports growing out of the war to demonstrate that we are not only able to produce mastic in large quantities, but of very superior quality. For a long

time we imported from Germany—and in lesser quantities from Switzerland and Italy—many tons of rock mastic. But when importations suddenly ceased, architects and engineers found that the situation was really advantageous in so far as this particular material is concerned. They were at first concerned because mastic is used for so many purposes that to be deprived of it without being able to find a substitute would be a serious matter. But they know that they can not only get a more uniform material than the rock mastic but that it has been available for some time. That this change in the attitude of architects and engineers is important is shown by the extensive use of the material. It goes into the floors of storage plants, abattoirs, breweries, hospitals, bakeries, railroad stations and shops. It is especially valuable as a waterproofing material, being used in subways, bridges, piers, and tunnels. The manufacture and use of the American product are already standardized. More than 75,000 square feet were used in the New York Municipal Building.

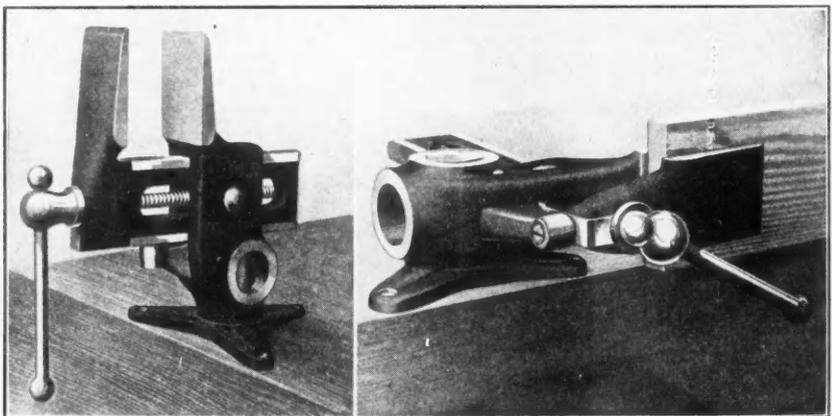
A curious fact is that while it was apparent we had a superior product it is only recently that we discovered why it is better. Chemical research disclosed the fact that in the Trinidad lake asphalt, which is the bitumen used in the American-made mastic, nature had supplied exactly the percentage of fine material content or filler required to obtain the best results. Analyses show no variation, whereas, in the case of rock asphalt the filler and bitumen content varies from fat to lean. A variation of the material ordinarily employed is an acid-proof mastic for lining tanks in which dilute mineral acids are employed.

Thus the war has led to the development of another important and specialized industry that not only gives employment to many men, but is keeping at home a great deal of money that formerly went into the pockets of foreign producers.

## We have at last a Vise that is good enough for the House Carpenter

**T**HE Carpenter Vise swings perfectly free on its base in any of its many positions. The

workman places his work in the vise in the best position for working to get the best light, with his body in a natural position so that he can work direct from the shoulder. The vise locks automatically in any position. This means greater efficiency for the workman, increased output, better and truer work with less labor. This tool is a profit booster for the contractor, a labor saver for the workman. If your hardware dealer cannot show you a vise in action send for full information direct.



## THE WILL-BURT COMPANY, Orrville, Ohio

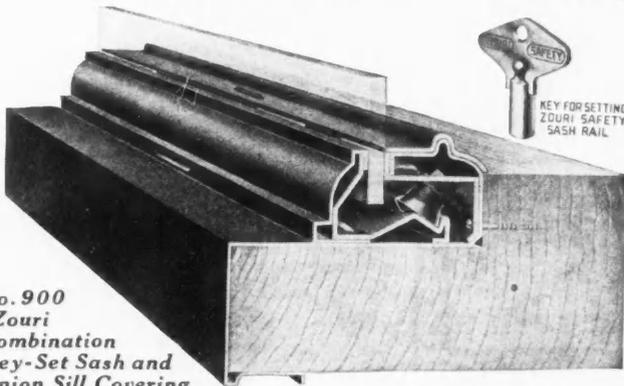
# You Don't Use a Screw Driver To Wind Your Watch

By the same token you have learned that show-window glass-setting, a mighty delicate operation, incurs many hazards when subjected to direct screw pressure, impelled by the tools used in the building trades, the power of which is beyond measure.

In the Zouri Key-Set Sash, the outer member is drawn against the glass by means of a small key. The operation is just as delicate as winding a watch. The sense of touch tells your fingers the sash is in place.

We urge comparison of illustrations of construction and invite comparison of samples. We illustrate Zouri Construction in all our advertising. We even urge comparison of any cheaper lines with copper moulding effects. Comparison will speedily show you why we can't and won't sell Zouri Key-Set Store Fronts at the price of copper moulding effects.

*Insist on Samples—We'll Gladly Send Them*



No. 900  
Zouri  
Combination  
Key-Set Sash and  
Union Sill Covering

The Zouri Safety Key-Set Sash (with Union Covering) No. 900 is shown here to be free from dangers of direct screw pressure, or a resilient rabbet. Its inner member is rigid. The Union Sill Covering, extending from inner side of plate glass to lower edge of sill, has no joints, no perpendicular screws, no sill deterioration, because leakage is impossible. Made in solid copper.



COUPON

Zouri Drawn Metals Co.

1811-1821 East End Ave.  
Chicago Heights, Ill.

Gentlemen:

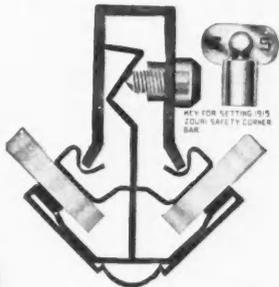
Please send me samples of your Zouri Key-Set Sash, Corner and Division Bars.

Name \_\_\_\_\_

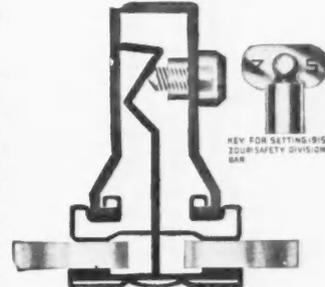
Address \_\_\_\_\_

## Zouri Safety Corner and Division Bars

The corner and division bars are free from direct screw pressure. They are proof against the carelessness of workmen. They can be set only with the small special socket key shown, so that undue pressure cannot be exerted by the tools used in the building line, the power of which is beyond control. These bars are specially constructed so that the edge of the glass cannot come in contact with the metal.



No. 200 Safety Key-Set Corner Bar



No. 300 Safety Key-Set Division Bar

We have been advised of adverse criticism on the word "co-operative" as used in a recent advertisement.

What we mean by "co-operation" is that we have prepared, for the convenience of architects and builders, the most complete set of architectural details ever published by a manufacturer in the building line. Our Advertising Manager overlooked explaining this fact in the advertisement referred to. These 1916 details will be furnished to architects and builders, on application, free of charge.

# Zouri Drawn Metals Company

1811-1821 East End Ave.

Chicago Heights, Ill.



## Edgewater Beach Hotel

**M**ARSHALL & FOX'S new monument to Chicago, located on Sheridan Drive, is built in the form of a huge cross, with all outside rooms and its beautifully stuccoed exterior is waterproofed and permanentized with



The necessity of using a dependable waterproofer for all stucco work above ground, as well as for waterproofing basements and all work subject to hydrostatic pressure, is now conceded by Contractors and Builders who strive to attain permanence in their work.

CERESIT effectively prevents cracking, spalling and discoloration of stucco, due to entrance of water into the pores of the cement. Its use will insure your clients against disappointment and future trouble.

Try CERESIT on your next stucco job, as well as for basements, silos, boiler pits, etc.—you will never regret it.

Every Contractor and Builder should have a copy of our new catalog which tells the **WHEN, HOW and WHAT** of profitable Waterproofing, Damp-proofing and Floor Hardener work. Write for it today.

### Ceresit Waterproofing Co.

910 Westminster Bldg. CHICAGO

### Inside Information

When a man has given the best years of his life to perfecting and building up some one branch or detail of the vast complex we call modern building construction, and has made a great success of it, it is safe to assume that he knows more about that subject, more about that particular detail which he has made his specialty, than the rank and file of those concerned with general building problems.

It isn't often that such a man is big enough and generous enough to be willing to give out what he has learned, to let others in on his inside information. The majority choose to keep all such for themselves, but when occasionally such a man does offer his store of knowledge and experience, all others are ready to stop and give heed.

These are the impressions that come to us in thinking of the inside information on modern store fronts that Mr. Francis J. Plym, President of the Kawneer Manufacturing Company, has been and is setting before our readers in each issue of this publication.

Mr. Plym was one of the first to see store fronts in their true light as the most important part of a store and the merchant's best advertising medium and salesman. He was the pioneer store front enthusiast. He studied store fronts, talked store fronts, designed store fronts. Business men were not ready at first to receive his gospel; but that didn't stop him.

It was just ten years ago that he gathered a small organization around him to specialize on modern store front construction. The phenomenal growth of this business—the growth of the attractive store front idea, carrying with it very nearly the entire reorganization of our American storekeeping methods, testifies to the soundness of his ideas.

As we have said, some keep the benefits of such special study and experience closely guarded, but not so with Mr. Plym. He wants architects and builders everywhere to have all of the benefits that can come from special inside information about modern store front design and construction. He is presenting a very remarkable series of articles in the *AMERICAN CARPENTER AND BUILDER*, each article illustrated with a full page working detail drawing, and with a wonderfully attractive perspective sketch of some modern store front style. This series began in our February issue, and continues each month without interruption.

We hope that everyone of our readers is following this series, and is giving it the study it deserves.

As a supplement to this series Mr. Plym has also prepared a very instructive, illustrated booklet on modern store fronts, and this he will mail free of charge to any architect, contractor or builder desiring a copy. Any special problems concerning the design of special fronts he will also be glad to work out for our readers. Mr. Plym is President of the Kawneer Manufacturing Company, Niles, Michigan. Write to him there if interested in store fronts.



### New Neponset Booklet

A summary of the products of Bird & Son have been gathered together in a little booklet called "Repairing and Building," which will be interesting to those who have in mind the construction of any structures having need for roofing material, wall board, or building paper.

The Neponset shingle is made in three colors, red, gray and green, and has the advantage, it is claimed, that since it is made in twin shape, the time required to lay a roof with these shingles is considerably less than with single shingles. The construction of these shingles is explained in this booklet, and their advantages are discussed. The Proslate Shingle is also mentioned, this shingle being constructed in such a

(Continued to page 112.)

—If 200 leading manufacturers said to you:

## “Visit Our 200 Factories in One Afternoon”

What an opportunity you'd have—to investigate methods, inspect raw materials and test results. A chance to compare the actual products side by side—pick the best in every line of building material. Think of the saving—both time and money—in buying.

Visit all 200 in one afternoon. Impossible? Take at least a month? Not now.

These 200 manufacturers have now come together—under one roof—condensed their business into 200 intensely interesting displays, and invite you—for your own profit—to come and see and learn at this great permanent

# Building Material Exhibit CHICAGO

The Mecca of the builder in search of building material and equipment. Everything that enters into any construction, from a bungalow to a skyscraper, can be found in this vast exhibit. By all means, come if you can. If you cannot, we will gladly secure bids for you. Send us your plans. Address Building Material Exhibit, Chicago.



manner that it may be sold at a lower price, while the quality is not sacrificed. These two shingles, together with the Paroid roll roofing, furnish a liberal choice of roofing material for the builder.

The numerous uses of wall board, together with some very good suggestions for their application, are offered to the reader of this pamphlet.

Every contractor knows that all he can do to keep down his customer's coal bill will make that customer more satisfied with his work. The ability of Neponset building papers to help the contractor or builder perform this service is also discussed.

The Neponset Built-up Roof suggests a method of handling the flat roof proposition.

This booklet may be obtained by addressing Bird & Son, Dept. C, East Walpole, Mass.



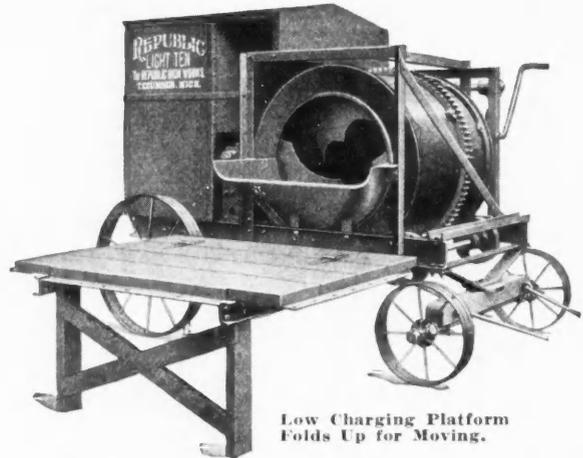
### Republic Low-Charging Mixer

The accompanying illustration shows one of the most popular 10-foot mixers that has appeared on the market this season.

This mixer really combines the advantages of both large and small mixers, having lighter weight than big machines, making it more easily hauled and placed on the work, but also having sufficient capacity to hold a full sack of cement each batch, avoiding the necessity of mixing half size batches and splitting a sack of cement.

Many new and original labor saving features are built into these machines, and from the illustration it will be noticed that the mixing drum is one that can be very easily cleaned owing to the large drum opening and the absence of pockets or other cement collecting construction.

An unusual feature about this is the large, roomy engine housing, making it easy to make adjustments, also self-ad-



Low Charging Platform  
Folds Up for Moving.

justing bearings to avoid binding of the working parts. The platform folds up for moving, making the mixer instantly available when placed on the job.

Many large contractors are ordering these mixers, using them in preference to heavier machines, especially where it would be difficult to place a big machine, owing to the condition of the ground, or the inconvenience of moving it in and out; therefore, many of these mixers form a part of many large contractor's outfit, and for medium and small contractors it proves a splendid investment, owing to the few men required to turn out large quantities of mixed concrete or being adaptable for small jobs.

Further information may be obtained regarding this machine and other sizes from the Republic Iron Works, Tecumseh, Mich., a firm that has been in business for 69 years, and has a reputation for good, high-class machinery at extremely favorable prices.

## The Favored Truck of Carpenters, Contractors, Painters, Decorators

WITH this KisselKar "Tonner" sub-contractors, painters, decorators, roofers are saving time and worry in getting materials, ladders, men, etc., on the job quickly.

General building contractors use it in transferring special workmen, tools and material from one job to another.

For hauling cement, stone, sand, lumber and millwork—larger sized KisselKar Trucks are built with special devices for quick dumping if desired.

KisselKar Trucks have the matchless Kissel-built motor, perfect worm drive rear axle, and sturdy chassis backed by Kissel reputation.

Write for truck information.

# KISSELKAR TRUCKS



\$1250 Chassis  
Price

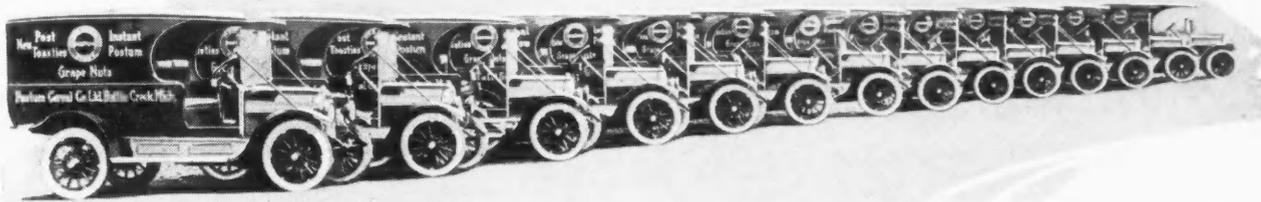
New KisselKar Worm Drive Truck  
"Built to Carry a Ton"

Four new sizes.....Chassis \$950 to \$2850

**KISSEL MOTOR CAR CO., 546 Kissel Avenue, Hartford, Wis.**

Branches, Display Rooms and Service Stations in all Principal Cities and Towns

**Overland**  
TRADE MARK REG  
Delivery Cars



## Overland Merit Won This Order From The Postum Cereal Company

THE Postum Cereal Company of Battle Creek, Michigan, has just received 14 Overland Delivery Cars.

They are to be used in various parts of the country to enable branch houses to better serve trade and take care of increasing business.

The contract was given to the Willys-Overland Company in the face of keen competition.

Final selection was influenced by unsolicited recommendations from other large concerns which for several years have used a large number of Overland Delivery Cars.

Overland Delivery Cars are *producers*. They are rendering efficient service for thousands of concerns in hundreds of different lines of business in all parts of the world.

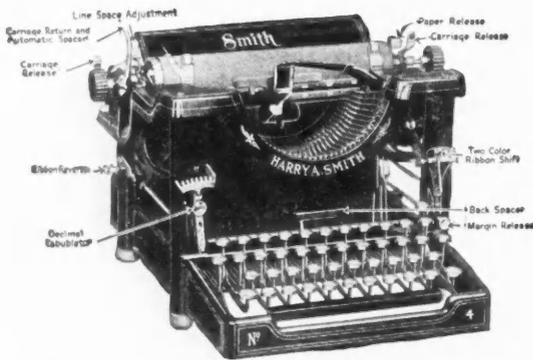
The Overland dealer will be glad to prove to you how Overland Delivery Service will be profitable in *your* business.

Phone him *today*.

*Write for Catalog---Address Dept. 734*

**The Willys-Overland Company, Toledo, Ohio**

*"Made in U. S. A."*



# TYPEWRITER SENSATION!

*Free Trial—Use as You Pay*

**Send Me Only \$2.00 a Month Until the Low Total Price of \$34.15 is Paid, and the Machine is Yours**

**This is absolutely the most generous typewriter offer ever made. Do not rent a machine when you can pay \$2.00 a month and own one. Think of it—Buying a \$100.00 Typewriter for \$34.15. Cash price, \$32.30. Never before has anything like this been attempted.**

## Standard **SMITH** Model Visible **No. 4**

Perfect machines. Standard Size. Keyboard of Standard Universal arrangement, 42 keys writing 84 characters—universally used in teaching the touch system. The entire line of writing completely visible at all times, has the Decimal tabulator, the two-color ribbon, with automatic reverse, the back spacer, ball bearing carriage action, in fact every late style feature and modern operating convenience. Comes to you with everything complete, tools, cover, operating book and instructions, ribbon, practice paper—nothing extra to buy. **You cannot imagine the perfection of this beautiful typewriter until you have seen it. I have a thousand of these perfect late style Model No. 4 typewriters at this bargain price, and each purchaser fortunate enough to secure one of these beautiful machines must try it out in home or office before deciding to buy.** I will send it to you F. O. B. Chicago for five days' free trial. It will sell itself, but if you are not satisfied that this is the greatest typewriter bargain you ever saw, you can return it at my expense. You won't want to return it after you try it—you cannot equal this wonderful value anywhere.

## You Take No Risk—Put in Your Order Now

When the typewriter arrives deposit with the express agent \$6.15 and take the machine for five days' trial. If you are convinced that it is the best typewriter you ever saw keep it and send me \$2.00 a month until my bargain price of \$34.15 is paid. If you don't want it, return it to the express agent, receive your \$6.15 and return the machine to me. I will pay the return express charges. This machine is guaranteed just as if you paid \$100.00 for it. It is standard. Thousands and thousands of people own and use these typewriters and think them the best ever manufactured.

**The supply at this price is very limited, the price will probably be raised when my next advertisement appears, so don't delay. Fill in the coupon today—mail to me—the typewriter will be shipped promptly.** There is no red tape. I employ no solicitors—no collectors—no chattel mortgage. It is simply understood that I retain title to the machine until the full \$34.15 is paid. You cannot lose. It is the greatest typewriter opportunity you will ever have. **Do not send me one cent. Get this coupon in the mails today—sure.**

**HARRY A. SMITH, Room 721, 231 N. Fifth Ave., Chicago**

-----Tear Out—Mail Today-----

**H. A. SMITH, Room 721, 231 N. Fifth Ave., Chicago. Ill.**

Ship me your Model No. 4 typewriter F. O. B. Chicago, as described in this advertisement. I will pay you the \$28.00 balance of the SPECIAL \$34.15 purchase price, at the rate of \$2.00 per month. The title to remain in you until fully paid for. It is understood that I have five days in which to examine and try the typewriter. If I choose not to keep it I will carefully repack it and return it to the express agent. It is understood that you give the standard guarantee.

Name.....

Address.....

### Engine "WHY" Book

One of the cleverest little books on engines that has ever been published has just been printed by Mr. Ed. H. Witte, a Kansas City engine expert. He says that while the supply of books lasts, he will be glad to send anyone who is interested a copy of this book, which is called "Why?" Just write "Why" with your name and address on a postal or scrap of paper and address Mr. Witte, 177 S. Oakland Ave., Kansas City, Mo.



### New Adjustable Scaffold

Patents have recently been granted the Neville Mfg. Co. on a metal adjustable scaffold which the manufacturer claims will not only save time for the builder, but will also save any possible damage to the roof which might occur during the time the scaffold is in place.

The scaffold, as may be seen in the accompanying illustration, is to be used in building or repairing chimneys. It is so simple in construction that its use is readily understood. It consists of two pairs of brackets, one pair being placed on each side of the chimney. They are hung over the ridge of



The Folding Steel Scaffold Bracket Used in Repairing Chimney.

the roof, fitting equally well over a ridge board or a metal ridge roll, since they are so constructed that no weight is carried by the roll. The horizontal bars are raised to the level of the ridge and the supporting bars are connected. Plank are then placed across and the scaffold is complete. By suitable adjustment these brackets may be used for a chimney on the side of a sloping roof also.

More information in regard to this adjustable scaffold may be had of the Neville Mfg. Co., Kewanee, Ill.



### "Wonder Mixers"

A pamphlet bearing the above title has just been completed by the Waterloo Cement Machinery Corporation in which they present their new models to the user of concrete mixers.

The Wonder Mixers are made either with or without folding track loaders and are shown in sizes ranging up to 11 cubic feet per batch.

Several special features are discussed in this booklet, among them the construction of the drum, which is made in two parts, the bowl or base being a solid, close-grained, semi-steel casting, and to this is riveted a heavy sheet steel bonnet with wide mouth. The makers claim that the wide mouth of this drum not only renders the mixing process visible, but it also makes possible an instantaneous discharge of the entire batch of concrete, which is a great advantage to the contractor or builder who is discharging directly into forms or who requires speed of mixing. These mixers have only one drum bearing with a well protected grease cup for its lubrication.

The folding track loader has several advantages claimed for it; among these, its rigidity, the saving of power due to the short travel required, the high discharge, and the low loading, which may be even at ground level.

There is also included in this catalog a well illustrated dis-

(Continued to page 116.)



*Jeffery Quads in Mexico*

## Make Your Trucks Save Your Tires

**T**HE Jeffery Quad has the lowest tire cost per mile of all 2-ton motor trucks on the market. This is being *proved* every day.

An official of one of the leading tire companies writes:

**“From personal observation I find that the tires on the Jeffery Quads used in army service are giving far superior service to the tire equipment on other makes of trucks used in and out of Columbus, New Mexico.”**

Tire cost is one of the biggest items in the running cost of a motor truck. Truck tires cost money. And every time you change a set of tires you may lose an additional \$10 to \$25 or more in truck operating time!

The Jeffery Quad has a record for unusually high tire mileage because:

—It drives on all four wheels, thus equalizing the amount of driving stress on the tires in starting.

—It brakes on all four wheels, thus equalizing the amount of friction on the tires while stopping.

—It steers on all four wheels, thus equalizing the amount of stress on the tires in turning.

—The power-on-all-four-wheels principle brings about the absence of the vibration and bumping which are such important factors in lowering tire mileage.

—The entire design of the Quad secures even distribution and balance of weight, thus increasing tire mileage.

But lower tire cost is only one reason why good business men, truck-wise by experience, are buying Jeffery Quads. The four-wheel drive, brake and steer features of the Quad reduce other operating expenses besides enabling the Quad to operate under road conditions where no other truck can travel.

The Jeffery Quad combines low cost service under ordinary conditions with amazing performance under extraordinary conditions. That is why more than 3,500 Quads have been built and put into service in two years—a record never even approached by any other truck of similar capacity. For further particulars about the Quad—or about the complete Jeffery line which includes light-duty, rear-drive trucks, address The Thomas B. Jeffery Company, Kenosha, Wisconsin.

### —Read This Letter—

#### **Tires Give 13,000 Miles Under Difficult Conditions.**

“The tires of the Jeffery Quad, both front and rear, have been wearing out evenly, except on one side, which tires we believe are still good for another 2000 miles, which would make a total of 13,000 miles of service in the original tires. It must be borne in mind that we make deliveries of building materials in the rears of buildings where it is necessary in a great many cases to drive over brickbats and other rubbish in order to get to the place where the materials are to be used.”

—Spencer Bros., Chicago, Ill.



# Jeffery Quad

## Power on All Four Wheels

cussion of the other features of these mixers, the Wonder Paver and the "Double Quick" backfiller.

Any of our readers may obtain copies of this condensed catalog from the Waterloo Cement Machinery Corporation, 103 Vinton St., Waterloo, Iowa.

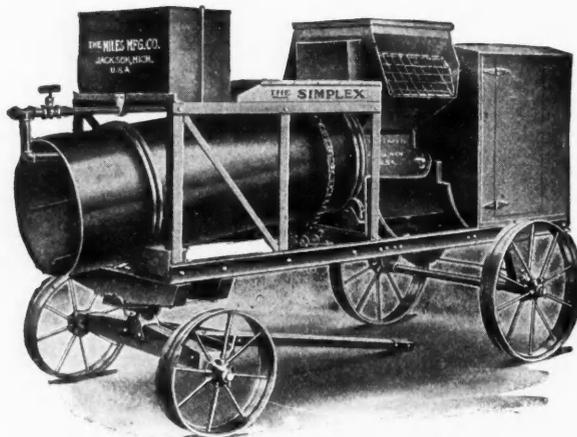


**The Miles Wet Process Concrete Block Machine and "Simplex" Mixer**

It has been the policy of the Miles Manufacturing Company to construct a concrete mixer which will eliminate the necessity of hand labor in proportioning the materials and at the same time produce a concrete as thoroly mixed as it was possible to obtain with a batch mixer. This company claims that in their Simplex Mixer they have been able to produce concrete in the best and most economical way possible by the use of a mixer which is of the continuous type with automatic measuring device. The use of paddles in the mixing process has been eliminated, the drum itself being turned and the materials rolled in much the same manner in which the batch mix is accomplished. The mixing drum is so tilted that the material must be turned and thoroly mixed thirty times in passing thru the mixer.

The proportions may be regulated by proportioning cams which are carefully graduated and locked into position. The only hand labor necessary is, then, the loading of the hopper, since once the proportions have been established and the proper amount of water turned on, the whole process of mixing is automatic. By making the proper initial adjustments it is claimed that the one size of mixer which this company manufactures will turn out any quantity of concrete up to one hundred yards in ten hours.

In connection with their Simplex Mixer, this company has originated the Wet Process Block Machine which is made in one size, but is capable of adjustment in either direction



The "Simplex," a Continuous Mixer Without Paddles.

from 4 inches to 24 inches in length and from 4 inches to 12 inches in width. In this machine the blocks are molded face down and the cores are inserted horizontally, the machine afterwards being turned and the core withdrawn vertically. The manufacturers claim that this method eliminates the possibility of collapse of material over the core hole and at the same time makes the wet mix possible. A very complete line of designs for the faces of these blocks is possible, and the adaptability of concrete blocks to varied types of construction cannot be disputed.

Very interesting data in regard to the cost of constructing concrete blocks by this process and the results of several mechanical tests together with more complete descriptions of the concrete machinery mentioned here may be obtained from the Miles Manufacturing Co., 307 Franklin St., Jackson, Michigan.

*"Father of them All"*

**The Great Bell**  
*The Original Pipeless Furnace*

We have thousands in use. Sizes, styles, and prices to suit all, \$38.00 to \$94.00.

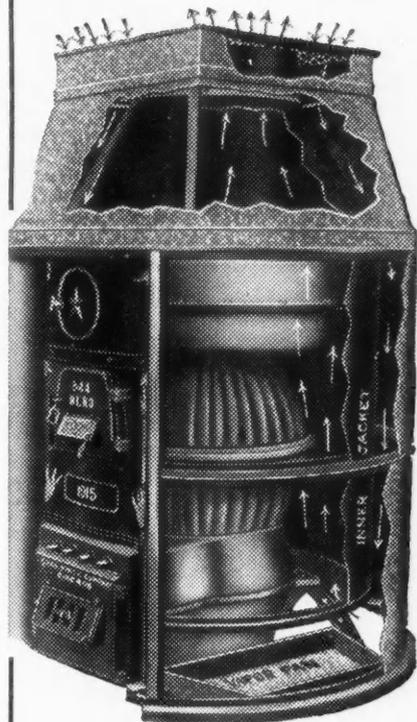
This furnace will heat any one or two-story building in the most efficient manner; with the least effort, and the lowest relative cost. It is made for the building where a furnace is needed, but where the cost has been prohibitive.

Our methods of production and sales have reduced the cost so low that no builder can afford to overlook our proposition.

Write for our catalogs, describing the various styles, prices and specifications of the Great Bell Furnace. We guarantee them to be and do all we claim for them in both catalog and correspondence.

**American Bell & Foundry Company, Northville, MICH.**

# The Hero Pipeless Furnace



**Heavy Cast Iron**  
Good for 20 years

Let us help you  
with your

**Heating and  
Ventilating**

We make a complete line of warm air furnaces and room heaters.

Good commissions paid to Contractors and Builders.

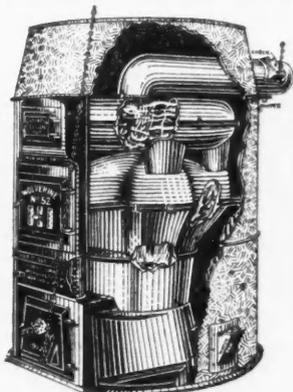
**CHAS. SMITH  
COMPANY**

180 N. Dearborn St.  
Chicago, Ill.

## WOLVERINE FURNACES

and the WOLVERINE SYSTEM of Heating and Ventilating are something you want to investigate. You buy direct from our factory at manufacturers' prices—furnace, registers, cold air faces, pipe and fixtures already cut and ready to put together. We send our own mechanics to install complete if you are in our local territory. If not we send complete plans and specifications that any good mechanic can follow.

We have been making furnaces and nothing else for 36 years. Our experience is at your command.



It costs you nothing to get our plans for your building and receive our written proposal.

Wolverine Furnaces are constructed on scientific principles which makes them durable and economical in fuel. Easy to clean and operate and sold under the most liberal guarantee ever given with heating apparatus. Write for large 32-page illustrated catalog that describes and shows these furnaces. It is FREE, a postal card will fetch it. Ask for catalog No. 63.

**MARSHALL FURNACE COMPANY**  
12 Dobbins St. - - Marshall, Mich.

# The One-Register Pipeless Sanit-Air System



**T**HE Heating System with 20 extraordinary features of interest to you.

It is the one system that produces more heat and distributes it just where you want it—with a distinct saving of one-half the fuel expense over any other method.

The "Sanit-Air" System warms buildings in one-tenth the time required by steam or hot water. Overcomes all common objections to furnaces. Occupies small space and saves the basement for storage.

The "Sanit-Air" System is the logical system because it circulates pure air, properly moistened, through one direct register. The air is cleaned and purified in circulating through the air washing system—insuring health, comfort and cleanliness.

Write for our card of instructions for installing (one man can put it in place ready for operation in one day). We will also send full specifications and some honest advice on heating.

Absolutely guaranteed by Standard Bond.

**Standard School  
Heater Co.**  
CHICAGO



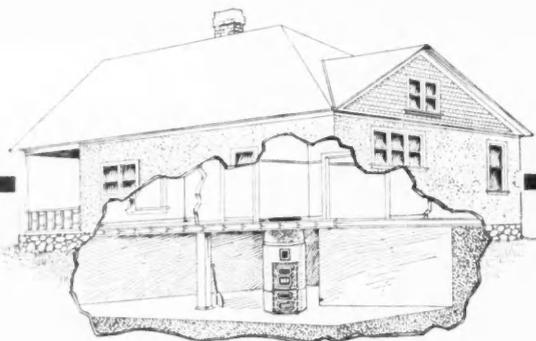
### FREE PLANS

Standard School Heater Co.  
Chicago

Gentlemen:—Send me your free plans and the 20 extraordinary features of Sanit-Air System, free of charge.

Name .....

Address .....



## Better Heating— Healthier Living

with the

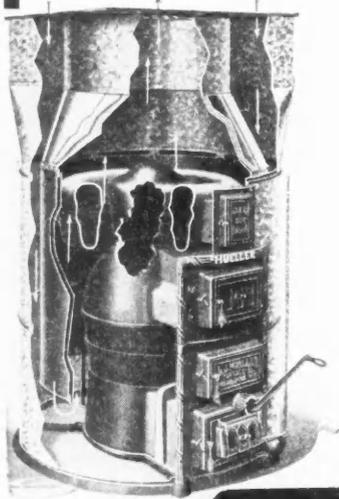
### MUELLER PIPELESS FURNACE

Thousands of installations prove the Mueller "Pipeless" the most economical and satisfactory method of heating the small and average sized home everywhere. Its single register directly over furnace provides rapid circulation or **pure, warm air** throughout entire house.

This is a **real** furnace—made of heavy, solid cast iron—no sheet iron used in its construction—and it gives a lifetime of satisfactory service. Burns hard or soft coal, coke or wood. As easy to install as a stove, but cleaner and easier to run. Also saves fuel, labor, time, trouble. The best "pipeless" furnace for the best heating results.

### A "Mueller" System for every Heating Requirement

For very large homes and other buildings, for which the "pipeless" furnace is not best suited, contractors and builders have choice of a Mueller system adapted to their every building requirement, covering Warm Air Furnaces, Hot Water and Steam Boilers and Vapor Systems.



### Mueller Leads Since 1857

Let us help you solve your heating problems with our nearly 60 years of successful heating experience and unbeatable line of heating appliances.

#### Send for Catalog

and full information on all Mueller Heating Systems. Dealers positively protected.

**L. J. MUELLER  
FURNACE CO.**  
218 Reed St., Milwaukee, Wis.

### The Bessler Movable Stairway

Two factors have collaborated to place the Bessler movable stairway upon a high pedestal of importance. Growing congestion in cities and towns bringing about higher ground values—and increasing cost of building material and labor bringing the cost of building operations up to new heights. All of which brings home to the architect and builder the great importance of saving space—and that is the mission and the purpose of the Bessler Movable Stairway Company at Akron, Ohio.

This stairway is designed to replace stationary stairs leading to upper rooms, attics and so on. When in use it presents a strong, well-built flight of stairs complete with hand-



Installation of the Bessler Movable Stairway.

rail simple and sturdy in appearance. When no longer required it can be made to fold up into the ceiling with nothing visible but a neat panel finished to match the remaining wood-work in the room. To cause the stairway to disappear the stair-horse is rolled up on the panel. When in this position it is swung into the ceiling by means of a powerful spring barrel concealed under the stairs, and by the aid of the counterbalance formed by the now projecting stair-horse.

This spring barrel also aids in rolling stairs up on panel. Its operation is really so easy that a little girl can use the stairs as easily as a grown up. When again wanted the panel is pulled down from ceiling by means of a small chain, and the stair-horse rolled down the panel. A new book, "The Modern Way Up," tells all about this interesting and useful stairway. It will be ready for distribution soon. The Bessler Movable Stairway Company's advertisement will be found on another page of this issue.



### Starrett's New Catalog, No. 21, Now Ready

The L. S. Starrett department of sales wishes to announce to mechanics, hardware men and to every man who uses tools, the completion of the new book, Catalog No. 21.

The new catalog consists of 336 pages of illustrations, descriptions and prices, having 16 more pages than Catalog No. 20.

In compiling the new book special care has been given to grouping together tools of the same classes, and to presenting the facts, in regard to the uses of the tools, as briefly and clearly as possible.

The catalog, like former editions, is carefully indexed both by name and number.

(Continued to page 120.)

# Empire Pipeless

The One Register Wonder



Sectional View, showing Double Casings and Circulation of Air

**Adaptable to Houses with High or Low Cellars  
Burns Hard or Soft Coal, Wood or Natural Gas**

Shipped complete with casings, including square and round pipe to Register, smoke pipe tee with check damper complete, combination duplex register, water pan, 10-lb. can asbestos furnace cement, and chain and pulleys.

## Quick, Easy and Inexpensive to Install

because it does away with all extra cutting through floors, walls and partitions. No expert needed to do the work.

## Fixtures and Equipment

- Ash Pit**—Unusually deep and roomy.
- Joints**—Deep cup joints, thoroughly cemented and gas tight.
- Grates**—Triangular pattern. Easily removed. No bolts used.
- Fire Pot**—Heavy and ribbed. One-piece or two-piece, as desired.
- Radiators**—Cast iron or steel.

- Feed Door**—Opening larger than in ordinary furnaces.
- Hot water connections**—Through openings at left of feed door.
- Gas Rings**—For natural gas, furnished when ordered at a small advance in price.
- Chains and Pulleys**—For regulating drafts and checks.
- Cement**—10-lb. can Asbestos furnace cement.

APPROVED BY



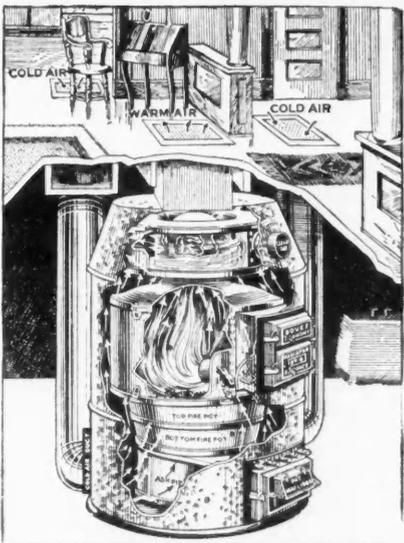
TRADE MARK

No waiting. Prompt shipments from CHICAGO Guaranteed. We carry a large stock at all times.

**Co-Operative Foundry Company, Rochester, N. Y.**

Western Branch: 505 So. Clinton St. (Phone Harrison 6373) Chicago, Ill.

## BOVEE'S PIPELESS CENTRAL



## HEATING SYSTEM AND OTHER FURNACES

Every home can now have a first-class high-grade heating system in an old house as well as new. Heats as much as three large stoves. Costs but little more than a good stove.

We furnish either our **UPRIGHT FURNACE** for burning hard coal, soft coal or wood; or our **HORIZONTAL FURNACE** with large doors 16x16 inches for burning 4-foot wood or soft coal.

Either style furnace furnished in any size necessary to heat the house.

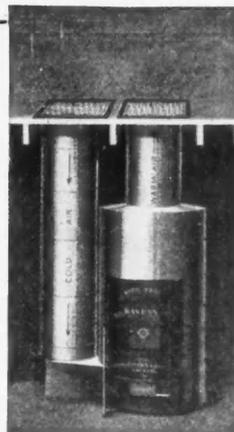
**UNUSUAL SYSTEM WITH PIPING TO EACH ROOM FURNISHED WHEN DESIRED.** Write for our three color catalogue, free.

## BOVEE FURNACE WORKS

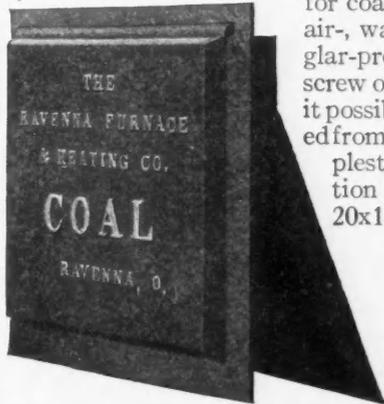
210 Eighth St. - - Waterloo, Iowa

Our Pipeless System of heating is the only practical single, warm air conveyor system, in line with scientific principles. The system provides for advantages as follows: warm air velocity, which saves both fuel and furnace, requires little basement room; lowest cost of installation.

Send for descriptive circular. Also get circulars on our Window Chute



for coal. Absolutely air-, water- and burglar-proof. No catch, screw or bolt to make it possible to be opened from outside. Simplest cast construction made. Sizes 20x15" and 20x18".



**The RAVENNA FURNACE & HEATING CO.**  
RAVENNA, OHIO

Some new Starrett tools shown in the new book are quick-reading steel rules, metric steel shrink rules, 3-foot blacksmiths' steel rules, metric and English blacksmiths' steel rules, metric and English folding pocket rules, drop-forged steel combination squares with metric and English graduations, improved bevel protractors with metric and English graduations, die maker's square, pocket vernier caliper, Yankee 1-inch micrometer caliper, vernier height gauge, adjustable hack saw frames, cutting nippers, cutting pliers, drive pin punches, spring steel handy equivalent tables.

Several of the tools formerly listed have been improved in design. On account of the advance in the prices of everything used in the manufacture of tools, they have been compelled to advance many of the prices. The prices in No. 20 Catalog are out of date and no longer exist. Every man, therefore, should get a copy of the No. 21 Catalog for the correct prices. Catalog may be obtained from dealers or by direct application to the L. S. Starrett Company, of Athol, Mass.

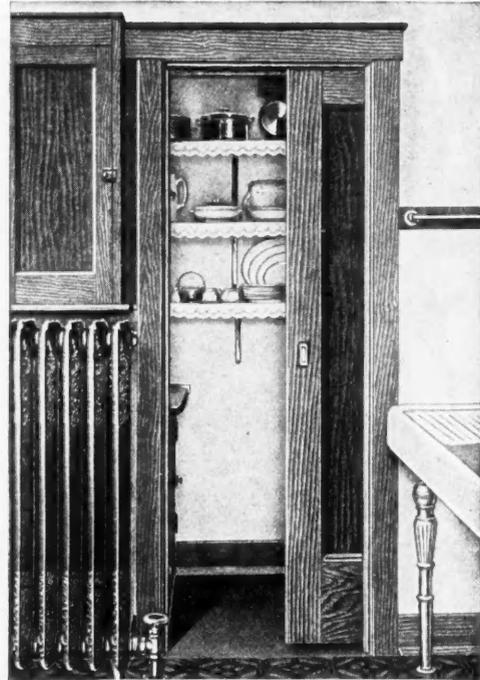


**Sliding Doors in the Home**

One of the good ideas featured in the current issue of "DooR-Ways," the little magazine printed by the Richards-Wilcox Manufacturing Company, is reproduced herewith:

"A young man employed in an architect's office noticed the arrangement and the way certain doors were hung in his home caused his mother many needless steps and a great deal of inconvenience. He made several changes by rehang- ing some of the doors and saved his mother many steps during each day.

"What was true in this home is true in many others. In many cases it seems that the only place left to have the pantry or a closet is just where it shouldn't be.



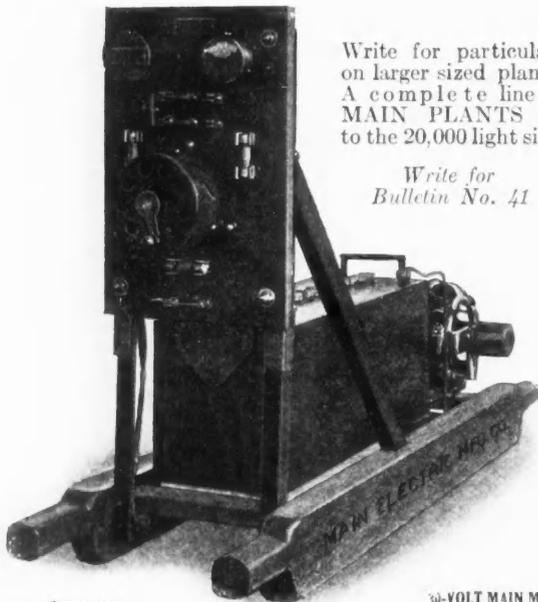
**A Sliding Pantry Door Installation.**

"In this illustration note how the doorway was hedged in, making a swing door impracticable. The correct answer for this problem was a R-W hung door."

If you are not on the mailing list for this little publication write the company at once—address, Aurora, Ill. They distribute it free of charge—which is less than one-hundredth its real worth!

**The Sensation of the Times**

A high grade, well constructed, practical 30-volt, MAIN ELECTRIC LIGHTING PLANT now within the means of all who desire better light.



Write for particulars on larger sized plants. A complete line of MAIN PLANTS up to the 20,000 light size.

Write for Bulletin No. 41

**\$76.95**

30-VOLT MAIN MIDGET TYPE XX SEVEN LIGHT SIZE

**MAIN ELECTRIC MANUFACTURING COMPANY**  
500-520 Aiken Avenue PITTSBURGH, PENN., U. S. A.  
Largest Exclusive Manufacturers of Isolated Electric Lighting and Power Plants in the World

You simply Push-  
  
the Button -

**No Engineer — No Large Battery**

The **Bruston Automatic Electric Light plant**, for country homes, churches, hotels, small towns, etc., is absolutely automatic.

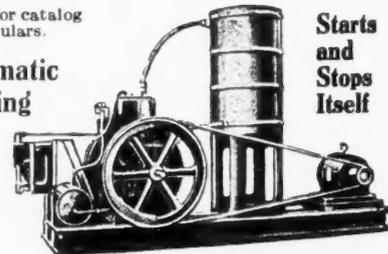
Generates current from 50% to 75% less than rates usually charged by lighting corporations. Over a thousand in successful operation.

We have a special proposition for Carpenters and Builders in small towns and country districts to install and sell the Bruston Plants at a good profit.

Write to us now for catalog and further particulars.

**Bruston Automatic Electric Lighting & Power Company, Inc.**

126 Liberty Street  
NEW YORK CITY



**Starts and Stops Itself**



# DELCO-LIGHT

*Electricity for Farm, Village and Suburban Home*

Whenever and wherever you build a home be sure it is wired for electricity.

Electricity is the modern, universal light.

It has superseded every other light in the city, in steamships and railway trains, on automobiles—

And now Delco-Light brings it to the village and farm.

It is lack of foresight and economy to build a house anywhere without providing for the use of this modern source of light and power.

Delco-Light is a compact, simple and highly-efficient light and power plant for home use.

It furnishes 40 to 50 lights for house and barn, and provides power for churn, cream separator, pump, washing machine and so forth.

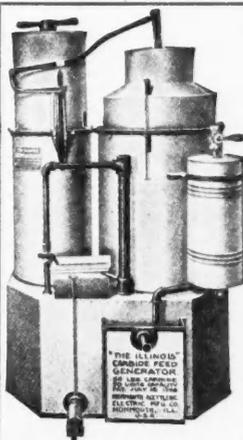
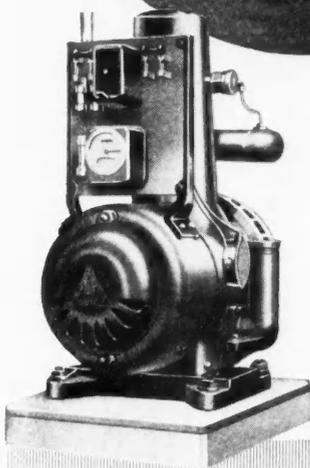
So simple a child can manage it—starts on touching a switch—stops automatically when batteries are fully charged.

**Price, complete with batteries, \$250**

*Write for Illustrated Folder*

**The Domestic Engineering Company, Dayton, Ohio**

Offices in all principal cities



**Lighting Systems**  
that are Safe, Simple, Reliable and Efficient

**Illinois and Monmouth Pit Generators**

represent the pinnacle of Perfection in Lighting Systems. Their convenience and fine lighting facilities are appreciated by every rural resident. They are very easy to sell and yield you a handsome profit. We give Carpenters and Builders special Prices and Discounts and help them close sales by sending all prospects, handsome booklets and literature showing the desirability of our Generators.

Simply send us the names of persons who might be interested; we'll work together and you act as our direct agent installing and selling them. In the meantime learn more about Illinois and Monmouth Generators by reading over our Catalogue and Proposition—Write

**Monmouth Acetylene-Electric Manufacturing Co.**  
Dept. AB. MONMOUTH, ILL.



**The Engineers Behind This Ad Worked for You**

They have perfected an ideal pumping and electric lighting outfit, assembled it so any builder can install it, and manufacture it in such a manner that it always gives satisfaction.

**Standard WATER and LIGHT Systems**

consisting of the complete units, ready to install, in many sizes, with engine or electric power; offer the builder a good margin of profit, the user a perfect working outfit, and the dealer an opportunity to meet competitors. Water or light plants are sold separately.

*Write to us about these plants. They mean much to you as builder or dealer.*

**The Standard Pump & Engine Co.**

745 Carroll Ave.

Akron, Ohio

## HIPPED TURRET SKYLIGHT

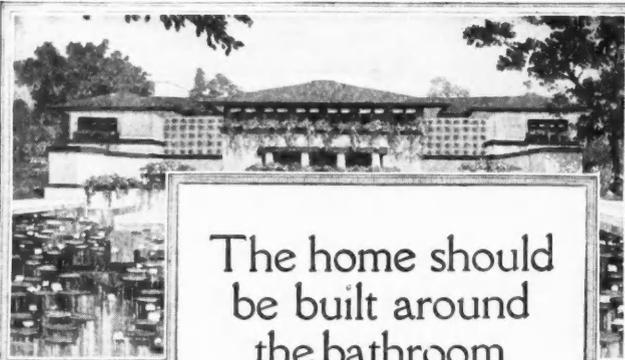


with swinging sash. Size 24" high; all windows on each side made to open at the same time. Operating device locks them open or closed.

The Skylight is of guaranteed quality. You can use it on any of your buildings with the assurance that it will stand the wear. Watertight. Can be set up in a moment by an inexperienced man.

Write for our Skylight Catalog and Prices

**Galesburg Sheet Metal Works - Galesburg, Ill.**



## The home should be built around the bathroom

This is a most important room in any home. It is the room that should receive first consideration when plans are being made.

A beautiful bathroom containing modern hygienic plumbing fixtures adds to the value and attractiveness of any house or apartment, whether it is elaborate or inexpensive.

## KOHLER WARE

is an expression of 20th century ideas

KOHLER enamel is purest white. Its beauty gives distinction to KOHLER WARE, which is always of one quality—the highest.

The trade-mark, permanent in the enamel of every KOHLER product, is the purchaser's safe guide to the best price-value

### The "Viceroy"

This beautiful tub is made in one-piece; it can be installed with or without tiling, and is low in price, due to manufacturing economies

The "Viceroy" imparts to any bathroom the appearance of elegance and luxury

Write for our free book, "KOHLER of KOHLER." It contains illustrations of our products and tells in an interesting way how we have made enameling one of the finer arts.

"It's in the Kohler Enamel"

**KOHLER CO.**  
 Founded 1873  
**Kohler, Wis., U.S.A.**

#### BRANCHES

Boston New York Philadelphia Atlanta  
 Pittsburgh Detroit Chicago  
 St. Paul St. Louis Houston Denver  
 San Francisco Los Angeles Seattle London

Belmore Lavatory, Viceroy Bath, Flats V-15-A  
 Flats K-140 EA (Patent Applied For)



## More Kohler Offices

Three new sales offices have been opened by the Kohler Company, Kohler, Wis., manufacturers of enameled plumbing ware. The new branches are as follows:

St. Louis—1010 Chemical Building, J. W. Keicher, manager.

Los Angeles—802 Van Nuys Building, Garland Mitchell, manager.

Houston—703 Mason Building, J. H. Inman, manager.

In addition to these the company now has offices in Boston, New York, Philadelphia, Pittsburgh, St. Paul, Atlanta, Detroit, San Francisco, Seattle, Chicago and London.

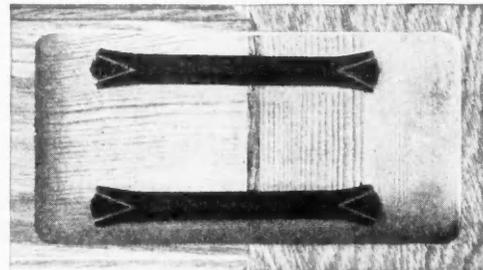


## Morgan Doors Now Built with Patent Wedge Dowel

The Morgan Company of Oshkosh, Chicago and Baltimore, makers of Morgan doors and millwork, have just added another important feature in the building of Morgan doors. In place of the old straight dowel they have acquired the right to use the wedge dowel, the last word in door construction.

This dowel locks stiles and rails together with so tight a grip that there isn't the slightest chance that they can ever come apart. The fact that Morgan doors are made with an all white pine core makes them especially suitable for the use of this new device.

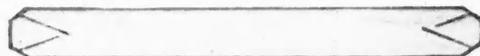
The wedge dowel is made of hardwood with two oblique slits at each end as shown in the accompanying illustration. When stiles and rails are clamped together the wedge formed by the slits is broken loose and forced back against the dowel so as to expand the sharp ends, which are, by the pressure



Showing How Ends of Dowels are Forced Apart by the Wedges.

of the clamping machine, driven into and embedded in the soft white pine core. The larger illustration herewith gives an idea of the way in which the ends of the dowel are forced apart by the wedges and also of the spreading that takes place in the sharp ends when they are driven into the core.

There are two grooves along the dowel to assure an even spread of glue along the dowel and to prevent any glue or



Dowels with Two Oblique Slits at Each End.

air pockets forming at the end of the dowel. At the conclusion of the clamping operation the holes are filled by the dowel with just enough glue to make a perfect bond between dowel and core.

Interesting as this construction is, the thing that appeals most to men who work with doors is that this simple device means that a door will absolutely stay put. There is no sagging, no chance of stiles and rails coming apart. And coupled with the white pine core it means a door that will give perfect service without the expense and annoyance of constant retrimming and rehanging.

Morgan doors are the only hardwood doors made with this wedge dowel construction.

**Fortify  
your  
Foundations with  
CANTON COAL CHUTES**

—do away with cracked foundations, broken windows and dirty lawns.

Builders like them because they are easily and quickly installed at a very low cost.

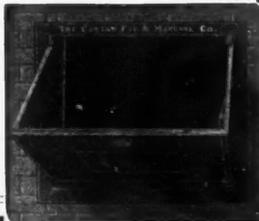
They please the owner.

Made in three sizes that cover the requirements on every job, and the cost is small.

Our catalog "B 4" of Builders' Iron Work contains many things of value to you. Write for it.

**Canton Foundry & Machine Co.**

Canton, Ohio



**MAJESTIC  
Coal Chute**

**Protects the House and Lawn**

It prevents the house, lawn, walk, flowers and shrubs from being littered up and ruined with coal dust and stray lumps. It minimizes depreciation on your home. When the chute is not in use for coal, a glass door serves as a window, giving splendid light to the basement.

**Locks from the inside and is absolutely burglar proof**  
It is extra durable, has a heavy steel body—semi-steel door frame and boiler plate hopper. It will last as long as the building. Arrange for one when you build, or can be used in place of cellar window.

We make the Majestic in all types for houses, hotels, store and office buildings, apartments, etc. See them at hardware and building material dealers.

Architects and Builders Write for Catalog of Majestic Specialties—See Sweet's Catalog

**The MAJESTIC CO., 610 Erie St., Huntington, Ind.**

Manufacturers of Coal Chutes, Garbage Receivers, Milk and Package Receivers. All Metal Basement Windows, Rubbish Burners, Street and Park Refuse Cans, Metal Plant Boxes, Hose Reels, Pipe and Pipeless Warm Air Furnaces, etc.

**"Best" Coal Chutes**

are now in use in thousands of buildings, giving general satisfaction.

They are neat and practical, built of the best materials and sell at a moderate price.

Built in three sizes with either glass or solid doors.



Write for Folder

**Sterling Foundry Co.**  
8 Ave. A,  
Sterling, Ill.

**Comfort Indoor Closet**

**ODORLESS—SANITARY—GERM-PROOF  
No Sewer, No Waterworks, No Plumbing Needed**

This modern home necessity is fast taking the place of the unsightly, unhealthy, inconvenient out-house in the back yard. Thousands now in use and all giving complete satisfaction. Can be put wherever convenient in the house. No odor whatever. Gives city convenience in the country or town.

**Costs Less Than Out-House**  
Anybody can afford one. May save cost in doctor's bills first month. Saves those cold night trips out-of-doors. Impossible to get same amount of comfort for the money another way. Sold on 30 days' trial and under sworn guarantee to refund all money if not entirely satisfactory. Send for description and prices today. Be fair to your family.

**Agents Make Big Money Easily**  
Comfort Indoor Closets sell themselves as fast as people understand about them. Contractors and carpenters are making big money by merely suggesting this closet. Write for details of our exclusive agency offer. Send postal now before somebody else gets your territory.

**Comfort Chemical Closet Co., 307 Factories Bldg., Toledo, Ohio**



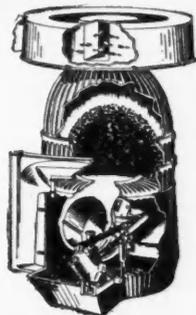
**Build Business  
The UNDERFEED Way**

Think what it means to you in reputation and new business to cut your customers' coal bills  $\frac{1}{2}$  to  $\frac{2}{3}$ ! You can guarantee to save  $\frac{1}{2}$  to  $\frac{2}{3}$  on fuel cost for every one of your customers who installs an UNDERFEED and operates it properly. We back that guarantee—get full particulars NOW.

**Write for Information Today**

A postal brings all details and copy of helpful book, "From Overfed to UNDERFEED."

**The WILLIAMSON HEATER CO.**  
457 Fifth Ave., Cincinnati, Ohio



UNDERFEED Furnace

**WILLIAMSON**  
NEW FEED  
**UNDERFEED**  
Furnaces and Boilers  
CUT COAL BILLS  $\frac{1}{2}$  to  $\frac{2}{3}$

**In every summer  
cottage you build**

**—you can install, at a profit, a  
Ro-San Indoor Closet**

Every building—home, cottage, store or office—that has no sewer connection needs this modern sanitary indoor closet. Absolutely odorless. Act as our agent—this fixture sells easily to your customers—good profit. Hundreds of carpenters represent us. We also distribute through builders the

**Ro-San Washstand**

Provides Running Water, Hot or Cold, Without Plumbing. Every housewife wants one. Convenient, sanitary. Sells readily with little effort. Carry this work along with your regular business. Ask for terms to agents.

**Rowe Sanitary Mfg. Co., 780 Rowe Bldg., Detroit, Mich.**



Absolutely Odorless

### Corbin Rim Night Latches

There are many places where the builder can put night latches to advantage. Some of the many positions that can be filled by night latches and a list of style and sizes that are suited to all classes of work are shown in the new catalog of rim night latches issued by P. & F. Corbin.

This booklet is gotten up in fine style and contains much that will be of interest and value to the builder and architect.

The construction of these locks is of the highest grade as can be seen from the following description of the locking mechanism.

The Corbin ball-bearing pin-tumbler cylinder used on the outside of the door is the same cylinder that is used on the highest grade of Corbin locks. It has practically an unlimited number of changes of key, a key-way that will not admit a picking tool of any kind, ball bearings which permit the keys to pass in and out easily, and a master-keying system which is flexible, compact, and perfectly trustworthy under all conditions. In those types which do not employ the pin-tumbler cylinder, a secure locking mechanism is used.

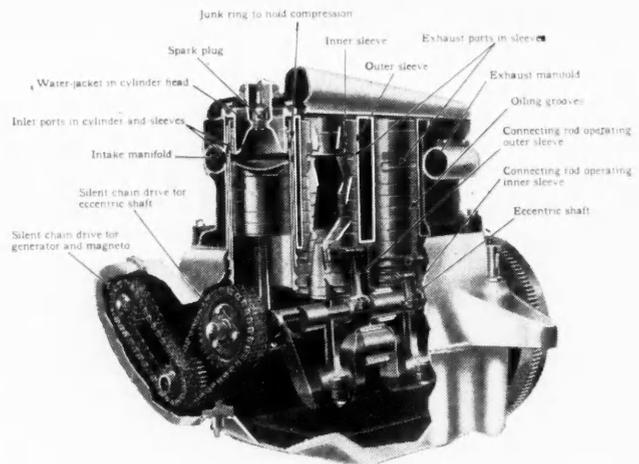
Copies of this booklet giving further information and showing the many styles and sizes of Corbin rim night latches can be secured by writing to P. & F. Corbin, New Britain, Conn.



### The "Knight" Sleeve Valve Gasoline Motor

Motor car owners and prospective car owners are showing a growing interest in the Knight type sleeve valve motor. This is due to the fact that this type of motor has recently been adapted for use in cars of moderate price.

To clearly understand the principle of the Knight motor it is necessary to understand something of automobile motors in general.

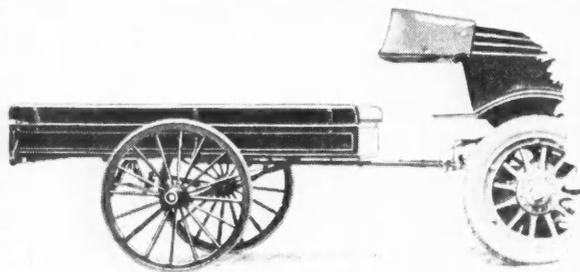


Willys-Knight Sleeve Valve Engine.

All automobile motors are of the type known as internal combustion motors. That is, the explosion, which furnishes the power, takes place inside the cylinder or chamber, in which the piston works.

In principle the operation of all types of internal combustion motors is the same. Gas is drawn into the cylinder. Here it is compressed and, after compression, exploded. After the explosion has taken place the exhausted or "dead" gas is forced out of the cylinder and fresh gas admitted. The intake of fresh gas to the explosion chamber, and the exhaust of "dead" gas from the explosion chamber, are governed by valves.

The sleeve valves, which distinguish the Knight motor from  
(Continued to page 126.)



You do not need an expensive truck when you have an automobile.

Let us tell you how much you can save by using the

## Page Auto Trailer

We use three-quarter platform springs and trailer is coupled to auto by a Universal Joint and Shock Absorber Combination that is positive and does not disfigure your car. No tugging or jolting of car with this attachment. Trailers built in three sizes, with or without Ball Bearings.

Send a postal now asking for full particulars and prices.

**PAGE BROS. BUGGY CO.**

(Established in 1869)

MARSHALL, MICHIGAN

## Financing the New Building

If you contemplate the erection of a new building, you will be interested in the Straus Plan of assisting in financing real estate improvements. A "service to borrowers" may sound unusual, yet for thirty-four years our dealings with builders have been in the form of a service which has created notable satisfaction.

### Large Building Operations

We underwrite First Mortgage Construction Bond issues, in amounts of \$100,000 and over, on the best class of office, hotel, mercantile and apartment buildings in the larger cities of the United States. In addition, we are also interested in bond issues on industrial plants and completed buildings.

Those planning building operations of this nature will do well to write for our folder, "Money for Building," which explains the Straus Plan.

**S. W. STRAUS & Co.**

ESTABLISHED 1882 — INCORPORATED

STRAUS BUILDING, CHICAGO

# Make Your Motor Car Pay for Itself

Instead of using it for pleasure alone make it pay for itself and its upkeep by doing light hauling and carrying your help to your different jobs.

## THE ROCHESTER TRAILERCAR "It Tracks and Backs"

Attached to any make of car, will carry your tools and materials.

The Rochester Trailercar is built like an automobile—it tracks perfectly and can be backed in any desired direction.



It is built exceptionally low, making it easy to load and unload, and can be drawn over the country road at a speed of 25 miles an hour safely and without skidding or jostling.

It will save time—save money and save bother and allow you to move your help and materials quickly.

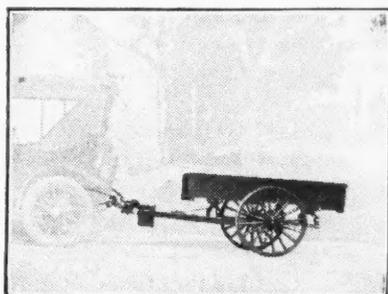
Contractors in all sections find the Trailercar a most useful and profitable addition to their equipment.

Let us mail you our illustrated folder showing details of construction and a variety of uses.

Mail your request today

**THE ROCHESTER TRAILER CO.**

122 Main St.  
East Rochester, N. Y.



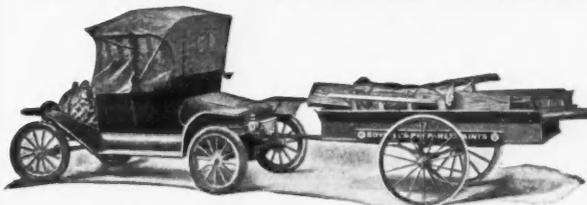
Make your automobile more of an asset by the addition of a

### LAROS Automobile Trailer

If you own one of these trailers you will not have to depend on the drayman or the farmer when you are in need of some material in a hurry. It is just the thing for hauling tools, saw rigs, cement mixers or other light loads.

**D. A. Laros & Sons Co., Grinnell, Iowa**

## THE TRAILER WAY MAKES CARS PAY



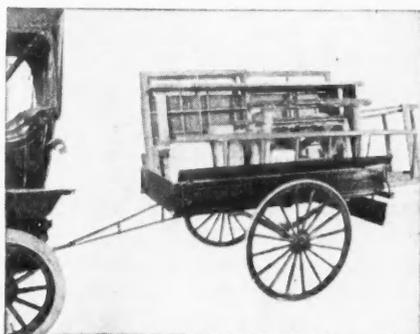
### A MODEL FOR EVERY NEED

Adjustable Draw Bar and a Coupling which takes care of every movement even to the most severe twist.

Catalog ready—ask for it.

**THE MILES MANUFACTURING CO.**  
309 Franklin St. Jackson, Mich.

### MANUFACTURERS OF Automobile Trailers and Horse Drawn Vehicles



Our Auto-Trailer has been in use for over two years and they have given good satisfaction. We also build Trailers to your order.

Mr. Contractor:  
If you do not find the Defiance Auto-Trailer with your dealer, write us for full particulars, prices and terms.

**THE DEFIANCE CARRIAGE COMPANY**  
Reed Brothers, Props.  
DEFIANCE, OHIO  
N. B.—  
Any Style Hitch you might need for your car.

## Kalamazoo Trailer

Built by Men Who Know



The hitch for connecting the trailer with the car allows a free up-and-down, sideways and twisting movement without cramping. Size of body, 7'x40'.

### One-Half Ton Capacity

Solve your cartage problem in the most inexpensive way by writing for full information on the Kalamazoo Trailer. Dept. T.

**Kalamazoo Carriage and Harness Co., Kalamazoo, Mich.**

other types of automobile motors, are round shells of cast iron, which slide up and down between the cylinder wall and the piston. There are two of these sleeves in each cylinder, one working within the other.

The explosion takes place inside these sleeves.

Fresh gas is admitted to the explosion chamber, and exhaust or "dead" gas is expelled thru ports or openings cut into the sleeves at opposite sides, near the top. As the sleeves slide up and down these ports come together and large openings are formed thru which gas has free and unobstructed passage into and out of the explosion chamber.

The sleeves are raised and lowered by connecting rods from an eccentric shaft. The eccentric shaft is operated from the crankshaft, the same as the camshaft in a poppet-valve motor.

The sleeves operate easily and smoothly. Their surfaces are always covered with a film of oil, and their travel is small, one-ninth of the piston travel—in most cases less than one inch.

In this motor such uncertain factors as cams and springs have been entirely eliminated. The connecting rods give a valve action that is absolutely positive, and that remains positive. The timing of the opening and closing of the valves cannot vary no matter what the speed, and no adjustments are ever required to correct valve-timing.

The openings of these sleeve valves are entirely protected from the heat, which causes carbon to "pit" or eat into the

metal. When the explosion takes place the valve openings are up behind a wide, expanding ring in the cylinder head, called the "junk ring." And as the hollow cylinder head carries cooling water down into the inner sleeve, the valve openings of this motor are between two water-cooled surfaces at the time of explosion.

The junk ring is similar to a piston ring, but much larger. It presses outward against the inner sleeve and seals compression at the top of the explosion chamber in the same manner that the piston rings seal compression at the bottom. Compression is not in any way dependent on the fit of the sleeves to each other.

Any carbon that lodges back of this junk ring presses it tighter against the inner sleeve. And any carbon that lodges on the sleeves builds up minute depressions in their sliding surfaces to a glass-like finish, making them run even more smoothly and quietly. In this way the Knight motor employs to advantage a factor that in motors of all other types is a disadvantage. Valve grinding is never necessary in a Knight motor, because carbon improves the operation of the valves.

The sleeve valves operate quietly, because their action is a smooth, sliding action—positive and regular. This quiet valve operation indicates the absence of wear.

The sleeve valves in the Knight motor permit an explosion chamber that is as nearly spherical as it is possible to get. This type of explosion chamber is the object of all motor designers, for it gives the most powerful motor. A spherical

explosion chamber gives a minimum of wall surface for volume of gas, consequently less heat energy is lost thru radiation, and less cooling water is required to maintain proper temperature. There are no side pockets to retain "dead" gas and weaken the force of the explosion, and the compressed gas is all confined directly above the center of the piston. This allows also placing the spark plug in the center of the cylinder head, insuring instantaneous and complete combustion of all gas.

The combustion chamber in the Knight type motor is formed by the inner sleeve, the removable cylinder head and the piston. Each of these is perfectly machined before assembling. No rough surfaces can possibly remain to form a lodging place for carbon. And this form of construction insures also explosion chambers of equal capacity in each cylinder, a prime requirement of a flexible motor.

Simplicity is an outstanding characteristic of the Knight motor. It has no intricate small parts to wear and get out of order. And the clean, simple design which characterizes this motor is evident in even its outward appearance. The valve mechanism is entirely within the motor itself, no working parts are exposed to gather dust and dirt.

In other respects, the Knight type motor has much in common with motors of other types. The manufacturer of a Knight motor can follow his own judgment as to the number of cylinders and their size. He has his own option also between battery and magneto ignition, between thermo-syphon and pump cooling, etc.

Why?

## AN ENGINE BOOK WITH A PUNCH

Would you build a house with a foundation like this?

Would an iron kettle hold water better if the bottom were cut off and patched on again like this?

**No! Then write for this new Book**

**BUILT BY EXPERTS**

FREE

A BOOK YOU NEED

JUST take a postal or scrap of paper and write the word "Why?" on it with your name and address and I will mail you this book.

Lively as a joke book. Sensible as the dictionary. Learn more about engines in 10 minutes than some men learn in a lifetime. The supply is limited so write quick.—ED. H. WITTE,

Read These New Prices

2 H-P, \$29.95

3 H-P, 47.85

4 H-P, 64.75

6 H-P, 89.90

8 H-P, 129.80

Write for prices on 12, 16, and 22 H-P.

WITTE ENGINE WORKS,

1778 Oakland Avenue, Kansas City, Mo.

1778 Empire Building,

Pittsburgh, Pa.

*Stearns*

No. 10



**Try This Scraper on Your Floors at Our Expense**

Here's a Scraper that scrapes clean and smooth, in the corners, close up to the walls, and scrapes without those wavy lines so often caused by "chatter". Our knife with double edge wears twice as long as any other Scraper knife. Our adjustable handle, rubber tires and the way the weight is thrown on the knife are all exclusive features of the Stearns No. 10.

We don't ask you to "beware of other Scrapers", but we do ask you to accept this machine on a fifteen day FREE TRIAL OFFER, so you may "compare it with other Scrapers," for by test the Stearns is best.

There are fifteen days in which you can test its easy running, smooth shaving and sturdy qualities at our expense.

Write us about it.

Sold by dealers, direct from the factory or on fifteen days' trial. Particulars will interest you.

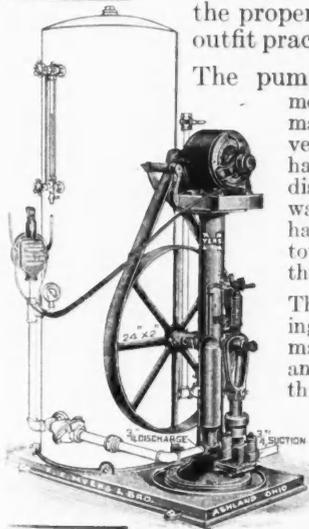
**E. C. STEARNS & CO.**

500 Oneida St.

Syracuse, N. Y., U. S. A.

**Myers Electric House Pumps  
Contribute to Home Comforts**

A Myers Electric Pump is very convenient for household service. The automatic switch controls the pump and motor, so that the tank always has the proper working pressure. The outfit practically takes care of itself.



The pump tank and motor are mounted complete on one base, making the entire equipment very easy to install. The pumps have an air compressor and the discharge carries both air and water to the tank. The air after having been compressed in the top of the tank drives the water through the distributing lines.

These outfits are ideal for pumping soft water. They are also made for shallow and deep wells and for open elevated tanks so that every requirement is covered

Write for our Hydro-Pneumatic Pump Catalog, and learn how easy it is to have water conveniences.



**F. E. MYERS & BRO.,** 360 Orange St.,  
ASHLAND, OHIO  
ASHLAND PUMP AND HAY TOOL WORKS

**Maintain Your  
Estimated Profit!**

Every time a contractor's engine "bucks," it means a delay on the job. Every delay eats a hole in the contractor's profit. **Insure yourself the fullest profits** by buying an engine that will "go and go right" under any condition of weather or work, on any kind of a job.

Think further! An engine that "stands the gaff"—an engine that you can **rely on**—actually **cuts construction costs**. With an engine that is right you can figure closer and bid closer—your profit will be there just the same.

*THE "New-Way"*

SERIES "F" ENGINE

*"GOES AND GOES RIGHT"*

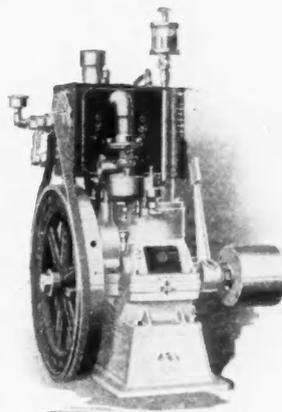
Here is one engine that meets the real requirements of the contractor—and here are six reasons why:

1. **Light weight.** Engines can be moved quickly and economically from one job to another. The 6 H.P. engine complete, ready to mount on any machine, weighs 325 pounds—other 6 H.P. engines weigh from 800 to 1,500 pounds.
2. **Efficient cooling system.** No water to freeze in winter time—no water to run dry in summer time—no water to carry any time.
3. **Thorough lubrication.** One oil cup supplies cylinder. All bearings and gears are oiled from the splash and run in bath of oil that insures perfect lubrication at all times. No dry or burned out bearings.
4. **High-class ignition system.** Series "F" Engines furnished only with gear-driven, high tension magnet. No batteries—no complicated wiring—no spark coil.
5. **High grade carburetion.** Engines are throttle governed and are fitted with float feed automobile carburetor, which insures perfect carburetion under all loads and conditions. Responds perfectly to sudden changes in load, giving close regulation for most exacting service.
6. **Simplicity and accessibility.** Valve cage construction and patented hinged crank case allow free and easy access to valve and all inside working parts.

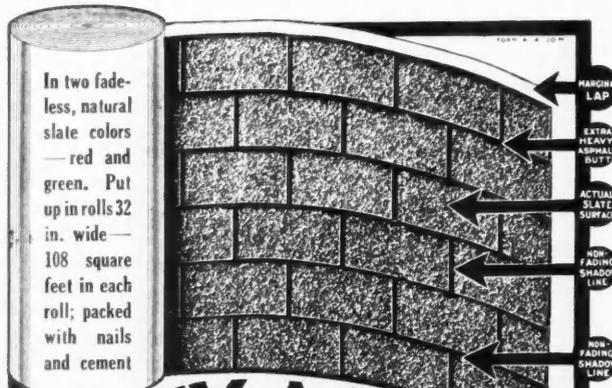
7. The strong and compact design, light weight and reliability of the "New-Way" Series "F" Engine fit it splendidly to meet the demands of the contractor (either as a separate power unit or as a part of his mixer, hoist, pump or other equipment).

Its compact design allows it to be mounted in the smallest space on any machine, and without sub-base its center of gravity is low, so that weight of the entire outfit is kept down.

Contractors, write for full particulars about all sizes of the "New-Way" Series "F"; ask for catalog 11.



**THE "New-Way" MOTOR COMPANY**  
**LANSING, MICHIGAN, U.S.A.**  
12 PINE STREET



## FLEX-A-TILE ROLL SHINGLE

(PATENTED)

WE had in mind, when we designed this new Flex-A-Tile Roll Shingle, the growing demand for asphalt shingle roofs that would cost little to lay. How nicely we have accomplished this economy is surprising—this full size, 32-inch wide roll of asphalt shingles takes no more labor to apply than ordinary roll roofing.

It is a splendid shingle roofing, too—satisfying perfectly the requirements of those who heretofore would never roof with commonplace roll roofings.

Of course, the illustration above cannot begin to give a realistic idea of the true beauty of the shingles—nor can it show the distinctive way each single shingle stands out without the aid of paint or any imitation process to produce the genuine appearance of individual asphalt shingles. But, let us send direct to you a sample of this Flex-A-Tile Roll Shingle. Hold it in your hand. Feel its weight. Test it any way you will.

### Just Write Today

Say that you are interested in the new Flex-A-Tile Roll Roofing and mention what your business is. We will forward liberal samples, prices and any other information you may wish.

### Become an Agent

A number of excellent agency appointments for this new Flex-A-Tile Roll Shingle are still available.

## THE HEPPE'S COMPANY

Dept. F, 1010 Kilbourne Ave., Chicago, Ill.

*Flex-A-Tile Diamond Point Slabs*  
*Utility Board*                      *No-Tar Asphalt Paint*  
*Other Guaranteed Heppes Products*

### Larger Quarters for Elliott

Due to their rapidly increasing business, it has become necessary for the Elliott Woodworker Company to find larger and more central quarters. They are now situated at their new plant, corner Brush and Congress streets, Detroit, Mich.

This down-town location will be more convenient for customers and the trade generally. They would be glad to have anyone interested call and see a demonstration of the Elliott woodworker, which is commonly called "The Builders' Friend" by the numerous contractors who are using them.

Extra tools and accessories for these machines are kept in stock.



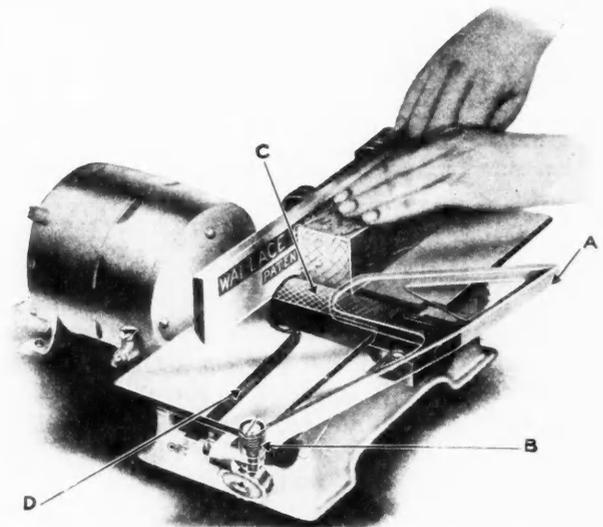
### A Perfect Planer Guard

The growing demand for safety devices on woodworking machinery emphasizes the necessity for thoughtful attention to this detail by the machinery manufacturers.

The Wallace bench planer is equipped as shown in the illustration, its makers anticipating the demand which will be made in the near future, that manufacturers "build in" their safety devices before the machines leave the factory.

The flap and shutter guard as applied to the Wallace bench planer is an example of what refinement of design can do in the way of real safety without hampering the operator.

In the phantom view shown, "A" is the flap, an aluminum casting swinging over the tables, and held against the stock by the flap spring "B" so that the unused part of the knife



The Flap and Shutter Guard on the Wallace Bench Planer.

is covered. When special work, such as rabbetting is done, the flap can be swung off the machine out of the way.

The shutter "C" is a part of a steel tube which slides in grooves in the frame concentric with and surrounding the cutter head, entirely covering the throat opening. The lip of the shutter rests on top of the front table, being held by the shutter spring "D" until it is pushed by the stock around under the rear table.

When the cut is finished the shutter is snapped back over the throat opening. In case of a "kickback" the stock actually draws back the shutter with it, this action automatically eliminating the possibility of nearly every planer accident.

This "foolproof" device is made exclusively for the Wallace bench planer by J. D. Wallace, 525 W. Van Buren Street, Chicago. Employers of labor and users of woodworking machines who are interested in securing perfect safety without reduction of output, can get full particulars of this device by writing to the above address.



# BAYONNE

Cuts Roofing Costs

Rising metal prices make the cost of copper roofing altogether excessive. It is not alone excessive—but entirely unnecessary.

## BAYONNE

assures you of all the advantages of a copper covering and eliminates its disadvantages—contraction and expansion. This natural shortcoming of all metals causes buckling and cracking—followed by heavy repair expenses.

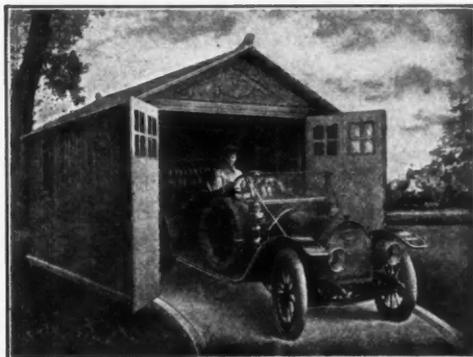
BAYONNE is far more economical to lay because it requires less labor and time. **And once laid, it stays flat**—does not shrink and expand, or buckle and warp. Nor does it blister, crumble and corrode like tar and other prepared coverings do.

But aside from all these qualities—the one fact that it is absolutely waterproof, that it never can leak, makes it the ideal covering for roofs of porches, verandas, decks or conservatories.

Write for Sample Book "N" giving prices and laying instructions. See Sweet's, Page 426

**JOHN BOYLE & CO., Inc.**  
112-114 Duane St.--70-72 Reade St., New York  
Branch House 202-204 Market St., St. Louis

## Mr. Carpenter You Can Make a Lot More Money



An Agency for the METAL SHELTER CO., Inc., will bring you more business, more profits, more customers, better and quicker results all along the line, and it will be

### A REAL BUSINESS OF YOUR OWN

Don't wait until someone else gets the agency for our garages, cottages, bungalows, stores, etc., etc.

It is easy to sell them and easy to set them up—a building a day. An investigation will cost you nothing. Write NOW for our descriptive circulars and proposition.

## Metal Shelter Co., Inc.

Whitehall Bldg. New York City

## Famous for Shingle Beauty and Economy

For best appearance and wear of roof or shingled side walls do not decide on "just shingles"—buy

## "CREO=DIPT" STAINED SHINGLES

17 Grades  
16, 18, 24-inch  
30 Colors



Come Bundled  
Ready-to-lay

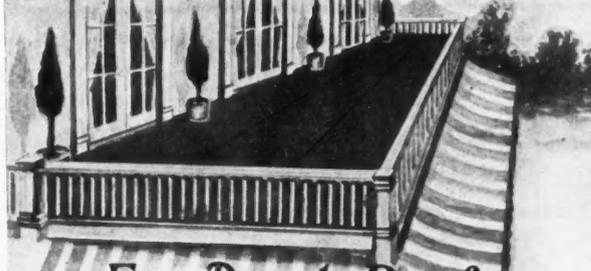
Cut from selected live cedar; preserved against fading, dry rot, worms and weather. Permanently stained in thirty different colors. Save muss and fuss of staining on the job. Easiest to lay—no wedge shapes—no waste—all shingles perfect.

Write for Book of Homes and Samples of Colors on Wood

Get your lumber dealer to carry three or four standard colors in stock.

**STANDARD STAINED SHINGLE CO.**  
1028 Oliver St. No. Tonawanda, N. Y.  
Factory in Chicago for the West

## Durable, Practical, Economical



## For Porch Roofs

There is no better Covering than

## CON-SER-TEX CANVAS ROOFING

CON-SER-TEX is the most economical material to lay on porch roofs, floors, and sleeping balconies. It is the ideal covering for all flat surfaces or wherever the pitch is less than four inches to the foot.

It is easy to lay—clings to the surface, makes a neat, clean, smooth, durable covering. When properly laid it will last as long as the house itself.

CON-SER-TEX is a scientifically treated cotton fabric that will not

**ROT, SHRINK, STRETCH, CURL OR PEEL**

Send for our new illustrated booklet, "Roofing Facts and Figures."

**WILLIAM L. BARRELL & CO., 8 Thomas St., New York City**

Chicago Distributor  
**GEORGE B. CARPENTER & CO., Wells & Michigan Sts.**  
California Distributors } **WATERHOUSE & PRICE, Los Angeles**  
Distributors } **PACIFIC BUILDING MATERIAL CO., San Francisco**

### New Fire Door Hardware Catalog

Information which will be of value to anyone interested in fire door hardware may be found in the very complete catalog just brought out by the Richards-Wilcox Mfg. Co.

The numerous illustrations are arranged so that each type of fire door is shown assembled, followed by illustrated list of parts with accompanying price list. Also various accessories, including angle iron door frames and sills, fusible links for fire doors, locks for sliding doors, drills for brick and stone, expansion bolts with instructions for their use, overhead track with brackets and roller-bearing carriers are included.

An especially interesting feature to the contractor or builder is the set of drawings showing in detail the application of fire door fixtures and those showing special cord arrangements to comply with underwriters requirements in regard to the placing of fusible links.

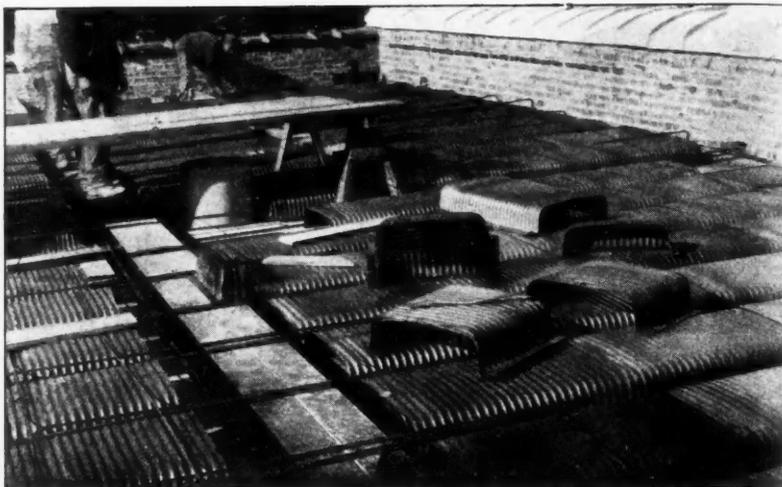
A copy of this useful catalog may be obtained from the Richards-Wilcox Mfg. Co., Aurora, Ill., by asking for their catalog No. 14.



### Pressed Steel Cores for Concrete Floor Construction

Berger's Pressed Steel Cores or Tile, for concrete floor construction, are coming into general use, and are now used extensively thruout the country.

They are designed to give the greatest strength and displacement for the least amount of weight and cost, at the same time making a great saving in concrete, reinforcing steel, centering and labor—also greatly reducing the dead floor load.



Method Used in Placing Pressed Steel Cores in Concrete Floor Construction.

The cores in lighter gauges are for "left in" construction, while the heavier gauges can be removed and used over again indefinitely. Cores with 20-inch base for joists 24 inches on center. Cores with 25-inch base for concrete joists 30 inches on center.

The cores can be shipped to any part of the United States at an exceptionally low freight rate because one car of cores will cover an area equal to twenty cars of clay tile.

The Berger Mfg. Co., Canton, Ohio, manufacturers of these cores or tile, will co-operate with architects, engineers and contractors, furnishing them with complete designing data which will enable them to economically lay out concrete floor construction by the use of Pressed Steel Cores.

## SLATE WE HAVE WHAT YOU WANT

*In Roofing Slate, Slate Blackboards  
Structural and Plumbers' Slate*

SATISFACTION GUARANTEED in QUALITY and PRICE

*Ask for Delivered Prices*

**J. K. HOWER** Station C Danielsville, Pa.

R. J. KICHLINE, Sales Agent



### Best Roof Under the Sun

Montross Metal Shingles for House or Barn or buildings that require durable, economical roofs. Easily applied. Fire, lightning and storm proof. Nine different designs. Write for illustrated catalog and testimonials from satisfied customers who have used Montross Roofing for a "Quarter Century." Liberal commission to good, live agents.

Montross Metal Roofing Co., 110 Erie St., Camden, N. J.

## ROOFING SLATE SINCE 1869

Miners, Makers and Shippers of all Styles and Colors of Roofing Slate. Write for Prices.

**RISING & NELSON SLATE CO.**

Main Office: West Pawlet, Vt.

Branch Offices:

1058 Marbridge Bldg., New York City. 4 Post Office Sq., Boston, Mass.  
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# ROOF SLATES

## STRUCTURAL SLATE BLACKBOARDS

**E. J. JOHNSON**

38 Park Row New York

**Quarry Operator**

BLACK, GREEN, PURPLE, RED

Booklet, Samples and Prices on Application

## SAN-TI-LITE

*Easy to Lay*

THE all mineral Composition floor material that is the standard from coast to coast. Sold only to builders and contractors under positive guarantee. The best all purpose sanitary floor in the world. Attractive profits. Write us today for samples.

THE SANTILITE CORPORATION  
166 PLUM STREET SYRACUSE, N. Y.

## SAN-TI-LITE

*Easy to Lay*

**Genuine Franklin Tunnel Roofing Slate**  
*For Real Roof Protection*

How can artificial roofing protect your building from the elements of the weather, if the roofing itself must be protected and stored a way in a dry place to preserve it before being placed on the roof?

**G. F. T. Slate**

is carried in stock on our slate bank without covering of any kind, always exposed to the weather. The only ROOFING that need not be stored in a dry place to prevent it from rusting, decaying, or disintegrating. Sample and catalogue on request.

**SLATINGTON SLATE CO.**  
 SLATINGTON, PA.

**BUILD FOR PERMANENCE**  
 and beauty, of concrete or stucco, finished with

**Bay State Brick & Cement Coating**

This will give absolutely weatherproof walls. Makes possible many rich, artistic effects in white or tints. Preserves texture of concrete and stucco. Tested by architects and builders for 16 years.

Write for a sample can—saying which tint you prefer, and ask for booklet 30.

**Wadsworth, Howland & Co., Inc.**  
*Paint and Varnish Makers*  
**Boston, Mass.**  
 NEW YORK OFFICE: Architects' Building



**Get Samples of this Composite Metal Lath**

A wire mesh, covered with brick-clay, under heavy pressure and baked presenting a surface of TERRA COTTA upon which to plaster.

Very flexible and easily handled. THE ONLY LATH WITH SUCTION assuring a positive and permanent bond and eliminating DROP.

Superior for STUCCO and all outside work as danger from rust is overcome.

Low original cost and positive saving in labor and material.

*Write for Samples and Full Information to*

**COMPOSITE METAL LATH CO.,** 128 Broadway, NEW YORK, N. Y.



**THE ROCK OF AGES CLEFT FOR YOU**

**RED SHELDON'S SLATE** GRANITE  
PURPLE **BLACK**

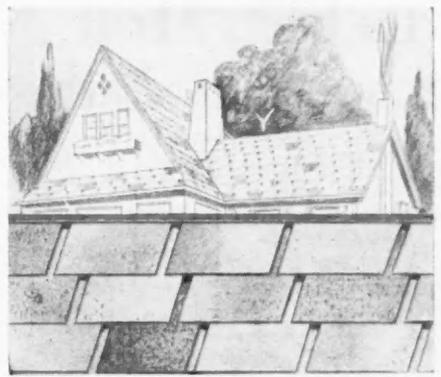
**THE ROOF FOR AGES ALWAYS NEW**

**ECONOMICAL — ARTISTIC — FIREPROOF**  
 Outlast the building. First cost, only cost. The only roof you can afford to consider for a permanent investment. Artificial substitutes bring endless expense for upkeep. Post a postal and get posted.

**F. C. SHELDON SLATE CO., Granville, N. Y.**

**Mottled Roofs are in Fashion Now**

**Hudson Mottled Asphalt Shingles**



Surfaced with Red and Green Crushed Slate in varying proportions produce the variety of surface texture so much sought for.

*Send For Free Samples*

**ASPHALTON** **Asphalt Ready Roofing Co.**  
 Dept. 53 9 Church St., New York, N. Y.

**UNFADING ROOFING SLATE**  
 and Slate Blackboards

*Best to be had and made in Slatington — Buy from us*

**Slatington-Bangor Slate Syndicate, Inc.**  
 Slatington, Penna.



**Asphalt Ready Roofing Co., Dept. 53, 9 Church St., New York, N. Y.**

Send sample of Hudson Mottled Shingles and Book Shingling and Roofing, with no expense to me.

Name.....

Address.....

**Valuable Information on Arkansas Soft Pine**

If you are an architect or if you are a contractor who is interested in the design of buildings, you will find in the "Architects' Manual on Arkansas Soft Pine," published by the Arkansas Soft Pine Bureau, a considerable amount of well arranged information which will be of use to you.

The first portion of this manual is devoted to a discussion of the qualities claimed for Arkansas soft pine, including a very complete description of the wood as to its origin, individuality, physical characteristics, proper uses, proper finishing and painting formulas. A considerable portion of this section of the booklet is composed of excerpts from various Forest Service Bulletins. Photographic illustrations show the typical figure in Arkansas soft pine interior trim.

The economy of using standard mouldings is evident, provided a sufficient selection may be offered to meet the demands of the varying tastes of your trade. In the central portion of the Manual is a very complete assortment of standard moulding designs shown in profile with the list price associated with each design.

The grading rules included in the book are those of the Southern Pine Association, these rules being exactly those upon which the Arkansas Soft Pine is graded, only those which apply to this particular wood being included.

On the last few pages of the book are shown the standard sizes of flooring and partition, ceiling, siding, roofing and Byrkit lath.

The Manual and also samples of the finished wood will be furnished our readers by the Arkansas Soft Pine Bureau, Dept. D, Little Rock, Arkansas.

**Ransome Business Grows**

A great impetus has been given the Ransome Concrete Machinery Company in its sale of mixer machinery by Frank L. Brown, the new manager and president. This company is now doing a larger business than ever, and as an evidence of enterprise, it has recently acquired a show room in the loop district of Chicago, at which will be exhibited the standard types of the various items they manufacture and offer for sale. This exhibition should be of great interest to all contractors and road builders thruout the Middle West.



**The "Brackett," Hollow-Chisel, Electric Mortiser**

Built to satisfy the demand for a general purpose mortiser at a big saving in price, this machine is giving satisfaction wherever tried out. Some very interesting tests, in competition with other mortisers of both the "chain" and "hollow-chisel" type, have been recently made, the Brackett machine being victorious in every trial. These tests have proved to some skeptics that it is not necessary for a good mortising machine to weigh "a ton" nor require a 10-horse engine to run it. The "Brackett" machine has fully demonstrated its capacity for rapid and clean work in every instance. In point of power consumption, the "Brackett" machine is said to have used an average of one-tenth of the power used by other machines for the same operation. In every point contested the "Brackett" machine has demonstrated that it is a practical machine, yet it is selling at a price of from one-fifth to one-half.

(Continued to page 134.)

Cellular Lath Company.

I used your Keezon Cellular Lath on the new Institutional Building of the Kingshighway Presbyterian Church, and have found it so satisfactory that I take great pleasure in commending it to others.

GEORGE F. BERGFELD,  
President Bergfeld Realty Company.

St. Louis, Mo.



**Get the Facts About Keezon Cellular Lath**

Write us now for full particulars regarding the lath that is revolutionizing the lath industry. The lath that saves 30% in time, labor and material. The lath that assures a job unequalled from a quality standpoint.



Keezon Lath is fire-resisting and can be specified in slow-burning construction. Keezon Lath can't rust. It is unequalled for stucco work. It can be applied to flat surfaces without furring. It can't warp, buckle, expand or contract.

Keezon cellular construction forms a key to which plaster clings with greater tenacity than it will to any other known form of construction. In a test made to demonstrate the holding strength of the Keezon Key, water to the depth of two inches was poured on top of a Keezon ceiling and allowed to remain for twenty-four hours. At the end of that time most of the water had soaked through the plaster without causing the slightest loosening or sagging.

In a word, Keezon is in the unique position of combining many advantages of every other lath (wood, composition or metal) and yet in addition of being very reasonable in price.

Get full particulars.

**Cellular Lath Company**

603 La Salle Bldg.  
St. Louis, Mo.  
Factory: 5126 N. 2nd St.

**USE THE COUPON**

Cellular Lath Company,  
603 La Salle Bldg.,  
St. Louis, Mo.  
Please send full particulars.

My dealer is .....

Name .....

City ..... State .....



(See how this 10 ft. panel stands straight without bending! Send for actual photo.)

## Exactly Like Lumber

And always retains its original color because it is genuine treated wood fibre. Hard, stiff, strong, solid. Rap it with your knuckles. Whittle it. Saw it. Costs less—and saves you \$4 to \$6 per M sq. ft. by coming already sized. Won't warp, wave or buckle. Our users say

### WATERPROOF PLASTERGON WALL-BOARD

"has no equal at any price"

#### Your Safeguard in Purchasing (No. 1)

"We have used and tried out several makes of wall board and find Waterproof Plastergon the best of all."

J. M. Hoagland & Co.,  
Sharon, Pa.

Samples and our "Contractors' Practical Working Guide" sent free. Send the name of your lumber or builders' supply dealer. Write today.

#### Plastergon Wall Board Co.

1 Philadelphia Ave. Buffalo, N. Y.



The little one had been listening when father was explaining to mother how Linofelt was made—and how it kept the house warm.

It is a blanket, made of rough, woolly flax fibre, sewed between strips of heavy Kraft paper—spread between studding of side walls and under floors—goes on before lath and plaster.

## LINOFELT

"Between You and the Weather"

(Copyright 1914 Union Fibre Co., Winona, Minn.)

Is a perfect insulation, keeps house warm in winter and cool in summer—just 38 times more effective than paper. Saves 30% on fuel bills.

Architects, contractors and builders now specify Linofelt—it makes friends and holds clients.

We want to send our Linofelt book to all who don't know about this splendid material. Write us today.

#### Union Fibre Co.

118 Union St., Winona, Minn.



Your Reputation Demands

## UPSON PROCESSED BOARD

---the Most Dependable Wall Board

Made in America

Contains no dirty, black materials or cheap, punky "jack pine" fibers.

Write for Samples and Information

THE UPSON CO. Fiber Board Authorities 16 Upson Point, Lockport, N. Y.

LOOK FOR THE FAMOUS BLUE CENTER

## CAREY Ceil-Board

SUPERSEDES PLASTER FOR WALLS AND CEILINGS

comes in panels ready for the job. No muss or dirt. Easily applied. Hammer and nails are the only tools necessary. Flain or hardwood finishes, can be papered or painted. Samples and booklets on request.

### The Philip Carey Company

1021 Wayne Avenue, Lockland  
Cincinnati, Ohio

Offices and Warehouses in Principal Cities



You can't expect Beaver Board results unless this trade mark is on the back of the board you buy



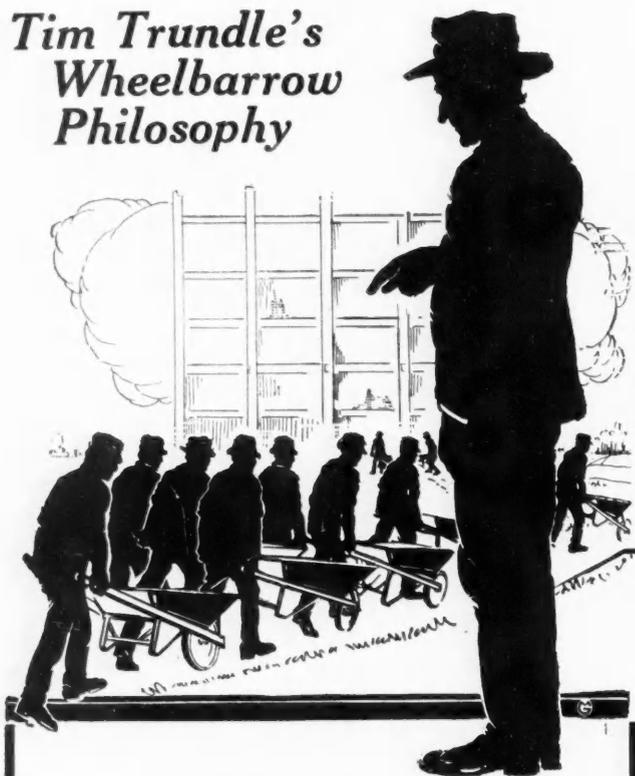
For satisfactory walls and ceilings—in new work or remodeling—large jobs or small.

Write for samples and literature

#### The Beaver Board Companies

565 Beaver Road,  
Buffalo - N. Y.

## Tim Trundle's Wheelbarrow Philosophy



"Men who buy Barrows mostly fergit that a wheelbarrow is more than somethin' for a man to *push*.

"They miss the hull point of the thing, which is that a barrow is not only a tool to work with but is the only thing there is by which the man's work is MEASURED.

"One man delivers ten barrow loads an hour and the fellow next to him only eight, from the same pile over the same wheelin' boards, to the same place. The 8-load man is worth only four-fifths as much as the 10-load man.

"And by the same token, a Sterling Barrow will make it easy for a man to do his ten-an-hour stint, while the same man, totin' the same stuff the same distance with common barrows would sweat his shirt and tire his muscles, to deliver eight barrow-loads.

"See what I mean by a barrow bein' a measure of a man's day's work, as well as a tool to work with? A certain number of tons or yards or thousands has to be carried a certain distance on every contract—the measure of all that stuff is the wheelbarrow-load.

"By bein' so much better balanced, and by runnin' so easy on its *self-lubricated fiber bushings*, the Sterling Barrow invites every man to carry *bigger loads*, carry 'em *faster* and carry *more of 'em* than he'd do with ordinary Barrows.

"This isn't jest theory; it's boiled-down experience from studyin' a thousand jobs.

"Isn't it good sense, then, to invest jest a little more in the cost of Barrows, if they will give you so many more *ten-miles* on every job?

"Why, man, the increased work done the first week will, like-as-not, pay twice the difference in cost between a *Sterling* and a bum barrow. And after that, the bigger workin'-ability of the Sterling is all 'velvet' on a dozen or a hundred other jobs.

"Next time you buy Barrows DON'T think of them as only two sticks, two legs, a tray and a wheel."

—Tim Trundle.

Send for Catalog No. 19

### Sterling Wheelbarrow Co.

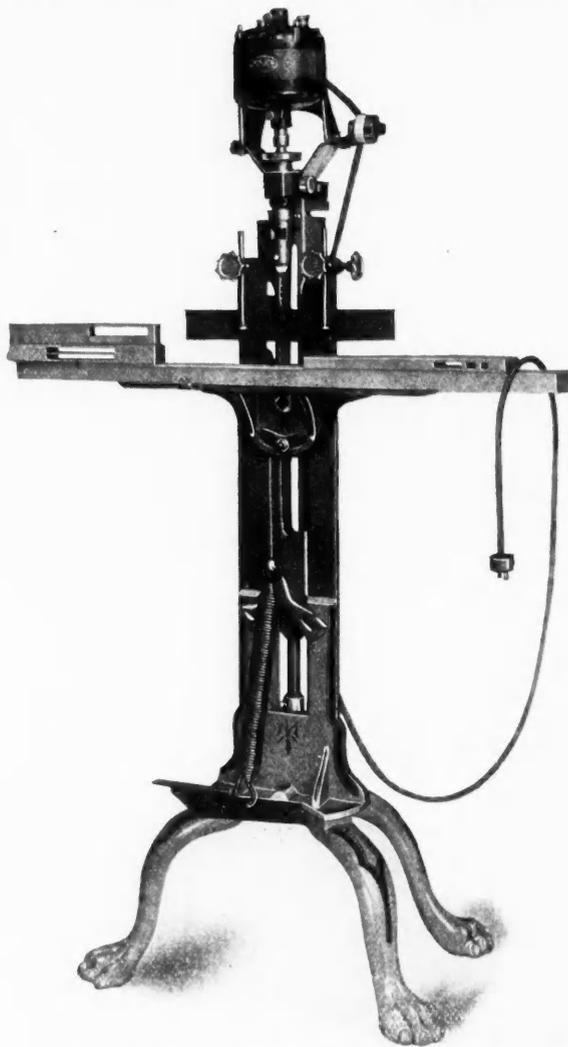
5207 Shenners Ave.

West Allis, Wisconsin

Makers of Patented Ribbed Channel Steel Foundry Flasks, Snap Flasks, Skim Gates, Wedges, Foundry and Contractors' Wheelbarrows and Carts, General Wheelbarrows, Trucks, Carts, etc.

Altho the machine has but recently been placed on the market, it has been thoroly worked out over a period of more than two years, during which time a machine has been in daily use, working in all kinds of wood and experimenting in cutting green or wet lumber. After the most severe use the same bit and chisel are still giving good service today.

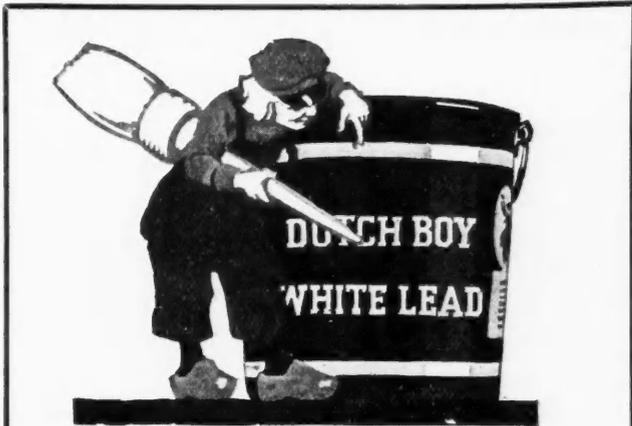
The "Brackett" machine has entirely overcome the most objectionable feature of hollow-chisel machines—namely, "split" chisels. The bit will cut yellow-pine, cypress, fir, spruce or other pithy wood and do it quickly and cleanly without injury to bit or chisel. The special construction of the bit and the high speed at which it turns are the secrets of the success of the machine—the "chips" are cut as fine as saw-dust and are rapidly elevated thru the chisel and discharged thru two large openings, instantly relieving the bit from excess friction and eliminating the strain on the chisel. There is practically no chance to "choke" the chisel with chips.



A Hollow Chisel Mortiser in Which the Chisels Will Not "Split."

This machine is being placed on the market by Warren W. Morse of Hopkins, Minn., and he will be glad to take up the matter with you. He has an interesting proposition in the way of introducing the machine in territory where he has not placed any of them yet and those who are in need of a mortiser will do well to correspond with Mr. Morse.

The machine is sold strictly on its merits, if not as represented it may be returned, and money will be refunded or you can make arrangements to test out this machine in your own shop before you pay for it.



NEW and distinctive markings have been adopted for the sides of all packages of Dutch Boy white lead. Instant identification of this reliable paint material is now easy.

Each black steel keg has the familiar figure of the Dutch Boy Painter and our guaranty on the side in brilliant orange. In addition, the words DUTCH BOY WHITE LEAD, in large legible type, appear between two bright orange stripes as shown in the illustration.

**NATIONAL LEAD CO.**

New York Boston Buffalo Chicago  
Cincinnati Cleveland St. Louis San Francisco  
Philadelphia (John T. Lewis & Bros. Co.)  
Pittsburgh (National Lead & Oil Co.)

**and nothing else**

This Nothing Else is the point  
Guards your customers—  
Insures their satisfaction

Paint  
**DEVVOE**  
Paint  
—The paint that requires  
fewer gallons and wears longer

**DEVVOE**  
Founded 1754

F.W. Devvoe & C.T. Reynolds Co. Devoe & Reynolds Co.  
New York Chicago  
The oldest manufacturing concern in the United States. Continuously  
in business for 162 years.

**Paint Guarantee**  
The paint in this package is full measure, and is composed of:  
50% Pure White Lead  
50% Pure White Zinc  
Oxide of Zinc  
With the proper amounts of  
Pure Linseed Oil  
Pure Turpentine, Drier  
and nothing else  
**DEVVOE**  
FOUNDED 1754

**Varnish Guarantee**  
Absolute Uniformity  
Assured by Our  
Guarantee  
This Varnish has been properly  
aged, and is composed of:  
Fossil Gum 9.0%  
Pure Linseed Oil 45.5%  
and Drier 45.5%  
Pure Turpentine 100.0%  
and nothing else  
**DEVVOE**  
FOUNDED 1754

**VENUS**  
10¢ PENCIL

REMARKABLE for its even smoothness, unvarying high standard, and perfect adaptability for every known purpose.

17 degrees ranging from 6B softest to 9H hardest and two copying. Distinctive Venus water mark finish. You need Venus pencils. See your dealer.

For better and easier work it is worth while to insist on Venus pencils. For either the heaviest boldest of lines, or the faintest and most delicate of detail they are invaluable.

**FREE** To any builder writing on business letterhead, we shall be pleased to send a test sample of Venus Drawing and Copying pencils and Venus eraser FREE. Mail us your name and address today.

**American Lead Pencil Co.**  
212 Fifth Avenue, New York  
and Clapton, London, England

**At Last! A Practical Home-Study Course for**  
**CARPENTERS**

**FOREMEN—SUPERINTENDENTS—CONTRACTORS**  
and all other men in the Building Lines  
**Plan Reading, Estimating,**  
**Architectural Drawing, Contracting, etc.**

This is a course for practical men. We send you actual blue print plans of buildings now being built or recently completed. Practical training, not book knowledge, is what you want—it's what we give. When you think of the opportunities this training offers, you will take time—right now—to mail the coupon for full information.

**To Succeed** in any branch of the building business you must have a complete knowledge of plans and specifications. You must be able to estimate closely the cost of material and labor. Guessing won't do—you must know. This knowledge is what makes successful foremen, superintendents and general contractors. This knowledge means money—thousands of dollars—to any builder—to you!

Your spare time is enough. You can master these subjects in your own home by this new, easy, quick method.

This elegant set of Drawing Instruments and Complete Outfit furnished FREE to our Students.

**Special Trial Offer!**  
For only \$2 we will send you the complete set of working blue print plans for a large residence just completed in Evanston, Ill. Also the complete specifications for this job. We will also include questions concerning the plans and a complete itemized estimate showing how to figure the cost of the building down to the last penny. This is information worth many times its cost to you. Supply of plans on this offer is limited and will not last long. Send for your set today.

For FREE Information, Mark and Mail this Coupon.

Builders' Course  
 Plan Reading  
 Estimating

Architectural Drafting  
 General Contracting  
 Building Superintendence

Name .....

Address .....

Town ..... State .....

College or Home-Study Course .....

**Chicago Technical College**  
1017 Lake View Building, Chicago, Ill.

### New Hand Book on Concrete Roads

A new hand book on concrete roads, just off the press, is called the Kahn Road Book. Its 128 pages are principally devoted to useful information and illustrations on permanent concrete road construction. The large number of photographs of completed roads and those during construction adds interest to the reading pages.

The first part of the book contains a general historical review of concrete pavements with detailed information regarding particular sections such as Wayne County, Michigan, and surrounding suburbs. The reports of Road Commissioners are quoted on the satisfaction of the roads and on questions of maintenance. Tables are shown giving cost data as well as summary of yardage and mileage throught the country.

The reinforcing of concrete pavements is freely discussed and information on Kahn road mesh is included. The necessity and advantage of expansion joints with the necessity of protecting the edges occupy another section of the book, including in it practical information in regard to Kahn armor plates and installing device.

Complete specifications with interesting illustrations on concrete highways occupy the next section of the book. The one course concrete highway, the one course concrete street pavement and the two course concrete street pavement are covered by these specifications. Diagrams covering templates, bridges, etc., are included.

Of interest in connection with pavement construction are concrete curbs and methods of protecting the edges and the installation of these curb bars, also the concrete culverts, bridge floors, etc. This information, together with tables giving quantities of materials for concrete and mortar, are included in the general Kahn Road Book.

The Kahn Road Book is issued primarily for engineers

and contractors, county engineers, road commissioners, etc. To such persons the Kahn Road Book is sent on request by addressing the Trussed Concrete Steel Company, Youngstown, Ohio.



### "Trouble Saver" Scaffolds

Of late years the contractor has found it necessary to watch very carefully the amount of money spent in carrying on his business. One of the items which has, conscientiously or otherwise, been given insufficient attention is the expense and



Showing Neat Appearance of Folding Steel Scaffold Brackets.

inconvenience of building wooden scaffolding. Furthermore, since the advent of the idea of the liability of employers, more attention must be paid to the safety of workmen. With these ideas in view the Steel Scaffolding Company have

(Continued to page 138.)

## Our Free Plans Will Help You—

**Meadows**  
TRADE MARK REGISTERED

Don't figure on any crib or granary without consulting our Free Plans. They will show you how to get greatest capacity at least expense by installing Meadows Inside Stationary Cup Elevators.

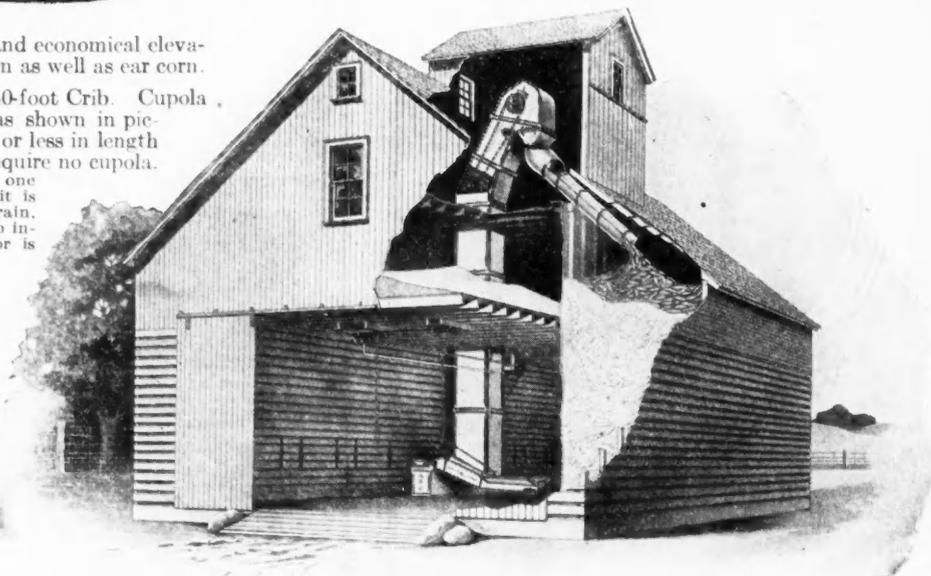
The most convenient and economical elevators, carrying small grain as well as ear corn.

The picture shows a 40-foot Crib. Cupola need not be as large as shown in picture; and cribs 36 feet or less in length with half-pitch roofs require no cupola.

Elevator is confined to one side of driveway. No pit is necessary for dumping grain. Just a hole 16 inches deep into which boot of elevator is set. The wagon jack is entirely overhead, fastened to the joists.

But write in today for our free Crib and Granary plans, catalogs and large posters telling all about our outfits and their application. Valuable information for the builder, and writing for it obligates you in no way.

**Meadows  
Mfg. Co.**  
Pontiac, Illinois



## FUTURE ORDERS

and your reputation as a builder of barns depend upon the barns you build today.

## Sanitary Barn Equipment

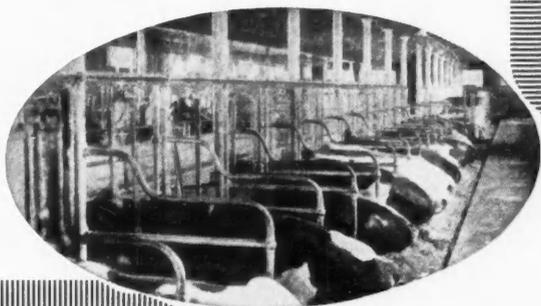
meets the approval of every owner, and a satisfied customer is always the best argument in soliciting his neighbors' business.

Every barn builder will find many helpful suggestions in our book "Modern Barn Equipment" which shows our complete, up-to-the-minute stable equipment, for every stable, large or small.

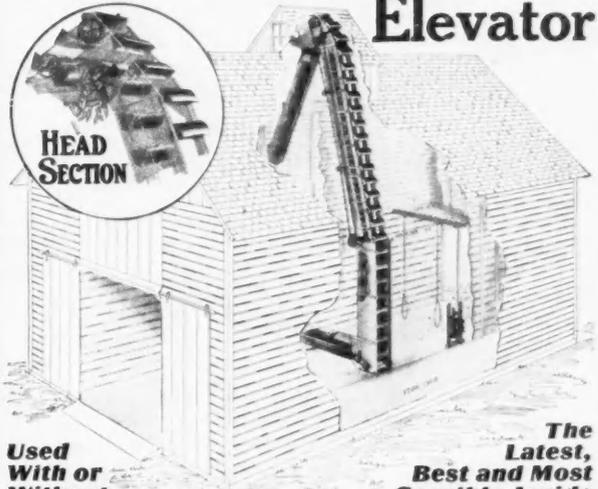
We'll send it for the asking.

**Glor Bros. & Willis Mfg. Co.**

E. Main St., Attica, N. Y.



## Get FREE Plans of this Modern Crib with the Famous National Giant Inside Elevator



**Used With or Without Cupola**

**The Latest, Best and Most Sensible Inside Machine Ever Invented**

Carpenter-Contractors drop us a postal, please, and we'll be glad to tell you how to make big extra profits by recommending and installing our **National Giant Bucket Elevators** in your crib jobs.

The "National Giant" has more desirable features for you to base your recommendation upon and more sensible features for the FARMER than can be found on any other make of inside grain elevator. Why? Because on cribs 28x38 ft. or less, with half pitch roof, it is not necessary to have a cupola. Saves the farmer money. When cupola is necessary, we can save the farmer from \$15 to \$30 with the National Giant. Ask us why, please. We also save the farmer the cost of digging a pit, and on the length of elevator required. The "National Giant" leaves the corn on the cob, where it belongs; more money in the farmer's pocket.

### Get Full Details of Proposition to Carpenter-Contractors

Ours is a good proposition for you and the farmer. It will pay you to look into it. It will bring in more business, greater profits for you. One satisfied customer will bring you many more crib jobs. Write us today—we will give you full details and assist you in any way with plans, specifications, etc. Write now for full details.

**Portable Elevator Mfg. Co., 854 East Grove St. BLOOMINGTON, ILL.**

## Don't Order Wall Ties—Order Whalebone Wall Ties

The Quality Tie with the Bull Dog Grip



If your dealer cannot supply "WHALEBONE," wire at our expense the following:

(Name of dealer) can't supply Whalebone. Express Freight (number) boxes. (Your name.)

We will ship same day from our factory or from the nearest dealer handling. Samples mailed upon request.

**Allegheny Steel Band Co.**

886-888 Progress St.

N. S. Pittsburgh, Pa.

### OLMSTED'S IMPROVED MITRE BOXES

Wood and iron, with adjustable saw guides. Suitable for any cross cut or back saw. Insures perfect mitres. Carefully made. Several styles. Prices very reasonable. Write for circular.



### Olmsted's Tool Grinder and Sharpener

No foot power required. Guide rests for tools, etc. Requires no skill for operating—does rapid work. Ask for further particulars. L. H. OLMSTED'S SON - - - Hasbrouck Heights, N. J.

## The Caldwell Auger Bit is an Efficient Tool

To the ordinary user, all bits are much alike until they are put into use. When this is done the superiority of The CALDWELL is evident.

*This is because of the exclusive mechanical features in its construction.*

The construction, as shown in detail in illustration, enables The Caldwell to work several times faster and with less friction than any other known bit.

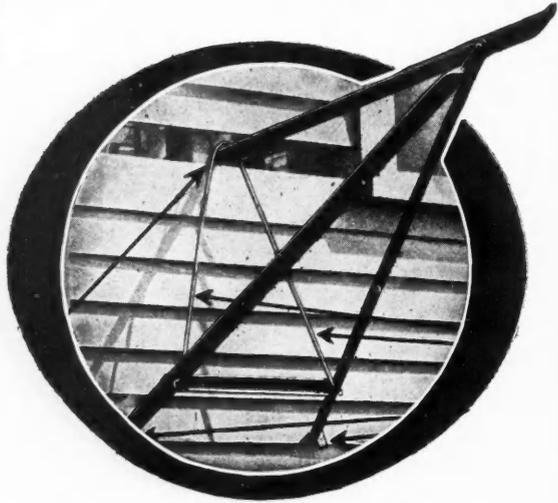
Regular	4	5	6	7	8	9	10	11-12	13-14	15-16	16ths
Prices	35	35	40	40	45	50	55	60	65	—	cents

COMPLETE SET OF 13 BITS, \$6.00

Until your dealer is supplied, remit direct to us. We will deliver without further cost to you. Send for Catalog.

The CALDWELL AUGER BIT CO., Lebanon, N. H.





**Save \$5 to \$8 on  
Every Job---**

You can save this much in the item of labor alone by using

## "Trouble-Saver" Scaffolds

And some builders are reporting even better results. One man has often made enough on one job to pay for his set of "Trouble-Savers."

Your men can put up and take down these Scaffolds in less time than it takes to get lumber ready to build a wood scaffold. All the labor necessary with a "Trouble-Saver" is that of hooking it over a studding. There are no nails to drive—no bothering with bolts or screws. Ten minutes' work will scaffold an entire house.

Compare this method with the old-fashioned way of wasting half-a-day's time to put up wooden scaffolding; to say nothing of the waste in lumber and nails.

And the Trouble-Saver can't wobble break, nor sway; the two legs hold it rigid.

Write for our 30-day Free Trial Offer, together with complete information, and opinions of other contractors.

**Steel Scaffolding Co.**  
Evansville, Ind.

directed their efforts to the design and production of a type of scaffolding bracket which will furnish the maximum of convenience and strength in their use.

The "Trouble-Saver" bracket is a folding steel bracket having two supporting legs which are braced against each other at the outer end to prevent any side motion. The bracket takes hold of the studding directly, which prevents any motion at the inner end. This double leg construction produces a bracket which is very solid, giving the workmen a feeling of safety which will make it possible for them to get around faster. Furthermore, altho the bracket weighs only 14 pounds and may be folded into a very small space, it is capable of holding with safety a considerably greater weight than will ordinarily be required of it. Read what one subscriber to the AMERICAN CARPENTER AND BUILDER has to say about these brackets:

Wayland, Iowa, April 15, 1916.

The Steel Scaffolding Co.,  
Evansville, Ind.

Dear Sirs:

We herewith send you a postal which shows the brackets we got of you lately and we will give you permission to fix up the testimonial any way to suit you and sign my name to it. The picture marked X is myself in it. I only wish I could have my other three men on it.

We may send you a card later in the season.

Thanking you, we remain,

C. K. SCHANTZ.

Mr. Schantz evidently believes that he is perfectly safe in placing a heavy load on these brackets. His photograph also illustrates another point of interest to the builder: Notice the absence of the clutter of stringers and braces which is always necessary with wooden scaffolds. The passer-by in viewing this work could not help but think, "There is a man who does his work neatly."

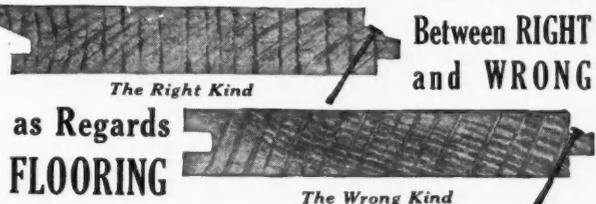
In these days of hurried building the time spent in building up the scaffolding and in making several trips to haul a few clumsy wooden affairs from place to place should be eliminated. It would appear as if a folding steel bracket which will fit quickly and securely, and which will take up a minimum of space in transportation from one job to another will offer a solution to the scaffolding proposition. Scaffolding should be an investment which will pay for itself rather than an expense which must be met on every job.

The contractor and builder who is interested in investigating the possibilities of steel scaffold equipment will doubtless be able to obtain some valuable information from the Steel Scaffolding Co., Evansville, Ind.



C. K. Schantz and Crew, Wayland, Iowa, Enjoying the Safety of Steel Scaffold Brackets.

**If You Don't Know the Difference**



as Regards  
**FLOORING**

Between **RIGHT**  
and **WRONG**

Write us for information about the right kind.

**Kuhn Patent Tongue and Groove Flooring**

**THE INTERIOR HARDWOOD CO.**

1317 Beecher Street

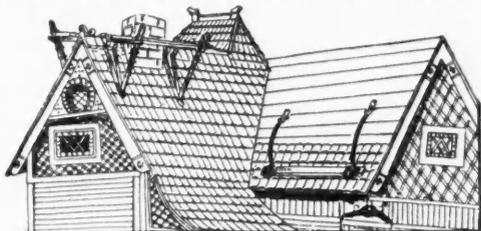
INDIANAPOLIS, IND.

**Folding Scaffold and Roofing Bracket**

Two accessories every carpenter and builder should have. They are actual time and money savers. When erected they are rigid and stable and are safer to work on than wooden staging. Write for description and prices.

**NEVILLE MANUFACTURING CO., Kewanee, Ill.**

Money returned if not satisfactory after 10 days' trial



**GERMANTOWN  
MASTER BUILDER**

**HATCHETS**

Are in the  
Kits of  
**MASTER-BUILDERS**  
*Everywhere*



In the beginning the steel from which they are made is of the finest selected quality. They are forged under the most modern conditions, and thoroughly tested at every step of their manufacture. Handles are made of the sturdiest second-growth hickory and will positively not come loose or break under the hardest service. Perfect hang and balance combined with the keenest of cutting edges.  
Two sizes, Nos. 319 and 320.

Price  
**\$1.50**

**GERMANTOWN TOOL WORKS**

Philadelphia, Pa.

Branch: 62 E. Lake Street, CHICAGO

**Simonds  
Saws—**



**—go thru  
a Board  
Fast and True**

*“They are made to cut;  
not to develop biceps”*

Simonds Blades are ground to an even gauge all along the tooth edge and uniformly thinner on the back, thus making a light-running saw that does not bind in the kerf, holds its cutting edge, saws true; and affords an easy, comfortable “hang” that pleases the Carpenter who wants to do careful work.

The steel is made by our own exclusive tempering process in our own steel plant; thus enabling us to put the best and toughest steel possible in Simonds Saws. The uniformity of tempering throughout the entire blade enables it to do fast and accurate cutting; and at the same time gives the teeth a toughness and hardness which enables them to hold their quick-cutting edges under long, hard usage.

We shall be glad to send our book “Simonds Guide for Carpenters” to anyone interested. It is a handy reference book of useful rules and illustrations that are usually hard to remember, and yet must be had when wanted.

Free to every carpenter.

**Simonds Mfg. Co.**

“The Saw Makers”

**FITCHBURG, MASS.**

5 Factories

11 Branches

**An Opportunity for Small Town Carpenters**

One of the sources of profit which is habitually overlooked by many carpenters and builders in the country and in small towns is the sanitary closet or privy. Others, who are more enterprising, find this not only a paying side-line, but earn the eternal gratitude of their customers by making the suggestion.

The old-style, out-in-the-back-yard closet or out-house is, as everybody knows, a nuisance, a discomfort, a breeder of disease and an unsightly institution. Every farmer or small-town dweller who has ever experienced the comfort of a city water-closet wishes that he could have this modern conven-

ience in his own home, but he thinks it impossible because he has no running water or sewerage system.

Right here is where the live carpenter steps in with a suggestion that nets him both a handsome profit and the friendship of his customer. He tells him about the Comfort chemical closet, the closet that can be installed right in any farmhouse or village residence, in any unused room or clothes closet or in a separate space partitioned off by the carpenter. He explains that this modern closet is absolutely odorless and so cheap that one can be installed at less cost than an out-house can be built, that it gives all the comfort, the privacy and the convenience of the city water-closet, but needs no running water, sewer or plumbing.

Naturally, the man who installs one of these Comfort chemical closets in his home remembers gratefully the carpenter who got him to do it. The carpenter who sold the first one (if merely suggesting it and taking the order can be called selling) gets a liberal commission for *that* sale, and on all the other orders that the neighbors voluntarily bring to him. It's like an endless chain and it is surprising how much some wide-awake carpenters have added to their incomes in this simple way. Besides, there's many an odd job of partitioning, etc., as a result.

Carpenters will do well to apply to the Comfort Chemical Closet Company, Toledo, Ohio, for the local agency. Their advertisement in this issue will give some idea of the construction of this modern necessity.



**“Hundred Point”**

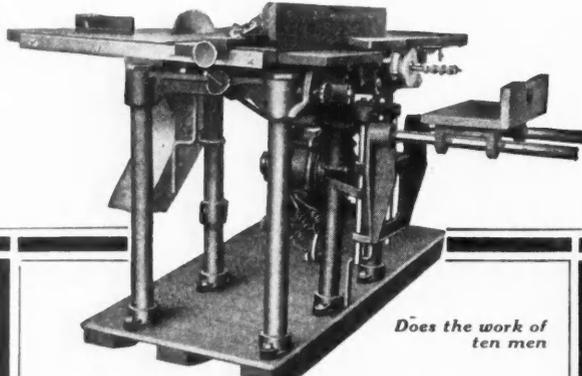
**Kissel Offers a New Six Cylinder Model**

Eight more coats of finish, many more bearings and bushings, an oiling system requiring but two grease cups—these and ninety-seven other points, some exclusive and the remainder the accepted standard, feature of the “Hundred Point Six,” a new car just announced by the Kissel Motor Car Company of Hartford, Wis.

In the table of points contained in the company prospectus, twenty are listed under the heading “Efficiency,” eighteen under “Stability,” twenty under “Simplicity,” ten under “Quiet,” fourteen under “Comfort,” nine under “Economy” and nine under “Refinement.”

The engine is a high speed Kissel—built block type with a bore of 3¼ and a stroke of 5 and will, it is said, make 55 to 60 miles an hour, if desired. A stiff, carefully balanced

*(Continued to page 142.)*



*Does the work of ten men*

*A Machine for all purposes*

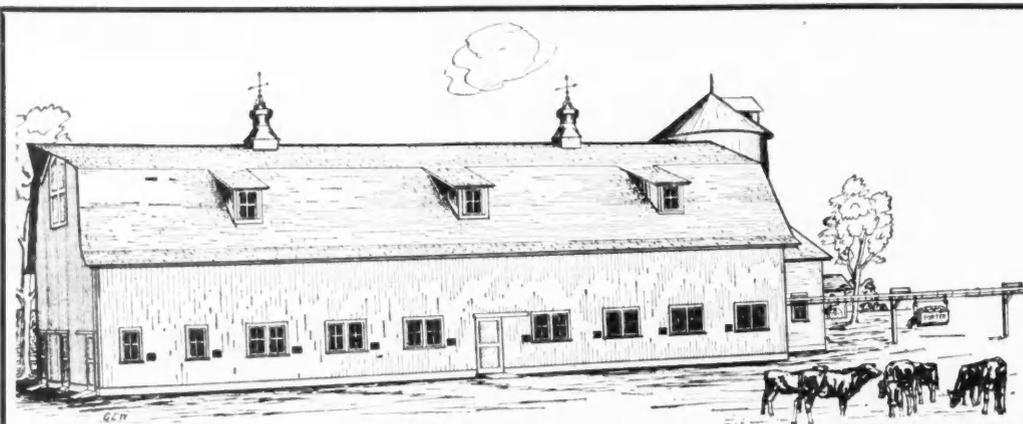
**BERLIN**

**Portable Woodworking Mill**

is the biggest labor-saver you can buy. Because of the present labor shortage, good men are at a premium. Don't let high-priced labor eat up your profits. This mill will do the work of ten men, and soon pays for itself in money saved.

Consists of a Rip Saw, Cross Cut Saw, Dado Saw, Grooving Machine, Jointer, Jig Saw, Boring Machine, Sander and Emery Wheel. Comes equipped with either gasoline engine or electric motor mounted on its own base. Guaranteed for two years. Write for information on this machine.

**SCHAEFER MFG. CO.**  
American St. Berlin, Wis.



**No Obligation  
No Expense**

We have something of interest to discuss with the best contractor in each community and we suggest that you act today.

**Save Money in Building Barns**

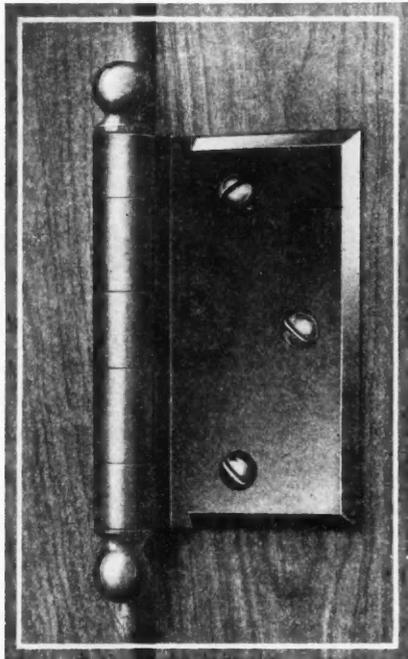
Obtain authentic and practical data regarding the construction, lighting, ventilation and equipment for the modern barn. Simply fill in and detach the coupon, forwarding it to us with the names of parties who will build or remodel barns.

Our COMPLETE BARN EQUIPMENT CATALOGUE and BARN PLAN BOOKLET will be mailed you promptly upon receipt of this information.

**J. E. PORTER CO., 620 Fremont Street, Ottawa, Ill.**

J. E. PORTER CO.,  
620 Fremont St., Ottawa, Ill.  
I attach herewith the names of parties who will build or remodel barns. Send catalogue with barn plan booklet and complete detailed information.

Name.....  
City..... State.....



## McKINNEY Half Mortise Butts

Whether the job be large or small it is always well to reflect that *you* are building for the future just as surely as the owner himself, and that upon the wise selection of the materials with which you build depends to a great extent what the future will hold in store for you.

The McKinney Half Mortise Butt, No. 2745, saves considerable time and labor in hanging doors because only the casement is mortised, the beveled edge ornamental leaf being attached to the surface of the door. It is attractive and durable. The rich finish and simplicity of design lends dignity and harmonizes perfectly with modern tendencies in architecture.

But over and above these features is dependability. The 40 years' experience in hinge manufacture, together with the quality of materials used and the competency of the workmen employed, is reflected in this butt, as in all McKinney Butts, and is not the least reason why you should get acquainted with McKinney Hardware right now. See your dealer—ask him to show you McKinney Butts for your next job.

Send for a copy of Architects and Builders Catalog—it will prove valuable. Ask for Catalog A-11.



**McKINNEY MFG. CO.**

PITTSBURGH, PENNA.

Makers of Hinges, Butts, Door Hangers, Track, etc.

# Up-to-Date Ideas for Up-to-Date Builders

## GENERAL SUMMARY OF CONTENTS

Radford's **DETAILS OF BUILDING CONSTRUCTION** is a complete manual of Building Practice, as applied to carpentry, construction and the use of millwork. It is a remarkable collection of full-page plates, accurately drawn and reproduced to exact scale, showing clearly every detail of modern building construction and finish. These plates make plain the framing and construction of residences of every type—frame houses, brick houses, brick-veneer houses, "stucco" or cement-plaster houses, cement block houses, etc.

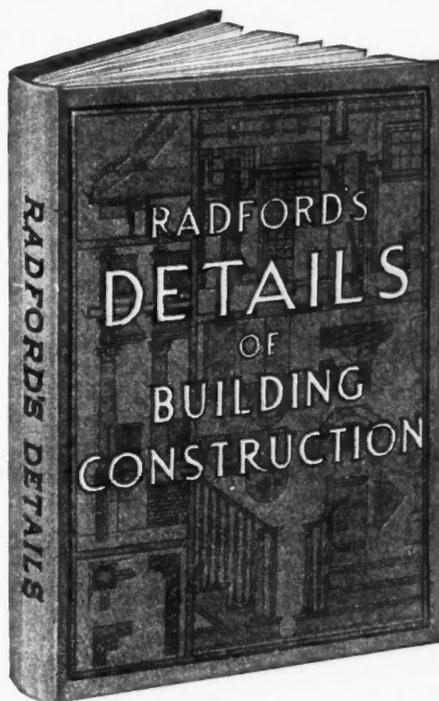
### 200 Pages of Live Information

200 pages of illustrations, with thousands of details, including a section showing home furniture making.

Every part of a building is shown in Radford's **DETAILS OF BUILDING CONSTRUCTION**. All dimensions, angles, curves, measurements and joints are made so plain and are so well illustrated that the "man on the job" will have no trouble or difficulty in doing the work. It has all been figured out by men who have made a lifelong study and success of architecture and building.

**Price \$1.00**

Postpaid



### PART I. Details of Construction and Finish

**38 Full Page Plates**, showing complete details of interior trim, with special "built in" features for every room and part of a modern residence.

### PART II. Details of Frame and Masonry Construction

**44 Full Page Plates**, presenting a graded series of 197 figures detailing completely every point in frame, brick and stone construction.

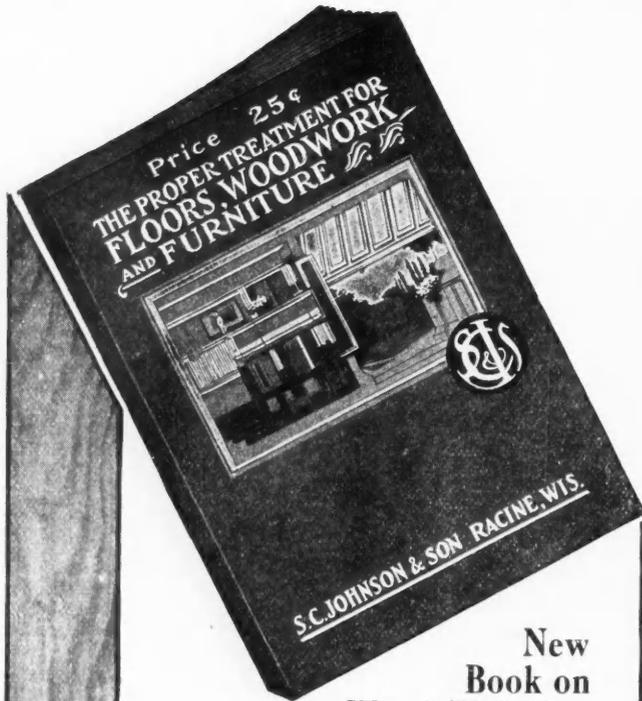
### PART III. Details of Miscellaneous Building

**57 Full Page Plates**—A veritable Treasure House of practical and reliable information for carpenters and builders—especially those working in the country—working drawings and details which solve completely every building problem.

### PART IV. "The Handy Man's Friend"—How to Make a Thousand and One Useful Things

**61 Pages**, packed full of practical helps for doing all the various pieces of work that the carpenter and the "handy-man-about-the-house" is called upon to do. Details and working drawings with brief explanatory text.

AMERICAN CARPENTER AND BUILDER ... 1827 Prairie Ave., CHICAGO



### New Book on Wood Finishing

EVERY architect, contractor and builder is entitled to one of these new books free for the asking. It is a valuable handbook on interior finishing, beautifully illustrated in nine colors.

It tells how to finish inexpensive soft woods as beautifully as hardwoods and gives complete specifications for finishing woodwork and floors with

### Johnson's Wood Dye

These dyes are not pore-filling varnish stains but coloring matter that penetrates deeply into the wood without raising the grain.

### Johnson's Prepared Wax

is the most extraordinary polish for interior woodwork and floors. It gives a hard, dry, glass-like surface that does not collect dust.

If you are not familiar with Johnson's Wood Dyes and Prepared Wax we shall be glad to send you samples for experimental work or finished wood panels showing the various shades of Johnson's Wood Dye.

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Fill out this coupon and mail to

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"The Wood Finishing Authorities"

RACINE

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WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER

crankshaft of exclusive design, all parts of cam shaft cast integral, the upper half of crank case in one casting with motor, 95 per cent copper back Fahrigr metal bearings and light pistons and connecting rods are a few of the engine details.

The ignition system is Remy, the carburetor a special Kissel-Stromberg design, the electric battery Willard and the starter the same successful Kissel system, operated in connection with the Bendix screw, that has been used in Kissel Kars for three years.

Special praise is given the springs, which are long and flat, with drop forged shackles and case-hardened suspension bolts. It is claimed that sidesways and rebound are eliminated by the design of these springs, making shock absorbers unnecessary.

The power plant, including the cone clutch and transmission are a single unit and, despite a much lower price than any prior Kissel six-cylinder car, the same type of full floating axle that has been conspicuous Kissel superiority in the past is used.

This axle, which is Kissel-built, has spiral bevel gears and nickel steel pinion with all stressed parts of chrome vanadium. It is urged that brakes, both external, are incomparable in efficiency and reliability. Timken roller bearings are used in the axles and wheels. Imported ball bearings are used in the transmission.

In place of the usual twenty to twenty-five grease cups found in the average chassis, Kissel has substituted oil bolts. Each of these bolts contain an ample reservoir which may be filled from a can in the ordinary way, thus doing away with one of the most obnoxious chores in connection with the care of a car.

The carburetor automatically supplies the right mixture at all speeds, which makes for gas economy as well as efficiency. Low fuel consumption is also promoted thru casting of the intake manifold inside of the cylinders and also by the vacuum feed system, which means a constant but never an over-supply of gas.

The wheel base of the "Hundred Point Six" is 117 inches. It has big door openings, extra deep upholstery of real leather, cushion springs and curled hair. The front seats are divided, of course, Kissel being the first in America to introduce the much-followed corridor construction. The driver's seat is adjustable to any length and the indicating instruments are mounted in a straight line on the cowl board. A pedal button starts the motor.

Motorists will appreciate the effort to make the "Hundred Point Six" as free from noise as it is possible to build an automobile. Its motor is chainless; a pressed fabric gear runs between the two helical timing gears; it has an extra deep frame which will not deflect and cause doors to work and rattle; body is mounted over felt packing on frame; oil pump is operated thru plunger off cam shaft, eliminating noise usual in gear-driven pumps; there are no internal brakes to rattle and wear; grease cup squeaks are done away with by substituting oil bolts.

The "Hundred Point" is a very smart little car with an improved stream line and body hung low without sacrificing ample clearance. It is given twenty-two finishing operations over the finest quality of twenty gauge silver finish sheet steel. It is built in touring and roadster models at \$1,095 and also mounts several new designs of the All-Year car, a Kissel idea which has proved so successful that fully two-thirds the Kissel output is now sold with demountable tops. Sedan, Coupe and Town Car Tops are in the new line, all being built in connection with an extra-strong lower body known as the Gibraltar. The Town Car is, in fair weather, transformed into a swagger Victoria, the Sedan into a touring car and the Coupe into a roadster.

# CHIEF ALL-STEEL CUPOLA



New-improved, scientifically designed ventilating cupola for all buildings. Up-to-date in design, material and construction. Used and approved on hundreds of farms. Made of heavily galvanized steel with base strongly braced. Can't rust, rot, or blow off. Absolutely storm-proof and bird's-nest proof.

**Easy to Install—Sure to Please Your Customers**

Chief Cupola saves time and labor installing—base bolts directly to roof and cupola bolts to the base. Only six bolts needed. Meets all requirements—insures adequate ventilation—satisfies all users. Write for full description, prices, etc.

**Shrauger & Johnson Co.**  
430 Walnut Street, Atlantic, Iowa

# Monitor Cupolas

**BUILT TO VENTILATE**



Proof against wind, weather and birds. Made of the best grade of galvanized steel, the Monitor will not rust, crack or dry out. It will circulate more air than a wooden cupola twice its size, and looks twice as good. Always on the job with the best kind of service, the Monitor will cost the owner less every day it is in use. Write for our special discounts to Contractors and Builders. Get acquainted with the cupola that will make the most money for you.

**B. F. Lichty & Sons Co.**  
Station A  
WATERLOO, IOWA



# Make More Money

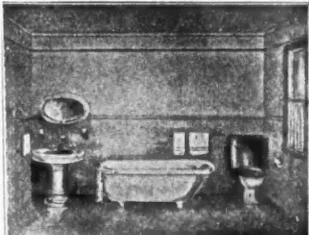
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Practically constructed, from galvanized metal, for great ventilating efficiency, long life, and splendid appearance, with or without weather vane. We co-operate with you. Send for our co-operative plan and complete information.

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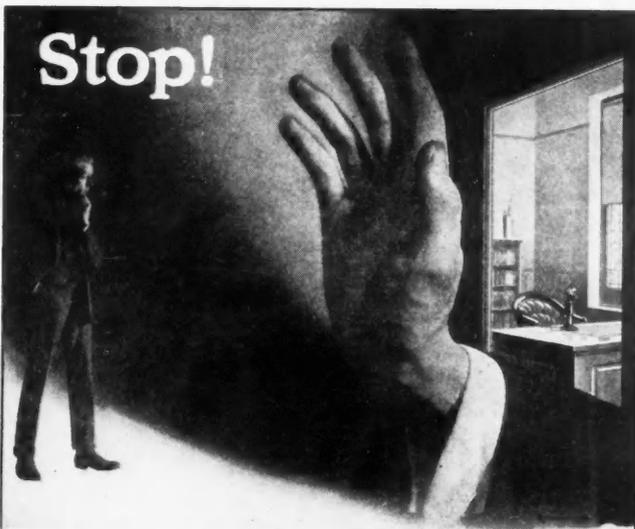


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You've reached your limit. You can't expect to step into a job that pays a big salary until you've prepared yourself for it.

It's a serious question, this problem of getting ahead. There is only one solution—you must have training; you must be able to do work that others can't do, or your pay will stay on a level with theirs.

The business of the International Correspondence Schools is to help just such men as you to get good positions and hold them.

Right now over one hundred thousand ambitious men are preparing themselves through I. C. S. courses for the bigger jobs ahead. Last year nearly five thousand reported increased pay as the result of I. C. S. training. These men got their training in spare time and in their own homes. What the I. C. S. have done for others they surely can do for you. But you must make a start—the same start that they made—and the way has been made easy for you. Mark and mail this coupon.

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and No. \_\_\_\_\_  
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If name of Course you want is not in this list, write it below.

**For Mixing Grout and Slush**

A special mixer has been developed by the Hall-Holmes Mfg. Company, 461 Oak St., Jackson, Michigan, for handling grout and other slush mixtures. It is being used with large success for grouting between brick on pavement work, and for mixing top dressing for concrete pavements, sidewalks, etc. This mixer is a light portable outfit, constructed on much the same lines as the well-known Grand Concrete Mixer. The charging hopper has two compartments, one for cement and the other for sand, the sand hopper being twice as large as the cement hopper. While the batch in the mixing trough is being mixed, the hoppers can be refilled. The contents of the hoppers is discharged into the mixing trough by simply pulling a lever.

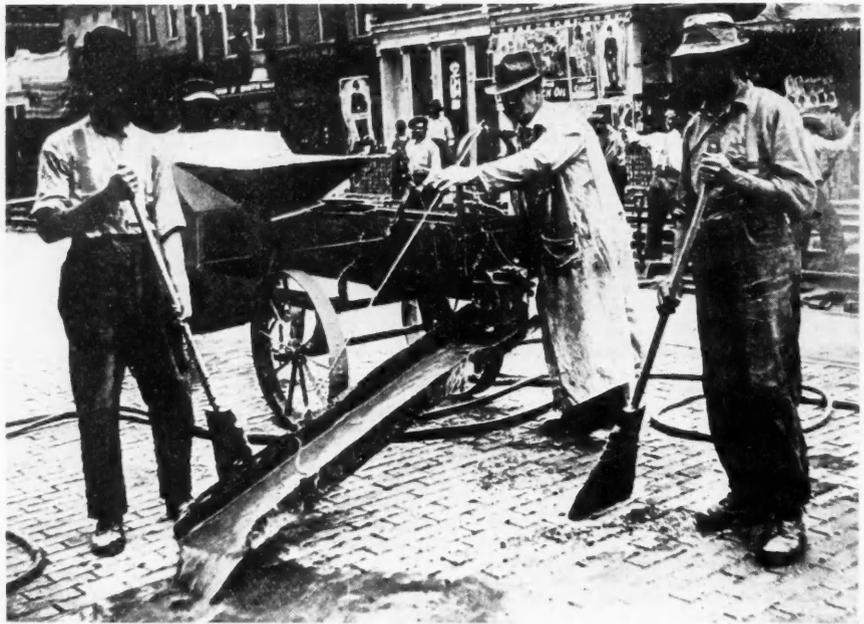
The gate at the discharge end is easily opened and closed, enabling the operator to pour out a pailful, or the entire contents of the mixing trough.

The Grand Slush Mixer is equipped with a 2½-H.P. water-cooled gasoline engine. The outfit is mounted on large, wide-tired steel trucks, 20-inch wheels in front and 30-inch in rear. All parts are strongly and rigidly built, the mixing paddles being of crucible steel.

It is pointed out by the manufacturers that it will save money to have a light machine of this kind on the job for mixing grout, since you cannot afford to stop your large

mixer to mix the slush, and still less can you afford to mix it by hand.

What is supposed to be record speed in getting men to a forest fire is reported from Oregon, where on one of the



This Machine May be Used in Paving Work as An Auxiliary Mixer for the Grouting Process.

*Do You Get Absolute*  
**RUST PROOF NAILS**  
?

When you buy nails for exposed work are you sure you get genuine "zinc coated nails"? There are many coated nails on the market under the name "galvanized" but they are not all rust proof. The only genuine galvanized nails are those coated with "pure zinc" applied by the "hot process."

**M. I. F. CO. ZINC COATED  
IRON CUT NAILS**

are genuine galvanized nails and absolute rust resisting.  
Write for sample and price list.

**Malleable Iron Fittings Co.**  
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*Zinclad*

**SHINGLE NAILS**

WRITE FOR SAMPLES AND PRICES

**W. H. MAZE COMPANY**

PERU, ILLINOIS

**Evans "Almetl" Fire Doors**

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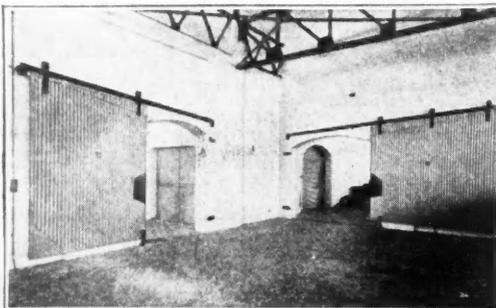
APPROVED BY UNDERWRITERS' LABORATORIES, INC., CHICAGO

The Evans "Almetl" Fire Door is of rigid, all steel and asbestos, non-warping, indestructible construction, and fire cannot pass through it. No wood to rot, no tin to rust, no seams to open, no thin covering to bruise. If you have had the costly experience of replacing wood core, tin-clad doors, you will welcome this new all-efficiency Fire Door.

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