AMERICAN CARPENTER AND BUILDER

THE WORLD'S GREATEST BUILDING PAPER

SEPTEMBER NUMBER

FLATS, STORES AND CITY HOUSES
Would You Break Your Neck for a Dollar?

You would not. Neither would you wish to have members of your household fatally injured or permanently disabled while washing windows by the old method, when this device can be attached at small expense, overcoming all danger; also permitting the entire window to be screened, thereby giving better ventilation, as both sash are swung inward. Also many other advantages.

Easy to install. Never get out of order

So Simple a Child Can Wash the Windows Now

The only cutting done is the stops on right hand side of windows to allow windows to swing in. The attachment with a screw driver is all that is required after sawing stops to swing any sliding window up to 6 x 8 foot.

Lower Sash Swung into Building

Both Sash Swung into Building

All women have a horror of cleaning windows, and justly so, as without this improvement it could only be done imperfectly and with great danger to life and health, besides being embarrassing and hardly modest.

This device can be applied to old and new windows, and no alteration of the frame or sash is required, nor is there any injury to or defacement of the woodwork. Anyone old enough to clean a window can use it. There is absolutely no interference with screens, shades, curtains, awnings or double windows.

Made of steel and finished in oxidized, dull black, dull brass and nickel plated. Sample set, including screws, with drawing and instruction sheet, will be sent upon receipt of 25 cents to defray expressage.

CORRESPONDENCE SOLICITED. AGENTS WANTED.

The Patented Window Attachment Co.
(Not Inc.) W. J. BLAKE, Manager

NEW NO. 443 North State Street :: :: :: :: CHICAGO
Do Your Own MILLWORK
ON THE JOB—
This is our NEW IMPROVED RIG with WATER HOPPER Cooled three HORSE ENGINE.

The “Little Shaver” Portable Saw Rig

THIS rig, ready to start when it reaches you, weighs 520 pounds crated; includes two saws, cross-cut and rip; dado head for plowing window and door frames, emery wheel for sharpening your tools, wrench, etc. The engine furnished with this outfit is specially built for this kind of a rig, and it has a belt tightener attachment which keeps the belt from getting loose and can be adjusted in a few minutes. It is water hopper cooled and will develop three horse power under continuous brake test, which gives an abundance of power to run the saw.

WRITE For Our Folder and SPECIAL AUGUST PRICE

Inter-State Equipment & Engineering Co., Old Colony Bldg. Chicago, Ill.

THE simplest and best floor scraping machine on the market. Has direct pressure on the knife, the handle having no pressure bearing control, as in other floor scrapers. With the entire weight on the blade gives the knife a uniform pressure at all times, with no possible chance of jumping and making a wavy floor.

Machine weighs 100 lbs. boxed for shipment.
Miller’s Lock Mortiser

**IS SCIENTIFIC**

The regulation of the feed by the screw in the head is what makes the cutting of hard or soft wood easy.

The actual use of the tool to cut an opening for a lock is ¾ minute. The whole job is done in 3 minutes. Cutters for five sizes of locks ½" to 1½" is furnished with each machine. Its merit has been demonstrated thousands of times. *Sent on Trial.*

**Butt Mortiser**

Cuts the seats for butt hinges in doors, jambs and other work. It does the work in one-third the time and makes a neat, clean, accurate job. Price, including rule gauge, 75 cents.

A. W. Miller Mfg. Co.

Western Office: RIVERSIDE, CALIF.  
Main Office: CINCINNATI, OHIO.

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**THE HAVEN FLOOR PLANER**

**HERALDS THE NEW ERA IN FLOOR SCRAPING**

Eliminates all defects found in other floor machines. Does away with the man-killing toil of the heavy-weight machine. It embodies the mechanical principle of the plane. It planes and scrapes floor at one operation. Does better work than most hand work. Most rapid scraper on the market.

“Wavy” Floors an Impossibility

Makes floor scraping simple and agreeable. Particulars on request.

**THE HAVEN MFG. CO.**  
RACINE, WIS.
The ANDERSON AUTOMATIC ADJUSTABLE SPRING DRIVEN FLOOR SMOOTHER

Very effective on old as well as new floors

THE AUTOMATIC MOTOR SPRING

Makes Floor Scraping Easier

It PULLS more than half of the load on the cutting stroke.

It permits the use of a heavier and more effective machine.

A floor-scraper, to do smooth work, must have weight in proportion to the size of the scraper edge used.

THE A. A. A. FLOOR SMOOTHER has two detachable weights and can be operated at 130 to 150 pounds.

SOME "ADJUSTABLE" FEATURES

TOP WEIGHT ADJUSTABLE to bring any desired pressure upon the scraper knife.

KNIFE CLAMP ADJUSTABLE to right or left shear cutting angle, or up and down, to conform with any style of scraper edge required.

KNIVES POSITIONED IN CLAMP by the turn of one thumb screw and easily readjusted so as to use all parts of scraper edge before resharpening.

HANDLE ADJUSTABLE to suit height by operation of a lever, and can be telescoped for work in small rooms.

Shipped on approval to responsible parties. Write for more information to

TRIPLE "A" MACHINE COMPANY

Tenth Floor, Chicago Opera House Bldg.

ACKERMANN'S "MAKE GOOD" OFFER

"More Work, Easier Work, Better Work than any Other Floor Scraper Made or the Entire Outfit is Free"

You run no risk in ordering Ackermann's Rapid Floor Scraper sent on Free Trial. You don't have to pay a dollar down, not even the express charges.

Besides this you receive free with the machine, a complete Ackermann Knife Sharpening Outfit which insures the successful use of the machine by even an amateur. This knife sharpener practically works automatically and will put an absolutely perfect edge on the knife blade in less than two minutes without removing the blade from the machine.

Ackermann's New Knife Sharpener works perfectly on the blade of any floor scraper. It cures all "Knife Troubles."

Real success in the use of any floor scraper depends largely upon the cutting edge maintained on the knife blade that actually does the work. No machine will do the work well unless the blade is kept constantly sharp. Up to the present time the average operator of any floor scraper made, has had much trouble in doing good work, quick, because sharpening the blades was very difficult.

Send for Booklet and Information.

Great Free Trial Offer

We will ship you on free trial, prepaying all charges except the Ackermann Rapid Floor Scraper and Ackermann's New Knife Sharpener. If they prove satisfactory, you purchase the machine, and the knife sharpening outfit is given you free. If not, return both at our expense. It costs you nothing to find out whether or not our claims are true. Write today.

J. B. ACKERMANN CO., GRAND RAPIDS, MICHIGAN

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Machine In position, ready to Sharpen Blade

Arrows point to the Knife Sharpening outfit which fits compactly into machine, out of the way. Knife sharpener sold separately if desired. Price, $5.00.

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
The American Floor Surfacing Machine

is the original and only two-roll, self-propelling, dust collecting machine, protected by U.S. and Foreign patents, and the only one that will satisfactorily surface any kind of a wood floor, and has been in general use by contractors, hardwood floor companies and others for over five years.

Its work is rapid, regular, smooth and even, because the power that drives the rolls propels the machine at the same ratio of speed.

Its work has established the standard for surfaced floors, and the only machine whose work is specified by leading architects and meets the requirements of contractors, owners and hardwood floor companies for finely finished, smooth, even floors.

It has surfaced and polished millions of square feet of the finest floors in America and Europe.

Don't be fooled with an imitation, but get a machine that does work in paying quantities, and can be operated in small rooms.

The only one whose construction is guaranteed and sold on its merits.

Write for our book "Surfacing Floors as a Business."

Manufactured by

The American Floor Surfacing Machine Company

TOLEDO, OHIO

PLATE GLASS

Bath Room Fixtures

FOR RESIDENCES, HOTELS, OFFICE AND APARTMENT BUILDINGS

Absolutely sanitary, require no cleaning, never wear out or show the effects of use. Not affected by hot or cold water. The modern 20th century toilet and lavatory fittings.

PLATE GLASS TOWEL BAR

Price $1.50

No. 141 24 inches, adjustable. Also made in 30, 36, 42 and 48 inch lengths at slightly higher prices.

Round glass towel bars, $2.00
Adjustable glass towel shelves, $3.50, $4.00, $6.00

We also sell plate glass with polished edges for table tops, any size, and glass push plates for use in fine residences and apartments, manufacture and re-silver mirrors, etc.

CATALOGUE SENT FREE ON APPLICATION

Geo. H. Anderson & Co.

Manufacturers and Jobbers of Plate Glass Specialties

281-291 W. Superior Street   -   CHICAGO

STARRETT

Universal Scraper

EIGHT SHARP CUTTING EDGES. INSTANTLY ADJUSTED BY BALL JOINT CONNECTION. BLADES MAY BE INSTANTLY SET AT ANY ANGLE. NEATEST AND BEST SCRAPER MADE.

Send for free Catalogue No. 185

The L. S. Starrett Co. Athol, Mass. U.S.A.

COMPLETE OUTFIT

Hand and Foot-Power MACHINERY

Our No. 3 Wood Turning Lathe can be speeded from 1,000 to 2,000 revolutions a minute with perfect ease. Stopped or reversed at will of operator.

Write for Particulars

W. F. & Jno. Barnes Co. 74 RUBY ST., Rockford, Ill.

COMPLETE OUTFIT

Hand and Foot-Power MACHINERY

Our No. 3 Wood Turning Lathe can be speeded from 1,000 to 2,000 revolutions a minute with perfect ease. Stopped or reversed at will of operator.

Write for Particulars

W. F. & Jno. Barnes Co. 74 RUBY ST., Rockford, Ill.

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
Free Trial

Weber Floor Scraper

The Weber Double Acting Floor Scraper is guaranteed to do more and better work than any other machine of its kind made. This is not an empty claim. It is guaranteed. And so strong is this guarantee that we will send the Weber Double Acting Floor Scraper to you on free trial, without one cent down, to try as you like. Let the scraper talk for itself.

Send for our latest literature on this subject—it tells you about its many valuable features and how you can prove for yourself that the Weber is the only machine for you.

JOHN F. WEBER, President,
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670 71st Ave., West Allis,
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The Weber Automatic Sharpening Device enables the operator to sharpen a blade without removing it from the machine. The blade can't be sharpened at a wrong angle—so simple a child can use it.

EVERY CONTRACTOR AND BUILDER
should know about our Hoist
direct connected with Gasoline Engine for use with Double Platform Material Elevators. We furnish Hoist and Elevator complete ready to run. This outfit will elevate more building material at a less cost than by any other known method. Our Bulletin No. 5 will give you all particulars.

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THE FOSS GASOLINE ENGINE
DIRECT TO YOU

We save you from 25 to 40 per cent on the Highest Grade Gas or Gasoline Engine.

Write for Price List and Catalogue.

FOSS GASOLINE ENGINE CO.
734 Portage Street - KALAMAZOO, MICHIGAN, U. S. A.
The HOLDALL BRACE

It's NEW and has jaws which adjust themselves to the shape of the shank. They grasp and hold securely straight, tapered, round and square shanks. The sleeve is correct in shape for comfort to the hand and to obtain the firmest grip. Every part of the Brace is made with greatest care. We say without hesitation that the Holdall is the most perfect tool of its kind yet offered. Made in usual sizes, with 8, 10, 12 and 14 inch sweep. Ask for circular giving further description.

Millers Falls Company
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GOODELL MITRE BOX
Made of STEEL - Cannot Break

First in Quality and Improvements

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Euclid Avenue and East 14th Street
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OFFICIAL HOTEL of the AMERICAN MOTOR LEAGUE

300 Rooms :: European Plan
Rates $1 to $4 Per Day

Headquarters for Auto Tourists
Many of the leading garages located within one block of the Hotel

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This DUMB WAITER complete ready to erect for - $18.50

SELF RETAINING MACHINE
HARDWOOD CAR
SECTIONAL WEIGHT
ROPE, GUIDES, HARDWARE, knocked down and shipped with the only complete directions for erecting ever issued

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In scraping a floor by hand when a complete floor scraping outfit can be had that will do the work perfectly and in one quarter of the time?

Let me demonstrate these facts by sending the

ACME FLOOR SCRAPING OUTFIT TO YOU ON A WEEK'S FREE TRIAL

By accepting this offer you will have an opportunity to fully test the merits of the several machines and if the same do not do all that I claim and do not meet with your approval, send them back at my expense. No "if's" or "and's" to this offer. It is simply a proposition which allows you to fully investigate the article you intend to buy before you invest your money.

Booklet and further information will be sent on request.

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247 Lake St. MILWAUKEE, WIS.

Richards "Hero"

Trolley House Door Hanger

PROBABLY THE BIGGEST SELLER ON THE MARKET

Noiseless fibre wheels. Wood header furnished with track and is easily put up. Adjustment in both hanger and track. Track can be taken down after walls are plastered. Runs smoothly and quietly. A favorite with contractors.

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THE RICHARDS MANUFACTURING CO., Aurora, Ill.
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"Little Giant"

Floor Scraper

Sent on Free Trial

20,000 "Little Giants" are in use throughout this country and abroad. These were purchased because they were better; because they did more work—did it quicker, cleaner and cheaper—than any other machine made.

So great is our faith in its ability to prove its worth to you that we are making the following liberal proposition.

THE RICHARDS MANUFACTURING CO., Aurora, Ill.
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The Union Floor Scraper

Price $35.00

A money maker for the contractor and a satisfied customer every time a floor is scraped.

The Union will pay for itself in two days.

SENT ON APPROVAL

GEO. J. BACHMANN
No. 501 Lyon St.
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TOOL CATALOG FREE

Every Carpenter should have one.
A postal brings it.

GOODELL-PRATT'S
NEW No. 9.
CATALOG CONTAINS 272 PAGES,
ILLUSTRATING AND DESCRIBING
USEFUL AND LABOR-SAVING TOOLS

In this edition we are showing a number
of new items which everyone should know
about.

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MONITOR SASH LOCKS

(PATENTED)
NEVER BREAK
BECAUSE THEY ARE MADE OF VERY HEAVY GAUGE
METAL AND PERFECTLY CONSTRUCTED

If the upper sash drops, the Monitor "Never Break" Sash
Lock will pick it up from a lower point than any other, adjust
the sashes perfectly, prevent all vibration and lock securely,
so it cannot be opened from the outside.

MADE IN TWO SIZES AND ALL FURNISHED BY
The Champion Safety Lock Co.
Geneva, Ohio

GRAND RAPIDS
All-Steel Sash Pulleys
Are sold DIRECT to Builders, Contractors and Mills at prices under the
common ordinary goods.

If you make ten or ten
thousand window frames,
we can save you money
and give you a superior
sash pulley. We are the
largest sash pulley makers
in the world. We ship
direct, or through dealers
and jobbers everywhere.
Write for catalogue and
free samples and prices
on gross, barrel, or any
quantity.
Direct from the makers
to you. Inquiries wel-
come.

GRAND RAPIDS
HARDWARE CO.
34 Pearl St., Grand Rapids, Mich.
Every carpenter and builder can afford to invest in one, or more, of these machines. From our stock of 500 new and rebuilt machines contractors can obtain sufficient machinery to make them independent of local mills and their attendant delays and high charges.

Stop paying somebody else profit—put it in your own pocket. Be in a position to estimate under competitors. You can do this by installing your own machinery. All our machinery is of special construction to secure fine finished surfaces and to reduce sandpapering to a minimum.

Prices are lower than you think. Send today for our monthly list of rebuilt machines (free to carpenters and builders).

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Massey’s Parallel Bar Vises
(Patented)
The sliding bars are supported at their rear ends by a carrier traveling on the ways of the stationary jaw, making the vise rigid and unbreakable. Positive Lightning Grip.

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Everything in Plumbing and Steam Goods at Cut Rates to Everybody

SAVE YOU 30 TO 45 PER CENT

HEATING PLANTS.
Let us make you an estimate on a heating plant. With instructions from our engineering department, you can install it yourself. Save a store manager’s commission. The only economical method of heating your home. Plans free. Tools loaned. Boiler only $11.50 and up.

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A Swell Head and A Swell Door are both pretty stiff propositions, but the latter is a mere trifle when you have The Taylor Door Jamb Adjuster.

A few turns of the screws make a perfect fit, whether the door swells or shrinks. Send for folder explaining this cut.

JAMES L. TAYLOR MFG. CO., Bloomfield, N. J.
The World's Famous Line of Wood Working Machinery

The accompanying cut shows the FAMOUS UNIVERSAL WOOD WORKER EQUIPPED WITH OUR NEW PATENT APPLIED FOR POWER FEED PLANER, which is made in both the 10" and 12" sizes. The 10" size will plane to a thickness of 4", and the 12" to a thickness of 6". Will do identically the same work as the regular standard pony planer.

Write us for particulars.

SIDNEY TOOL COMPANY, Sidney, Ohio, U. S. A.

We also build BAND SAWS, JOINTERS, SAW TABLES, SHAPERS, PLANERS, TURNING LATHES, SWING SAWS, and POST BORERS.

Dorn's Revolving Mitre Box

Saw compound as well as plain mitres any width with a back saw 4 inches wide

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The difference between good and indifferent Carpenters' Squares lies in something more than excellence of material and workmanship, which are, of course, among other "Sargent" features—it is in the qualities that increase its all-round efficiency. That is why the practical "Sargent" Standard Steel Square is the universal favorite wherever Squares are used.

Our latest model has the scales and markings which enable the carpenter to lay out all kinds of work and to calculate quantities with an ease and accuracy never before thought possible. "A practical treatise on Steel Square" is what several recipients have declared our little publication. Copy free simply by mentioning you saw this ad in the American Carpenter and Builder.

Sargent & Company
1149 Leonard Street
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The Best Ever
You Will Never Regret Buying One

Wide Heel Brick Trowel
Made of Best Quality Crucible Trowel Steel. Leather Handle.

Philadelphia Pattern
Best Quality Crucible Trowel Steel. Wood Handle.

Send For Catalogue

Genuine Marshalltown Trowel

Marshalltown Trowel Co., - - Marshalltown, Iowa

"Sterling" Transits and Levels
Fully 75 per cent of the Phila. Engineers who have purchased Transits or Levels this season selected "STERLING" Instruments.

Because, after inspecting our Factory and making a personal field test, they were convinced that "STERLING" Transits and Levels are without a fault.

Send for 225 page Illustrated Catalogue of Surveying Instruments, Engineering and Drafting Supplies.

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LUFKIN STEEL TAPES and RULES
ARE INDISPENSABLE FOR ACCURATE WORK MADE BY The Lufkin Rule Co.
Saginaw, Mich., U. S. A.
New York London
For Sale Everywhere.
Send for Catalogue.
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The Brand to Demand

“Diamond” Hay Carriers are built for service — are easy to operate and are absolutely positive in action.

They are built of selected material by mechanics having years of experience in this line of work, and before leaving our factory are given severe tests and are carefully inspected.

This not only insures a perfect Carrier, but also a perfect working Carrier, and one that will stay right after it goes in the barn.

The “Diamond” Hay Tool line is complete and includes Carriers for Steel and Wood Track, Steel Track, Forks, Slings, Pulleys, and other sundries.

Write for Catalogue No. 70, giving complete description, and other useful information.

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120th Street,
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HAMILTON—OHIO—LINE No. 103

This machine, with or without boring table, is especially designed for a great variety of operations, such as joining, smoothing, planing out of wind, squaring, beveling, tapering, rabbing, gaining, plowing, cornering, heading, mitering, tenoning, panel raising, hand matching, molding rip and crosscut sawing, boring, etc.

Hamilton Universal Jointer and Saw No. 103.

It is quickly arranged without material change for rip and crosscut sawing, planing, matching, joining, panel raising, tenoning and boring, and a variety of other operations, such as above mentioned, conveniently performed.

See our advertisement on page 147, May issue, and page 277, June issue, of this paper.

For further information and prices, address
THE BENTEL & MARGEDANT CO.
HAMILTON, OHIO.

THE NEW SASGEN
Circle Swing Derrick

Light in weight, speedy in operation, all malleable castings; weight 250 lbs., CAPACITY 1000 to 1500 LBS.

Manufactured by
SASGEN BROS.
2744 Lincoln Ave. (Old No. 665.)
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$35.00
Fully equipped. Ready for use.

Sold on trial to all reliable contractors. Our catalogue is FREE for the asking.

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419 East Water St.,
Milwaukee, Wis.

IMPROVED LEVEL

The newest and most accurate level for Contractors, Engineers, Builders, etc. Every instrument is absolutely guaranteed.

Write Today for descriptive circular and get details of the special introductory offer we are now making.

DAVID WHITE CO.,
419 East Water St.,
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Here is a Gimlet
Equal in quality and usefulness to any Brace Bit

HANDLE OF
SELECTED
COCOBOLO
WOOD

THREE SIZES ONLY
Cutting 4-32, 6-32, and 8-32 Holes

Price Postpaid 15 cents each

H. H. MAYHEW COMPANY
SHELBURNE FALLS, MASS.

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COLUMNS AND
CONSOLS

In quality and price our work is not surpassed.
You will make no mistake in writing us before ordering elsewhere.

Send for 48-Page Catalogue No. 15

It contains many fine designs of modern Grilles Columns and Consols.

Northwestern Grille Works
CHRISTENSEN BROS., Proprs. 1452 Milwaukee Ave., Chicago

MALLORY'S
Standard Shutter Worker

Opens and closes the blinds without raising the window. Automatically locks the blinds in any position desired. Made of gray and malleable iron. The best and most durable blind hinge. Incomparable for strength, durability and power. Can be applied to old or new houses of brick, stone or frame. Send for Illustrated Circular. If your hardware dealer does not keep them send direct to MALLORY MANUFACTURING CO.
204 Flemington National Bank Building. FLEMINGTON, N. J.

DON'T PUT SASH WEIGHTS IN YOUR WINDOWS THEY ARE OUT OF DATE

The "AUTOMATIC" SASH HOLDER

The "Automatic" Sash Holder is the new, modern, up-to-date device that dispenses with cumbersome sash weights, kinking cords or ribbons, useless weight pockets,冥思 kulites and reluctant balances, and saves all the time, labor and expense of fitting them in place.

Prevent rattling and permit the window to be moved up and down with ease. Hold it safely at any point desired.

A sample set of four sent, postpaid, for $1.20. Ask your dealer, or write to us direct.
Automatic Sash Holder Company
277 Broadway, New York City.

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
**The “UNIVERSAL” ADJUSTABLE HANGER**

can be used anywhere. It forms a perfect, practicable lock; sash hung with it cannot be opened or removed from the outside; it cannot be blown open by storms; makes practicable the only substitute for the half-sash sliding screen; is sold in sets, half sets, or in any other way the trade demands; indestructible; will outwear a dozen screens.

Ask your hardware dealer or write for free sample and catalog.

The ADJUSTABLE HANGER CO.
415 Heron St. Toledo, Ohio, U.S.A

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**BURLINGTON**

**Venetian and Sliding BLINDS**

*Venetian Blind for inside window and outside windows. Sash to match trim.*

**Screens and Screen Doors**

*Equal 500 miles northward. Perfect privacy with doors and window open. Can be put into any room at any angle. Use in sleeping rooms. Send for catalog, price list and proposition to you.*

**BURLINGTON VENETIAN BLIND COMPANY**

341 Lake Street, Burlington, Vermont

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**FOOT, HAND and POWER Wood-Working Machinery**

FOR WORKING WOOD IN ANY MANNER

**Complete Outfits**

- "Vibrad" Scroll Saw
- No. 6 "Union" Self Feed Rip and Cross-Cut Saw
- "Diamond" Mortiser
- No. 8 "Union" Power Saw
- "Rex" Moulder
- No. 6 "Union" Combination Saw

Carpenters, builders, cabinet-makers and wood-workers generally can successfully compete with the large shops by using our labor saving machinery. With any one of our machines one man will do the work of four to six men using hand tools.

They are built for hard work, accurate work and long service. Each machine is carefully tested before leaving factory. We guarantee them to give entire satisfaction, and they may be returned at our expense, if, after ten days' trial you prefer your money back.

Ask for Catalog "A"

**THE Seneca Falls Mfg. Co.,**

218 Water Street

SENECA FALLS, N. Y., U. S. A.

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Don't Ask the Dealer for Sash Cord. Ask for "SILVER LAKE" and see that he gives it to you. It is impossible to substitute, as our name is stamped on every foot of cord. Silver Lake Sash Cord is the Original Solid Braided Cotton Sash Cord, and has been the standard since 1868. No other is just as good.

**THE ROSS IMPROVED SASH COPING HEAD**

SAVES FOUR OPERATIONS

A great labor saving device in making feed, cutting the straight, bevel, or should mortise by merely adjusting the bits, thereby eliminating the operation of removing coping opposite Tenon Mortise, thereby saving labor, material from one machine to another. Cuts mortise up to 2 1/2 inches. Saves one-half the time in making sash. Used on top coping mortised.

If you are at all interested send for this head at our expense on ten days' trial. It will pay for itself in that length of time. In ordering state size of mandrel.
Cast Iron Gutters Last

Easily put up. Once up, always up. Do not bend or break by pressure of ladder against them. Will stand greater weight of snow or accumulation of ice than any vicinities play hob with all other metal gutters. Not affected by acid fumes that in some vicinities play hob with all other metal gutters. They are adaptable to any kind of building or type of construction. Cast with moulded face to form part of cornice, or rounded to serve as a hanging gutter. Used almost exclusively in England and all over Europe. Supplied in 6 feet lengths. Joints fitted ready to erect. No soldering required. Send at once for circular and prices.

HITCHINGS & COMPANY. Elizabeth, N. J.

The Value of a Modern Saw Bench

Take a look over this Saw Bench. It has two arbors—both can be fitted with saws, or one with a dado head. A few turns of a hand wheel will bring either in operation and can be stopped in any desired position. The design of these machines is simple. They are rigid in construction, easily manipulated, have durability of wearing parts and will produce a volume of output and accuracy of work greater than any others. Modern conditions call for modern methods. For full particulars write Smith.

[Smithville, N. J., U. S. A.

ROTHMOTORS ARE UP-TO-DATE CREATIONS

Look at this Modern, Direct Connected MOTOR DRIVE BAND SAW

Can YOU conceive of anything better?

We have Engineers who KNOW HOW

Can be fitted to your Band Saw.

ROTH BROS. & CO.

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136 LIBERTY ST., NEW YORK

FAR AHEAD for smooth, easy work and holding edge will be YOUR VERDICT ON TRYING CHAPLIN'S IMPROVED PLANES

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Talk good roofing; not how cheap you can put it on.

A Creaky door and a grumbling man are in the same class—there’s something out of order with each of them.
The average price of the entire Portland cement output in 1908 was only 85 cents a barrel—36 cents below the average price in 1907. The 1908 price is the lowest on record, the previous low price—88 cents below the average price in 1907. The 1908 price is output in 1908 was only 85 cents a barrel—36 cents a barrel—having been reached in 1904 as the result of business depression in that year.

Glass Bricks

Glass bricks are not gold bricks. Germany uses them for building purposes with measurable success. In Berlin is constructed a small villa, the walls of which are built of glass bricks of several shades of dark green and blue. The glass bricks are especially adapted to construction where light, cleanliness, and neatness are particularly in demand. In Hamburg they are utilized in place of windows. They admit light in walls which police regulations require to be fireproof and windowless.

In addition to admitting light to dark hallways, rooms, etc., they are said to possess the same strength as ordinary clay bricks. They are also utilized in walls in yards and in partitions in the interior of houses, salesrooms, offices, workshops, etc., as well as for the construction of verandas, hothouses, kiosks, bathrooms, hospitals, ice factories, butcher shops, railroad stations, breweries, stables, and in other places where cleanliness, light and uniform temperatures are especially desired.

The bricks are also made with a wire coating for fireproof walls. In some of the recently erected buildings in Milan, Italy, bricks made of glass have been adopted for ground and upper floors on account of the light obtained. They are also coming into use for partition work in some of the hospitals on account of hygienic principles.

In one of the leading banking institutions of the city of Turin the lobby office floor, which is about 36 by 58 feet, is entirely paved with glass bricks laid in iron frames for the purpose of admitting light into the basement where are located numerous private boxes or vaults. In the Netherlands hollow green transparent glass bricks are used principally for light giving purposes in machine shops and conservatories.

*Strength and Properties of Timbers*

The better grades of timber, weight for weight, are stronger than ordinary structural steel. It is for this reason that the frames of the various flying machines thus far brought out are usually constructed of wood.

Wood has considerable elasticity as well as strength. When the automobile first came into being, the wheels on many cars were made entirely of metal, or with metal spokes and a metal or wooden rim, following the design which had been developed with bicycle practice. It was soon discovered however, that for heavy auto service wood-spoked wheels were far superior, and today wood has practically displaced metal in this field. In like manner some automobile manufacturers are using ash frames for their cars.

Lignum vitae is a material which practically made possible the steam navigation of the ocean by vessels having submerged propellers. The older bearing materials or metals were either too soft to stand the terrific work imposed by a propeller shaft, or they were affected by sea water. Lignum vitae blocks set with the end of the grain toward the shaft make a well-nigh indestructible bearing. The wood is naturally oily and very hard.

The stern bearing of vessels are not the only ones in which wood is used to advantage. In many agricultural implements such as corn planters, hardwood boxes are used for shafting to run in. When this hardwood is soaked with oil it forms an excellent bearing, and will work for a remarkable length of time.

In days gone by practically all the bearings about a grist mill or sawmill ran in wooden boxes, and it is simply owing to the fact that with high-grade machinery of the present day metal bearings can be made more cheaply and accurately, that the old wooden box has been so nearly displaced.

In the case of gearing where quiet running is required, wooden teeth are extensively used in heavy mill drives, just as rawhide pinions are used in smaller gears.

Some of the softer and more pulpy woods, such as basswood and whitewood, are extensively used for brake blocks or friction blocks inside of brake bands or in connection with power clutches. The wood grips the metal face with which it is in contact better than any other substance thus far discovered.

White pine is used for pattern making, on account of its low specific gravity, its close, fine grain, and relatively great strength, the close fine grain and its softness making it easily tooled or machined into a given shape, and at the same time susceptible to a good finish with varnish.

Boxwood is used for wood engraving and measuring scales, on account of its strength and exceedingly fine strong grain, and the ease with which it can be tooled to a given form.
"Good gracious Jones! What a terrible time you're having, and this happens every spring and fall. I'm going right to the contractor and tell him I've changed my mind and want a furnace installed in my new home. Nothing like this for me!"

"Egad! My foot! O!!*!*#-##*!*

"What a narrow escape that was! I don't have to wrestle with snows and furnaces every spring and fall like Jones does!"

"I wish I'd put one in my house when I built!"

"Let be in baby!"

"Why Smith Put a Furnace in His New Home"
Evolution of the Fireplace
VARIOUS STYLES OF FIREPLACES AND TYPES OF CONSTRUCTION LEADING UP TO THE PRESENT-DAY
USE.—DISTINCTIVE DESIGNS SHOWN

By Lynde Claves

The primitive fireplace was a crude affair, poorly arranged, with but scant attention paid to necessary details; and in consequence it was of little real value. The only facility provided for the escape-ment of the smoke was a rude hole cut in the roof through which it was supposed to pass, but, failing to do this, escaped through the handiest side opening, first choking the apartment with its volume, and generally necessitating the flight of the occupants.

Later still, the fireplace was built directly into the wall, leaving no disturbing break projecting into the room proper, and it is this type which is employed at the present time. Even when this improved form of fireplace was commonly adopted, the Italians, who had clung to the hood device from the date of its in-ception, still employed it as a decorative feature, and as such it is sometimes used to-day.

At first, the fireplace opening was of small dimen-sions, but gradually, as it was thought that a larger opening meant an increase of heat, it was enlarged, until, at last, it was of such enormous proportions that it permitted the entrance of considerable cold from the outside; and then it was reduced to smaller dimensions.

The early fireplaces were lined with stone or brick. Later, iron was used for this purpose. Present day homebuilders use brick, tile and iron; but the last named is rarely satisfactory, and a man acts wisely when he builds his fireplace of some other material.
The finest type of the old-time fireplace was the Colonial, at first a huge affair, but, with the passing of time, considerably reduced in volume. It was generally the predominating feature of the crude one-roomed cabin which it heated, and was often built of roughly hewn rock or field stones picked up not far from the clearing where the little home stood. These stones were piled up wall fashion and chinked with mud and clay in place of mortar.

The earliest specimens of this type of fireplace were veritable caverns, built not only to heat the rudely constructed houses, chilled with the penetrating winds that entered through spaces between the logs and around the ill-fitting doors and windows, but also to cook the food which was suspended over the blazing logs in the big kettles and pots hung from the stick of green wood or the iron crane arranged for that purpose.

Huge back-logs, sometimes measuring ten feet in length and two in diameter, occupied the back of the fireplace, and served to throw the heat forward as well as to prevent the stonework from becoming too hot. A smaller log, known as the fore-stick, was placed at the front, slightly elevated from the hearth by fire-dogs, so called because of the grotesque animals' heads which ornamented them, and sticks were laid in between. The kindlings of dry pine and shavings were lighted by means of flint, steel and tinder-box, or coals brought from a neighbor's hearth, and the fire, once started, was rarely allowed to go out. Such fires today would be extravagant luxuries, but in those early times when an abundance of logs was to be had simply for the chopping, they were looked upon as ordinary, every-day necessity.

As times went on and the colonists became moder-ately prosperous, the number of rooms in their homes increased; likewise the number of fireplaces. The latter, however, were no longer of cavern-like dimensions, for the new houses, solidly built, afforded little chance for the bitter winds to enter, and, then, too, the huge logs were not so plentiful as in the earlier days, for the constant drain upon the forests had considerably depleted them.

By the middle of the eighteenth century the great yawning fireplaces were superseded by those of more
moderate dimensions, and though some few of the early ones were still in use, they were partially filled in with brick and mortar to conform with the urgent demands of economy. It was at this period that the brick oven was first introduced, and it proved a most valuable asset, doing away as it did with the trying process of cooking by the aid of embers alone. The tin kitchen was a later invention, and other accessories of the old-time fireplace were the long-handled frying pans, the baking pans supplied with legs so that they might be set directly among the embers, and the roasting spits.

With the adoption of the smaller fireplace came the decorative mantel and the more elaborate fittings. The finest of these rare old mantels are found in New England houses, and the beauty of their delicate carvings elicits the admiration of all beholders. Some of them show in the center the figure of an eagle, an emblem which was much in vogue at the close of the Revolutionary War. These are known as Constitution pieces, and are the work of the greatest wood-carver of his day, Samuel McIntire, who made his home at Salem. Horns-of-plenty, and baskets filled with flowers are some of his favorite emblems, and they are always executed with that exquisite care as to detail which was the distinguishing trait of his genius and the greatest asset to his success.

The iron firebacks, in use at this time, were also extensively decorated, frequently with the coat-of-arms of the family, or with a design consisting of a medallion bearing the owner's monogram and surmounted by the family crest. Floral patterns, too, were very popular, and the back of many an old-time fireplace was adorned with pretty flower sprays.

In the year 1750 a quaint innovation known as a hob-grate first made its appearance. It was often fitted into a fireplace that had been partly bricked up, and consisted of iron bars, designed rather for burning coal than wood. These bars were called "cat-stones," in contradiction to the term "fire-dogs," as applied to...
andirons used to support wood. Fenders of brass or iron were generally used with these grates, a small one arranged close to the fire to prevent the ashes from scattering over the hearth, and a large one placed around the entire fireplace. These grates are still extensively used in the South.

Towards the middle of the eighteenth century the Franklin stove made its appearance, and in the North superseded the open fireplace to a considerable extent. It was usually constructed of iron with trimmings of polished brass, and in appearance somewhat resembled the small open fireplace, with andirons for burning wood. It was a far greater warmth producer, however, and in addition was much more economical as there was little waste of heat through the pipe connecting it with the chimney.

Later in the century the fireplace was filled in with boards or bricks, and the fire-frame came into fashion. It was similar in appearance to the upper part of the Franklin stove, but unlike this earlier innovation, it rested directly upon the fireplace hearth instead of being raised from the floor on legs and having a hearth of its own.

Following this came the reign of the stove, and the fireplace went quite out of fashion. Gradually, however, its charm won back the hearts of men, and today it is an indispensable feature of every new dwelling house above a certain grade, not interfering in the least with the complete heating system which is installed for general purposes.

**Model Pantry to Lessen Domestic Labor**

By Bertha Kobelt

A **TALL row of shelves with a flour bin and tinware cupboard beneath may constitute a fairly convenient pantry in the eye of the carpenter, but the housewife in her various culinary experiences always finds herself ready to add a few improvements and devices of her own planning.**

A neatly-built china closet in the dining room, a kitchen cabinet next to the gas stove, and a refrigerator will render the special pantry conveniences less imperative, but a nicely arranged pantry is essential to the easy and peaceful working of all one's domestic machinery.

Most pantries have too many high shelves that are only accessible with a chair or a stepladder, and while they may come handy for keeping "forbidden fruits" from Johnny or Willie, they are more often a nuisance for their neck-breaking possibilities.

The small, blind, closetlike pantry, in which one must study to get things crowded in right, is quite as objectionable, for it interferes with neatness and order.

The average dimensions for a model pantry are 4 by 7 feet. No matter if your pantry opens next to a well-lighted window, it should have a window of its own, however small, for ventilation is quite as important as light. Staple groceries and daily market stuff are apt to acquire a moldy and musty odor in a short time in a pantry that is not properly lighted or ventilated.

**North Side Best Location**

It is best to have the pantry window on the north side, however, where the hot rays of the sun cannot penetrate. This will help to keep it cool and fresh. The floor should be of oil stained hardwood rather than natural maple, for the latter is likely to blemish easily where food is continually handled.

A pantry that may be describ as model has a tier of four short shelves at the narrow end of it, on which are stowed such articles as are kept in boxes, cans, or jars, and should always be within handy reach. All the other shelves extending the length of the pantry and on which china, crockery, and other table service is kept should be closed with glass sliding doors, or the ordinary cupboard folding doors.

It saves much dusting, rewashing and wiping to keep one's dishes behind closed doors, protected against dust and vapor damp. A lower cupboard for tin and enamel ware, skillets, pans, and the like, should have hooks, nails, and racks rather than shelves.
Tinware unevenly and loosely piled on the shelves often precipitates in a roly thunder of dishpans and pie plates whenever the door is opened. An ideally arranged pantry is not without a few drawers, about 6 inches deep, preferably built in on slides immediately under the shelves, so that one need neither stoop nor stretch on tiptoe to get at them.

One for cutlery and silver service, one for tablecloths and napkins, another for towels, etc., will help your endeavor to have a place for everything and everything in its place.

**Flour Bin Not Too Deep**

A deeper and larger drawer built in at the narrow end of the pantry is handy for keeping such utensils as rolling pins, egg beaters, and potato mashers. The flour bin need not hold more than 50 pounds at a time, and should not be so deep as to necessitate much stooping.

If it does not cause too much crowding a little sink is a splendid addition. Some modern pantry sinks have a hickory wood fly leaf, opened and extended like that of old sewing machines, which when dropped back on the sink can be used as a baking board.

A certain housekeeper who had an eye for time-saving contrivances had the pantry in the home she had purchased so completely remodeled that barely a vestige of the original open-shelf style remained. She did not approve of kitchen cabinets, and the china closet in her dining room was a small panel mirror affair, suitable only for exquisite bits of ceramic not commonly used as table service.

It was necessary to find a more appropriate place for her delicate chinaware sets than the long open shelves of her pantry afforded. The idea to have her pantry improved to meet the most imperative needs naturally presented itself.

For a reasonable sum she obtained four glass sliding doors from a wrecking house, and had these fastened against the shelves in such a way that they could be moved back and forth on small wheels concealed in grooves. There were two large flour bins in her pantry, only one of which she used.

It was only common sense to have one removed, and to substitute something with drawers in which to keep towels, asbestos, knives and forks. She finally selected an old, narrow chiffonier, part of which had been damaged and charred in an apartment-house fire. By having it sawed down it fitted nicely under the shelves on a level with the bins, and after the whole woodwork of the pantry was uniformly stained or painted in a mild shade of ochre, it was hard telling whether the carpenter had not built it himself.—Chicago Tribune.

**Interior Chart**

**Sketch Showing the Position and Form of the Different Parts of Interior Finish and Giving the Name of Each—Much Valuable Information in Condensed Form**

By Albert Fair

THE object in presenting this chart is to give the various names of interior wood-work, etc.

To get this within a reasonable compass and to show different styles of trim and interior finish, it was necessary to group the various designs together. Some of the details are exaggerated in size compared with the scale of the drawing, so as to show them plainly.

2. Sub-sill. 15. Architrave, interior casing or window trim.
4. Quarter rounds. 17. Parting head or strip.
7. Pocket, or opening to weight box. 20. Window latch or sash exterior casing.
10. Clap-boarding, shingles, or outside covering. 23. Meeting rail of outside sash.
26. Window head.
27. Exterior casing.
28. Sash stile.
29. Astragal or sash bar.
30. Sash lift.
31. Window pane or glass.
32. Panel back or breast.
33. Base blocks.
34. Window trim, casing or architrave.
35. Corner block.
36. Window trim.
361. Cap trim for window.
37. Picture molding.
38. Dado.
39. Plaster wall.
40. Border.
41. Stile.
42. Hanging stile.
43. Top rail.
44. Middle rail.
45. Lock rail.
46. Bottom rail.
47. Muntin.
48. Panels.
49. Knob.
50. Key hole.
51. Base blocks.
52. Door trim.
53. Head block.
54. Door trim.
55. Cap trim for door.
56. Carving.
57. Hinges.
58. Ornamental casing.
59. Door saddle or threshold.
60. Header.
61. Door stop or jamb mold.
62. Door jamb.
63. Furring.
64. Door jamb.
65. Plaster cornice.
66. Frieze.
67. Shelf molding.
68. Wainscotting.
69. Wall covered with paper.
70. Skirting or base board.
71. Chair rail.
Possibilities of the Steel Square

How to Use the Steel Square to Solve in an Easy Way Some Difficult Problems Often Encountered in Every Day Work

To lay off a straight line in length equal to the circumference of a given circle, is one of the things that may be accomplished with the steel square and may be done as follows:

Referring to Fig. 259, a square is shown with a line running from 22 on the blade and passing at 7 on the tongue. Now, suppose we wish to find the length of a line that will equal the circumference of a circle with a diameter of five inches. Take five inches on the tongue and square out till it intersects with the diagonal line from 22 to 7, thence at right angles to the blade, as shown, and the length of the required line will be as from A to B. If the diameter of the circle be 16 inches, then square out from 16 on the tongue, as before, but in this, the line will run to the right of the tongue instead of the left, because the diameter is greater than 7 inches. The circumference in this case is found to equal the distance from C to D. From this it will be seen that the circumference of any circle can be measured on a straight line, as the proportions of a right-angle triangle with 22 base and 7 altitude hold good for the measurement of any sized circle.

Fig. 250 furnishes another interesting problem, showing how the same results may be found as given in the former example but which we believe is more practical on account of its simplicity. Every school boy and girl has been taught that the circumference of the earth is a little more than three times its diameter. Now, since the earth is reckoned to be round, we will apply the solution to a circle on a small scale, as shown in the illustration. Place the heel of the steel square at the center and draw the chord line at the point where the blade and tongue intersect the circle; draw the line A B at right angles from the center of the chord, as shown. The length of the circumference will be three times the diameter of the circle, plus A B. This is a very useful diagram because it is simple and easily remembered. Mathematically it is multiplying the decimal 3.1416 by the diameter.

The hexagon is one of the simplest of all the polygons to draw and there are a number of ways of doing it, some of which we have illustrated before in connection with the steel square problems, but here is one that is simple and worth remembering.

Referring to Fig. 261, suppose it is desired to lay
off a hexagon with sides $2\frac{1}{2}$ inches wide. Set the dividers at one-half of this ($1\frac{1}{4}$ inch) and space off four spaces as at 1-2-3-4 on a straight line, as shown. At 1 and 3 draw lines at right angles to the first line drawn, then set the divider point at 2 and open up to 0 and strike the circle; where the same crosses the lines from 2 and 3 will determine the points for the corners of the hexagon. Connect up these points and the hexagon will be formed.

When a small boy on the farm, it was equal to a summer's vacation to go to town with father; and one of the sights that never failed to catch our attention was a tin shop, the proprietor of which during odd times cut from sheet metal various shaped figures and folded them up, soldered the joints and hung them out in front of his shop. As we remember it now he was considered something of a wonder in this line and he was perfectly filling to have it that way as he never offered any explanations but just looked wise and let the other fellows do the thinking.

One of the objects was a large ball-shaped figure with 12 pentagonal cone-shaped spikes covering same. In after years, we learned that those figures were polyhedrons, one of which we show in Fig. 262, called the dodecahedron, which is composed of twelve pentagons, this formed the base for the pentagonal cones as before mentioned. This can be laid out in one piece, as shown in Fig. 262. The circles are shown in the illustration to locate the centers and otherwise show the accuracy of the work. The starting point on the steel square is at 12 and 8.72 (8 17/24) which gives the angle from which to start the diagram. After deciding on the length of the sides of the pentagon, as at A B (3 3/4 inches), bisect the same with a line intersecting the perpendicular line above 12 on the tongue, as at C. Draw the circle with radius C-A, and space off on the circle, the distance A-B which will divide same into five points forming the pentagon. Twelve pentagons put together will form the dodecahedron. The remainder of this figure shows the layout for cutting the whole out of one piece so that the same will fold up and form a solid figure. After having formed the first pentagon, proceed to lay out the remainder by extending the line D-E, intersecting the angle line on the square at F, then bisect the line A-F with a line at right angles, intersecting the extended line A-C at G which will be the center for one-half of the layout. Then G-C will be the radius that will catch the centers of all of the other sides and is simply a repetition of the first pentagon and is all that is necessary to make as this will furnish a pattern for the other half of the figure.

**Framing for Base and Sill**

By I. P. Hicks

Last month details were given of a satisfactory bungalow cornice, and the cost of construction was figured according to the lineal foot method of estimating. The accompanying sketch shows the sill and outside base to accompany that cornice.

The base consists of three pieces, a face piece, cap piece and a sprung mold underneath. A 12-inch board ripped will make both the face piece and the cap and cost 4 to 5 cents per lineal foot for the lumber; the molding will cost about 1 1/4 cents per foot, making the total cost of the material 5 3/4 to 6 3/4 cents per lineal foot. The cost of the labor may be figured at 2 1/2 cents per foot for each of the board members and 1 cent for the molding, making 5 cents per lineal foot. Thus the total cost of the base for material would figure from 10 1/4 to 11 1/4 cents.

In the figure is shown a method of framing, the 4 by 6 sills are halved together and spiked at the corners.

The joists, which are 2 by 10, are notched so as to set with about 4 inches of them on top of the sill, then they may be gained into the sills about 1 inch deep and about 1 1/2 inches on the top as shown by the dotted lines which will make a good substantial way of framing.

**The Reason**

Weekle: “So Slipsy is a defaulter, eh?”

Deekle: “So they say.”

Weekle: “By George, I always wondered why he said ‘Thank you,’ so pleasantly every time I made a deposit.” —Bohemian.
"False Work"

THE USE OF CARPENTRY AND TIMBER FRAMING IN CONNECTION WITH MODERN STEEL, CONCRETE AND MASONRY CONSTRUCTION

By Owen B. Maginnis

It has been stated that the art and trade of the carpenter is comparatively obsolete and no longer necessary, having been displaced by iron and steel. So it is my purpose in this article to refute this statement and prove that iron and steel construction are dependent for their existence, lives and maintenance on the executed work of the carpenter and framer.

As an instance, I would quote the so-called "false work' used in the construction of the "Washington Bridge" which spans the Harlem River from 181st street on the Manhattan side to that part of the City of New York known as the "Bronx." Here the two arches of steel being in compression, had to be carried upon centers which were built up from the river’s bed on a foundation of piles driven temporarily to sustain the false work, which was designed to form the framework necessary to gain the semi-circular outline of each arch, of which there were two.

Fig. 1 will convey an idea of the method of construction. I might state, in this connection, that this
method can always judiciously and safely be followed and practiced when erecting centering, scaffolding or any form of "false work" or temporary structure to be carried to great heights not only on the exterior of great edifices or public buildings, or edifices such as churches, schools, etc., but for the interior; and it will always be the task of carpenters and framers to erect entirely on the direct mechanical application of the right-angle triangle and its hypotenuse reversed. Singly one would constitute a bracket reversed; the framing becomes a square or parallelogram or oblong with two braces or diagonals, each member of which has a double value structurally (See Fig. 2).

In this drawing, which shows the positions of the timbers, employed in Fig. 1, the uprights are abutting end to end as they rise from the base, the joints being cleated together with 2-inch cleats bored and bolted. The uprights are prevented from bending or springing by timber 2 by 6 inch ties, spaced in height equal to the distance apart of the line of uprights; and the whole construction is rendered stiff and stable by the diagonal braces shown in Fig. 2, which are reversed and bolted on opposite sides of the posts or rather uprights. This construction can be run on plan in squares, and if the uprights are set either 7 feet 6 inches or 5 feet 6 inches apart on centers, 16 or 12 foot plank, as the case may be, can be set on the ties, to walk on during construction.

It would not be wise, however, to trust much to the sustaining power of the timbers when only held by bolts, because it must be remembered that every timber bolted or nailed only carries on the timber above the supporting point and below is non-sustaining, except for the cohesion of the fibres of the timber; so that to insuring perfect safety when heavy loads are to be placed upon bolted or nailed tie timbers, it would be judicious to bolt or nail cleats below the bottom edges of the timbers.

The principle of the construction is simple, depending on the direct mechanical application of the right-angle triangle and its hypotenuse reversed. Singly one would constitute a bracket reversed; the framing becomes a square or parallelogram or oblong with two braces or diagonals, each member of which has a double value structurally (See Fig. 2).

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in order to obtain the full bearing strength of the horizontal tie or timber.

To carpenters and builders of experience, I need not give a word of warning as to selecting good, sound, dry, reliant timber for scaffolding or false work; however, I have seen accidents and failures occur in the course of practice of building construction owing to this cause of faulty timbering, proving regrettable and financially disastrous to all concerned. It is no matter to leave to a tyro, but to a competent judge of timber, who may be able to distinguish between that which is dry or wet hemlock, or oak and such like knowledge.

We will now pass to the matter of mechanical accuracy in building false work. In regard to this, I might state that much skill and care is absolutely essential, in fact, as much so as in the actual permanent building or structure to be afterwards erected and which must until completion depend upon the auxiliary false work.

First, the foundation, or base, must be solid and fully fit to carry the superstructure. If the base be piling, each pile must be driven home until a 1500-lb. hammer will not, from a height of 25 feet, send it down ¾ of an inch. If of stone or brick it must be sound and solid; and if on street or soil, same should be covered with heavy timbers to prevent subsidence.

Second, the bolt holes and positions of the timbers either vertically and horizontally on plan, or elevation must be exactly spaced and measured off with a ten-foot pole or tape line, so as to have the workmen execute the framing, square, plumb, level and true. Warped timbers should be laid aside and not used. Holes should be bored square to the sides and edges and not too near the ends of any one stick.

Third, all completed work should be tested as it rises from the bottom up tier by tier.

Fourth, when the outline on soffit of any arch, ceiling or other detail, has been built up to, the architect or engineer should be consulted or brought into advisement in order to verify the architectural accuracy of the details and guarantee the validity of the framing, lest it should fail or some hitch develop to mar the entire framing, as will be seen in the illustration, temporarily carries a wrought-iron lattice girder during the repairs of its members. This false work is portable; all that is necessary to take it apart is the unscrewing of the bolts and lowering of the timbers, which are of good solid yellow pine. To my mind the uprights would be better if slightly battered, like spur shores; still the form is excellent and might be copied with advantage.

In concluding this interesting subject, there is a very interesting anecdote apropos of the value and importance of temporary framing or “falsework” which I would like to append.

**Importance of “False Work”**

It is recorded that in the Middle Ages in a country in Germany, there was an architect and engineer, both professions were combined in those days, commissioned to design and superintend a stone bridge spanning a river. This he did and the work was let out, started and in progress, as he thought, to success, when, one evening when revising his calculations, he discovered that they were wrong, the stone materials insufficient and that on the removal of the centering or false work, the bridge would collapse and fall.

The rings of voussoirs were not all set in the arch, a few at the top and the keystone being lacking. Driven to desperation by worry and anxiety, he told his Frau, or wife, the story, saying that his reputation, his bonus and perhaps if an accident occurred, his head, depended on the work. At this point the woman’s wit came in and saved him.

One stormy night, soon after, when the sky was full of thunder and lightning, my lady stole forth and lighting a brand, set fire to the resinous timbers composing the falsework. The center burned out; the whole, carry walls, girders or such like. An observation of the construction will show that the base is composed of four steel I-beams bolted in pairs, resting on 12 by 12 inch wooden blocks, set and spaced on the sidewalk. On these rest four cross timbers forming sills for four frames, mortised and tenoned together, consisting of two 8 by 8 inch uprights, 4 by 6 inch braces and 10 by 10 inch heads. On these two longitudinal strings each 10 by 10 inch are placed; then 7 12 by 12 inch ties. The four frames are braced lengthwise by 2 by 6 inch diagonal braces reversed on opposite sides.

Finally, I might state that the splendid centering for the first arch (parabolic) in the Cathedral of St. John the Divine, in New York City, has long been in position and the second one has now been in three years. So how can it be said that constructive carpentry is even comparatively obsolete?
Artistic Bungalow Plans

COMPLETE ARCHITECT'S DRAWINGS OF AN ARTISTIC BUNGALOW WHICH IS THOROUGHLY PRACTICAL AND SATISFACTORY IN CONSTRUCTION AND ARRANGEMENT

The accompanying plans were prepared to follow out the ideas of Mr. H. H. Behrens, Chicago, Ill., and an exceptionally artistic and satisfactory little home has been erected from them for him in one of the Chicago suburbs.

As indicated on the drawings the exterior was over-
coated with cement plaster, rough finished; and in the gable ends and dormers exposed timbering was used—producing a very pleasing effect. A glance at the floor plan will show the spacious and at the same time convenient arrangement of the interior. The details show some features worthy of study.

**How to Raise a Ladder**

It seems very simple to see two men put a ladder up against a wall, but it needs care and a knowledge of a few little essential things or a man may be maimed for life, or the ladder broken. The "footing" of the ladder is most important. It is better for two to be at the foot and one to raise it if there are only three men, and if two are raising they should be of equal heights or nearly so. The one that is raising should push up from the sides and not from the rungs, and do it steadily and not in jerks. When there are
two raising it, each should take a side and push steadily and together. The one “footing” it should place both feet upon the bottom rung (not on the ground as it invariably slips), and catching the rung above throw his weight back so as to pull the ladder up. He must never get off the rung until the ladder is perfectly upright and then must act in consort with the one
who is raising. When two are "footing" one should put the left and the other the right foot on the bottom rung. When lowering the ladder the footer must not get off until the ladder is right on the ground.

Carrying a pair of steps is another small matter which an apprentice cannot be taught too early, especially when it comes to moving steps or trestles from one room to another. The proper plan is to always pass the top of the steps through a doorway first, because it is generally the top which does the damage by coming into contact with the top door jamb or architrave. Therefore keep your eye on the top of the steps and clear it first and the bottom may be depended upon to look after itself.
Combined Bank and Office Building

PERSPECTIVE AND PLANS OF A WELL ARRANGED BANK AND OFFICE BUILDING DESIGNED FOR A SMALL CITY

The ideals of American business life make it exceedingly desirable, if not absolutely necessary, for a responsible banking institution, no matter where it is located, to occupy a building dignified, substantial and harmonious in appearance, a building in keeping with banking principles.

A first floor space, rather broad and well lighted, is required for the bank itself; and a second story is usually added. This makes a strong architectural effect possible and also secures very desirable office space which is much in demand by doctors, lawyers, etc., at a good rental. The building illustrated, recently designed by G. M. Ashby, architect, shows such a building in its best form.

First Floor—Banking Rooms

Second Floor—Offices
Planning and Design of Modern Flats

THE popularity and use of the apartment or flat building is no longer confined to our largest cities. Both Chicago and New York claim the honor of having originated and developed this type of city residence; but they can no longer claim a monopoly on its use. Forced partly by the high price of land in the desirable sections within reach of the city centers, partly by the increasing cost of all the necessities and luxuries of life, as well as the annoyance and difficulty of securing competent help, our American families have been compelled in many of our cities and suburban towns, to abandon their natural preference for private and individual homes and enter upon what is probably an early phase of co-operative living.

The buildings devoted to this co-operative living may be generally divided into two classes:
The family hotel, in which the co-operative idea is so far developed that the necessary cooking and laundry work are done in common, either in or outside the building, in which case a large dining-room, kitchen and laundry are essential.
The other is the apartment or flat building proper, where each apartment is self-contained and completely equipped for a family home.

For the purposes of this article we have selected a number of designs by the leading architects of Chicago who have made a special study of flat building arrangement and construction. A majority of these designs are of the smaller, medium-priced class of buildings, such as are most often desired; these are the popular two-flat buildings, and apartments or offices combined with business buildings. Three-and four-flat buildings are also shown together with two of the larger city apartment houses for nine and twelve families. All of these designs have proved practical and satisfactory in actual work. They possess special features that recommend them for careful study to all builders interested in this class of work.

Some points worth noting in connection with the proper planning of an apartment or flat building were brought out by Thos. McCall, architect, in discussing this subject. It appears that the planning of an apartment building is much more difficult than planning an ordinary residence. Proper provision must be made for the kitchens, pantries and dining-rooms, and for the convenient housing of help, for the reception of supplies, disposal of garbage, etc. The requirements as to air and sunshine are very ex-
acting. The sense of privacy to each family must be maintained as far as possible. Most city ordinances now require that each apartment be separated by a brick wall, which is an excellent provision.

The latest arrangement in apartments is a great improvement over that of ten years ago; the long, narrow hall is now almost entirely dispensed with, so that in entering an apartment now we step into a square room or reception hall; and from this, through large openings, to the principal rooms. The reception hall is fitted up with fireplace, wall seat, or paneled to present a cozy appearance.

The parlor and library is in the front, commanding a view of the street, and fitted with a fireplace suitable for burning wood, coal or gas.

The dining-room also comes in for considerable attention, with paneled or burlaped dados, plate shelf, side-board and beam ceiling. The location of the dining-room is also a matter of much importance, requiring some thought and study, according to conditions.

The kitchen must be located conveniently to the dining-room, and of ample size to hold the furniture and equipment without being congested. Then, as to the pantries, bath-rooms, chambers and closets, each requires special attention to make the apartment complete and desirable. Bedrooms must be of ample size and arranged especially to receive the furniture, so that radiators will not come under the beds, or gas
An ornamental design for store and flat building of brick with stone trimmings and plaster panels. There is a large, well-lighted store room on the first floor and a very desirable, nicely arranged 3-room apartment on the second. Estimated cost $5,000.
brackets located so that the doors will bump back onto them, as is the case sometimes where plans are hurriedly drawn.

The bathrooms and sanitary arrangements require very careful attention, as a great deal of needless expense is often incurred by the careless running of pipes and placing of fixtures.

The department of help also requires some thought; the day of the servant sleeping in the basement has gone by, so we must make the proper provision for help in the apartment, if we wish to keep house and enjoy long life with a reasonable amount of happiness, and this arrangement is much more satisfactory to all parties concerned.

The heating apparatus is a very important feature, and requires some careful figuring to arrive at the correct proportions in boiler, radiation and chimney, to insure comfort throughout the building, with the minimum amount of fuel and attention. A poor heating plant in a building frequently tends to a poor investment, as it creates dissatisfaction amongst the tenants and consumes the maximum amount of fuel.
A little care in first adjusting the apparatus is the remedy—prevention is better than cure.

The janitor's rooms should be located in a pleasant part of the building, as an inducement to keep a good man, and of easy access to the tenants and others seeking information about the building.

The arrangement of the basement is a matter of great importance. The lighting and sanitary conditions should be the best possible. The laundry and store rooms should be located so they will not come in contact with coal dust. The coal room should be located for the convenient unloading of coal, with the least handling; and, if possible, in an alley. The garbage crematory, the hot water supply, and in short the whole equipment should be carefully studied out, to combine completeness with simplicity, thus making the care of the building an easy matter.

The planning of such a building can only be done successfully by those who understand this class of work. The public is very exacting in the matter of apartments, and is willing to pay the price, but everything must be modern and up-to-date, and the architect who follows the planning of apartments must know what is going on and keep in touch with public demands, and there is no reason why what the public demands cannot be made to pay, if supplied to needs of our smaller cities. Rent is always a large item in the monthly bill of expense, and this item can be entirely eliminated by the erection of a two-flat building.

This kind of building is the more desirable for those who prefer privacy, as the entrance or stair to each apartment is strictly private. The owner lives on the first floor and leases the second.

The amount of capital required is small and money is readily loaned on this class of property. It is erected more as a home than for an investment, and at the same time is an excellent investment, as the income from the second flat in most cases pays interest, taxes, coal and other expenses. It has commendable social features, making this plan of living desirable in many ways.

A building for any district should be in good taste—must be well lighted, conveniently arranged, thoroughly equipped, and adapted to the needs of the people. A cheap building in a high grade neighborhood is a public injury, while a high grade building in a poor location is a waste of money and a poor investment. Mistakes through inexperience can be avoided by a little counsel or advice, if taken in time.

Experience counts for much in this twentieth century. Hamilton W. Mabie wisely said, "Practice makes for skill, discipline for character, and the ac-

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The Two-Flat Building

The two-flat building is very popular as an economical proposition and is especially suited to the
cumulation of knowledge for intelligence." Tact, skill and judgment are valuable elements in the construction of apartment buildings; then it pays, and pays well—better than any of the stocks or bonds to be found on the market.

**Saw Strikes Horseshoe in Log.**

While sawing through a Litternut hickory log in a mill at Pierpont, Ohio, a horseshoe, embedded nearly 4 inches within the wood, was struck and cut through transversely for 3 inches without breaking any of the teeth of the saw, although the friction melted the iron and it attached itself to the plate in six different places. The saw was running at a speed of 600 revolutions per minute.

The shoe was hanging on a nail within the wood, and, according to the rings of growth outside of it, must have been placed there at least 25 years ago.

**Causes of Leaky Slate Roofs and Their Remedy**

A writer who has had an experience of many years chiefly in connection with slated roofs describes some of the causes of roofs leaking and points out remedies for the trouble in a recent issue of our London contemporary, *The Illustrated Carpenter and Builder*. He intimates that there are few, if any, roofs that do not at some time or another allow water to enter the interior of a building, staining the ceiling and doing other damage. He states that the two leading principles in connection with roof work are the pitch of the roof and the mode of covering it. He points out that the flatter the pitch the larger the slates and proportionately increase of lap, while the steeper the pitch the smaller the slates and less the lap. What he further says on the subject is of such general interest that we present it herewith.

On more than one occasion when the writer has had to repair a roof that looked perfectly sound, he has been told by the tenant that the leak appeared only after very heavy rains, and on removing a few slates over the defective part he has not found any broken or cracked slates to cause the leak. In other words, the roof is flat pitched, the slates are small, and the lap insufficient.

To remedy the defect, and where appearance is no object, an easy way out of the difficulty, and one that does not involve stripping the roof, is as follows: Remove about a dozen slates centrally over the spot where the rain has soaked through. If the existing slates are 16 by 8 inch or 20 by 10 inch procure some larger slates, trim down to the same width as existing slates but not the length, so that the extra length will give an extra lap to that portion of the roof affected. If, however, through weakness of roof timbers, a part of the roof has become concave on the surface the rafters should be firred up and the slates refixed.

Another and very frequent cause of leakage is where the roof abuts against the walls. It should be remembered that a great safeguard against leakage at this point is the insertion of a tilting fillet at the time of constructing the roof previous to covering in. It helps to keep the rain from percolating beneath the slates or flashings. The tilting fillets, though very essential, are in a good many cases omitted. They should be fixed at the junctions of walls and roofs as well as at the under eaves. There can be little doubt that flashings make the best finish at these points. Cement fillets do not, generally speaking, last long. The vibration of the roof in stormy weather causes the cement to become detached from the slates, leaving a gap for rain to enter, as the fillet has a better key and adheres firmer to the brickwork than the smooth slates. It would be better for the fillet to be oblong rather than angular in section, so that the greater part is on the roof. Were the fillet composed of lime and hair...
In order to economize slates sometimes the under-

In order to economize slates sometimes the under-

eaves are composed of small pieces of slates just suffi-
cient to break the joint, etc., but this should not be

allowed. Rain falling on a roof increases in volume

as it gets nearer the gutters and consequently the

undereaves course should be composed of full width

slates as well as any other part of the roof, for if not
Modern 12-Apartment Building at Jefferson Avenue and 54th Street, Chicago. Thos. McCall, Architect

Beautiful Building Containing 9 Sumptuous Apartments. Andrew Sandegren, Architect
so constructed it is liable to allow the rain to find its way to the interior of the building.
A good, sound slate roof requires:
(a) Tilting fillets at gutters and at junction of walls.
(b) No cement fillets but proper flashings wedged and pointed to the brickwork or stonework.
(c) The bond properly kept throughout.
(d) The lap regulated according to the pitch of the roof.

**Easy Rule for Furnace Men**
A simple rule for determining the equivalent cubic feet is: To the cubic feet in each room add for wall and glass exposure as follows (one-tenth of each square foot of wall exposure being equal in cooling effect to 75 cubic feet, and one square foot of glass exposure being equal in cooling effect to 75 cubic feet):

First, obtain the cubic feet by multiplying the length by the width of the room and by multiplying this result by the clear height of the ceiling.

Then multiply 10 per cent of the net wall exposure by 75 and add this amount to the total.

Then multiply the glass exposure by 75 and add this amount to the total cubic feet, and the cubic feet, the multiplied 10 per cent of the net wall exposure, and the multiplied glass exposure will constitute what may be called equivalent cubic feet; that is to say, the total will be equal to the cubic feet to be considered in determining the size of the furnace, the size of the warm air pipes and the size of the registers that will be required to heat the house.
The Care of Planer Knives

HOW KNIVES AND MACHINE ARE ADJUSTED AND REPAIRED AFTER THEY HAVE BECOME WORN—PRACTICAL ARTICLE CONTINUED FROM THE JULY NUMBER

By J. Crow Taylor

IT IS a comparatively easy job to adjust and care for knives when both the machine and the knives are new, for there are certain well-defined rules to follow, part of which have been laid out heretofore. It is when both machines and knives get worn, strained and battered from use that difficulties arise which are not provided for and thoroughly covered in the general rules and instructions for setting and adjusting knives. It is then that a man begins to realize the limitations of his knowledge, when he comes across conditions that he never counted on and is frequently at loss just what to do. He begins to realize, too, something of the value of experience; what is called book learning or knowing the principles that apply generally is not by any means the whole thing. A man gets the most of his real practical education through experience which leads him into and out of all kinds of puzzling situations.

When Knives Are Sprung

One of the troubles that comes to planer knives quite frequently in the course of time is the springing out a little right at the point of the cutter head lips, so that the chips begin to work their way under the knife. Sometimes the springing out of the knife primarily leads to the chips edging their way in and at other times possibly the wedging in of chips starts the knife springing out. Anyway, no matter which leads to the other, the two combined make a very common and irritating fault in the use of planer knives.

One thing that may induce a knife to spring out easier than it should is excessive tightening of the knife bolts. The man putting on the knives is between two fires on this point. It is decidedly important that he should get the bolts which hold them screwed down firmly so that there is absolutely no danger of the knives coming loose and flying off the head while in motion. When a knife does this, there is damage done and usually quite serious damage. It is regarded as one of the dangerous things about a factory—dangerous to both the man and the machines. A big knife going out in this way is about as dangerous as the old-time chain shot. It isn't fired with the same velocity, neither does it go as far; but it goes far enough and does damage enough that every possible precaution should be taken against it. Naturally, therefore, the man putting on the planer knives is inclined to screw down the bolts even tighter than is necessary in order to insure safety. It is best that they should do so too, but the result of this straining down tightly on the bolts is to start the knife turning up a little on the edges and in the course of a little while it gets slightly convex on the face side. Then the chips begin working under it and there is danger that they may wedge in tightly enough to break the bolts and tear the knife off and thus cause the same damage they would to come loose and be thrown off.

The novice in planing machine work when first confronted by this problem of a knife with a convex face side so that chips work under it will be puzzled and will likely be longing for the experience of older men to guide him. Some of these experiences and practices can be set forth here and thus add to the regular rules for the care of planer knives.

There are several different methods practiced or different means resorted to by those in charge of planers to correct this fault of planer knives opening at the tip of cutter heads so as to let in shavings. Probably the oldest practice of all is illustrated in Fig. 1; it is to put a sheet iron bushing under the
back edge of the knife, so as to lift it up a little and thus cause the front edge to come down closely at the lip of the cutter head even though it is slightly convex on the face. As a temporary means of curing the trouble this remedy serves very well. But it serves, in time, to aggravate or enlarge the convexity of the knife on the face side. When the heel or back edge is raised for the strip of sheet iron or tin in order to insure raising it enough to let the front come down firmly, it is generally raised a little higher than is absolutely necessary; thus there is created a concave or hollow space under the center of the knives where the bolts tighten down. And with the tightening down of the bolts the knife is sprung down into this. After being kept screwed down tightly until it runs its time it is pretty well fixed in this additional curvature and stays there until in the course of a little time additional bushing must be added to the back. So finally it is found that some other remedy must be resorted to, unless meantime the knife becomes so worn that it needs replacing with a new one.

Another remedy, and a better one, though it takes longer and cannot be applied so quickly, is to straighten or flatten out the knife immediately after any evidence of convexity appears on the face. The average planer knife is made up of a body of iron and layed with steel on the face. This makes it much easier to straighten than if the knife were a solid bar of steel. Probably it strains and gets convexed a little easier, too; but still it is better in this respect than a solid steel knife because it is well-nigh impossible to work a tempered steel knife blade without danger of cracking it, while the iron one can be easily straightened out by different methods.

Some, and probably the majority of millmen, resort to hammering certain knives which have become convexed on the face side. It can be done in this way, too, but one should be careful about it unless the knife becomes kinked and crooked on the edge. Knife hammering for straightening partakes somewhat the nature of saw hammering and calls for a smooth anvil and careful work. Usually a man when hammering a knife to take the hump or convex off the face side will set back a little more than straight and leave the face side a little concave.

Another method of straightening these knives so they will fit down is illustrated by Fig. 2; it is to reverse them on the head and put under both the front and back edge a light strap of iron the full length, so as to raise the knife up a little off the head, then tighten all the bolts down, carefully straightening the knife until it is bent down between the two strap supports. Let them stand this way over night and the chances are that the next day they will be straight enough to lie down on the head.

There is still another method, the method of grinding the face of the knife. There is not a great deal of face grinding done, however, on planer knives. Yet, as on some other knives, occasionally it becomes necessary to reface them by grinding, so as to get them straight and true all over. Quite a lot of this work has to be done in the veneer trade and there may be times also when it is advisable on a planer knife. It should always be done carefully and sparingly, however. Bear in mind that the face side of the knife has only a thin layer of steel and heavy grinding on it repeated a few times practically cuts away all the steel and then the knife is worthless. So in facing, be careful to grind just barely enough to straighten it up and put the face in order and then do it only as often as it is absolutely necessary. When necessary, however, don't hesitate about it at all, because it has been done and can be done again. Where the knife is worn on the under edge or rather on the face side rounding on the edge so that it will have to be ground back an eighth of an inch to get a good straight face again it will pay to save some of the grinding on the bevel by doing a little light facing.

If the cutter head itself gets worn so that it is slightly convex on the face and it is due to this instead of faults in the knife that the knife fails to fit down closely to the lip of the cutter head it may be remedied temporarily by the use of a paper, pasteboard, tin, or sheet metal bushing carefully placed under the back part or wherever it is necessary to improve the fit. But where the cutter head is out of shape in this way the sooner it can be worked on the better. Generally, however, this is a job for the machine shop and not for the planer man and the first opportunity that presents itself the cutter head should be sent off and refaced.

**Furnace Heat for the Home**

Furnace heat is used in thousands of homes and its efficiency depends very materially upon the location of the furnace and the proper arrangement of its connections. The heating qualities of a furnace can be determined by the purchaser by the radiating surface above the fire pot. A small fire box with a large radiating surface will give more heat than a large fire box with a small radiating surface and, in addition, will allow of economy in the use of fuel.

Having secured the furnace the most important problem for the owner is the selection of its location.
It should be placed as near the center of the building as possible so that its distribution of heat will be equitable in all directions. The owner should make sure that every piece fits smoothly and that all the joints are packed with asbestos cement. The smoke pipe should be of steel or galvanized iron, and should be the full size of the furnace collar. The opening in the chimney should have a heavy iron thimble into which the smoke pipe should fit firmly.

The first and second pipe joints, after leaving the furnace, should be the joints on which the check damper should be placed. This should have a chain attached, running to the floor above, so that the furnace may be regulated without the necessity of descending to the basement. A similar chain attachment should be made with the front draft of the furnace. Round, three-piece elbows should be used on the hot air pipes. Registers should have frames which will leave an air space between the register box and the woodwork, and if piping touches the woodwork at any point it should have at least three thicknesses of asbestos paper wound around it, and over this should be a strip of tightly fitted tin. The registers, of course, should be as close to the furnace as possible. If these precautions are taken the furnace will do its best service in the heating of the home.

The Leaning Tower

The Leaning Tower of Pisa is one of the wonders of the world, and, from a builder’s standpoint, probably the most unusual ever constructed. Various reasons have from time to time been suggested for its peculiar construction, but the theory most generally accepted is that the foundation settled on one side during construction and that the building was then completed, the columns in the upper stories being made somewhat longer on the lower side to prevent, it is supposed, too great an incline. The tower was begun in 1174, and was not completed until 1350. It is eight stories high (180 feet) and about 13 feet out of plumb. The circumference at the base is 160 feet. The tower is built entirely of marble. The columns number 207. In the belfry there are seven bells, and from the top is one of the most magnificent views in Italy. A circular staircase around an open well leads to the top. It is said that Galileo, whose ideas of the pendulum were suggested by a swinging lamp in the adjoining cathedral, later made his experiment with strings hanging from the inclined side of this tower.

Proper Interpretation

In answer to the question, “What passages in Holy Scripture bear upon cruelty to animals?” one boy said: “Cruel people often cut dogs’ tails and ears, but the Bible says, ‘What God hath joined together let no man put asunder.’” —Christian Register.
Two Pieces of Furniture Worth Making

COMPLETE DETAILED INSTRUCTIONS WITH WORKING DRAWINGS SHOWING HOW TO MAKE A TABOURET
AND A SETTEE

The two pieces of furniture described this month are a little different from most of those heretofore given in that they possess pierced ornamentation. This kind of decoration is very effective when properly designed and appropriately used. There is ever a danger that it may develop into mere meaningless "scroll work," such as we used to find—and do occasionally find even today—upon our factory productions, mere ornamentation having no integral part in the design of the piece of furniture and oftentimes with nothing to commend it in the way of good lines or individual attractiveness.

This same extreme we have all observed in the meaningless filligree work which covered the porches and gables of the houses of some fifteen years ago.

However, if such a style of ornamentation be simple and appropriate it oftentimes serves a good purpose in lightening the effect of a piece of furniture which otherwise might appear heavy, clumsy and uninteresting.

To make the tabouret the following pieces are needed. Secure a well-seasoned white oak, quartersawn, and have the pieces mill planed and smoothly sandpapered upon the two broad surfaces.

![Diagram of Tabouret Parts]

**MILL BILL FOR TABOURET**

<table>
<thead>
<tr>
<th>Part</th>
<th>Quantity</th>
<th>Thickness</th>
<th>Width</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>1</td>
<td>3/4</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Shelf</td>
<td>1</td>
<td>3/4</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Legs</td>
<td>3</td>
<td>3/4</td>
<td>6 1/4</td>
<td>18</td>
</tr>
<tr>
<td>Cleats</td>
<td>3</td>
<td>3/4</td>
<td>3 1/4</td>
<td>2 1/4</td>
</tr>
</tbody>
</table>

With the sweep-arc lay out the circular top. A molding plane will be needed to place the edge as shown. If one is not to be had the edge may be finished rounding with the spokeshave or plane, or it may be left square to the surface.

The shelf is rather odd as to its shape, but it is not difficult to lay out. As easy a way to do this as any is to joint one of the edges of the board straight and square; measure off in the middle of this edge seven...
and three-quarters inches. From the extremities of this line, using the bevel set to sixty degrees, lay two lines, as shown in the drawing. Measure up these lines from the edge of the board five and three-eighths inches each. Through these points lay off lines at sixty degrees again, but reversed in their direction. Along these measure seven and three-quarters inches and draw the last line. The edges to which the legs are secured are to be shaped according to the plan. Make a full-sized scale drawing and set the bevel from these lines.

To get the angle of sixty degrees on the bevel, square a line across a board at right angles to a straight edge. Measure along the edge, from this line two units and, placing the beam of the bevel against the edge, adjust the blade until there are four units on the blade the first and last of which shall rest upon the lines and the edge of the board respectively.

The legs are narrower at the top than at the bottom, it will be noted. Make and use a joint-edge until the two ends have been properly squared, then lay out and cut the slopes of the sides. For the curve at the bottom use about a two-inch radius but drop its center one-half an inch below the lower end of the leg that the curve may not show as a complete half-circle.

The decoration shown in the photograph will require a pattern. Draw one-half freehand, full size on a piece of paper; fold over, placing a piece of double-surfaced carbon paper between the parts and complete the design. Transfer this to the wood and bore and saw out the shapes.

Common screws are used for making the fastenings. In the cleats holes are bored and countersunk, two in each leg and two up into the top in each cleat. For the lower part, holes are bored large enough to receive the entire head of the screw to a depth of one-quarter of an inch. Round plugs are glued and inserted in these holes after the screws are placed. These plugs project slightly and have their ends slightly rounded.

How to Make the Settee

The settee shown is of the maximum length; it can, of course, be made shorter if desired. As in the tabouret, use well seasoned, quarter-sawed white oak.

The cleats are to be shaped so as to fit the angle made by the sloping legs and the top. Plane off the corner which is not adjacent to top or leg, somewhat. It will be found convenient to stain and fill the parts before they are put together.

Some of the pieces will be specified for mill planing on two sides, but most of them should be got planed and sanded on four surfaces. Where the edges are to be shaped, as in the arms, nothing is gained by having the edges planed.
MILL BILL FOR SETTEE

<table>
<thead>
<tr>
<th>Description</th>
<th>Material</th>
<th>Length</th>
<th>Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back horizontal, 1 piece</td>
<td>1¼ thick</td>
<td>4 wide</td>
<td>76 long S-4-S</td>
</tr>
<tr>
<td>Back horizontal, 1 piece</td>
<td>1½ thick</td>
<td>2 wide</td>
<td>76 long S-4-S</td>
</tr>
<tr>
<td>Back and front, 2 pieces</td>
<td>1¼ thick</td>
<td>3¼ wide</td>
<td>76 long S-4-S</td>
</tr>
<tr>
<td>Back and front, 2 pieces</td>
<td>¾ thick</td>
<td>2 wide</td>
<td>76 long S-4-S</td>
</tr>
<tr>
<td>End horizontal, 4 pieces</td>
<td>¾ thick</td>
<td>3½ wide</td>
<td>23 long S-4-S</td>
</tr>
<tr>
<td>Arms, 2 pieces</td>
<td>1¼ thick</td>
<td>4½ wide</td>
<td>27 long S-2-S</td>
</tr>
<tr>
<td>Back slats, 18 pieces</td>
<td>5-16 thick</td>
<td>4½ wide</td>
<td>12 long S-4-S</td>
</tr>
<tr>
<td>Back slats, 3 pieces</td>
<td>5-16 thick</td>
<td>4 wide</td>
<td>12 long S-4-S</td>
</tr>
<tr>
<td>End slats, 2 pieces</td>
<td>5-16 thick</td>
<td>4 wide</td>
<td>19 long S-4-S</td>
</tr>
<tr>
<td>Bottom slats, 18 pieces</td>
<td>½ thick</td>
<td>2½ wide</td>
<td>23 long S-4-S</td>
</tr>
<tr>
<td>Posts, 2 pieces</td>
<td>2½ thick</td>
<td>2½ wide</td>
<td>25 long S-4-S</td>
</tr>
</tbody>
</table>

Cut the four posts to the required length and chamfer the tops and bottoms one-quarter inch each. Lay out and cut the tenons on the horizontals, the rails, which enter the posts. It will be best to shoulder these tenons on all four sides.

Cut the mortises in the posts. Note that the back of the settee is inclined by placing the top mortise at the rear of the post and the lower mortise at the front. The drawing shows the positions of the other rails relative to the posts to which they are attached. Forethought and care will be needed in placing these mortises or the parts will not go together properly in making the assembly.

The slats should not be shouldered into the rails but mortises should be cut large enough to take in the whole end. It would be almost impossible, even for the most experienced of workmen to shoulder so many slats and be sure that all of them would fit up properly.

The arrows of the back slats have holes one and one-eighths inch in diameter; the slot of the shaft is one-eighth of an inch wide. On the end arrows, the hole is placed four and one-half inches from the lower end of the slat while the point of the barb is two and one-half inches from the top. The barb is three and one-half inches long and two inches broad at its widest part. In the arrows of the back slats, the hole is one and one-half inches from the lower end of the slat and the point of the barb one and one-quarter inches from the top end. The barb is of the same width as that of the end but is slightly shorter.

Glue up the ends of the settee first. While these are drying put the slats of the back in their rails.

The arms are fastened to the front posts by means of dowels and glue. They are fastened to the rear posts by means of common screws, the heads of which are to be sunk below the surface and covered with round head dowels. The screws that fasten the end slats to the seat rails are similarly covered.

The front rail is grooved on its inner surface three-quarters of an inch wide, one-half an inch deep and one inch from the top edge of the rail. The back rail is similarly grooved except that the groove is placed two inches from the top edge. This is to give the seat a slight slope backward. Glue and brads are used to hold these in place.

Carefully sand every part before applying any finish. There is always a temptation to slight this part of the operation on the part of amateurs. No other part of the work shows up to so great advantage as this.

Cushions such as the one shown can be purchased in colors to match the finish of the wood. This one is of Spanish roan skin of a soft brown to match the Mission stain. The wood is stained, filled and waxed.

**House and Barn**

At the request of one of our St. Louis (Mo.) readers, who writes that he is going out to Colorado to take up a homestead this fall, we present plans for an economical combined house and farm building. Part of this letter, stating the conditions, follows:

Under One Roof
"I am very much pleased to see you giving fellows advice how to make certain buildings. Being myself a bricklayer and only slightly instructed in carpenter work, I'd like to have your advice. I am going this fall to Colorado to take up a homestead. The country is much timbered, so I expect to make a cabin out of wood. There must be room for three people, two teams of horses, one cow and room for farming machinery. Also, the building must look respectable."

The accompanying design, which we would offer as a suggestion in this case, seems to meet all these conditions in a very admirable way. The little building certainly presents a good appearance—nothing to be ashamed of; and quite a bit would doubtless be saved by building this way all under one roof. The one point that ought to be carefully attended to in such an arrangement as this is to be sure of proper drainage from the stable.
Wisconsin's Model Dairy Barn
COMPLETE PLANS OF THE NEW MODEL DAIRY BARN RECENTLY ERECTED AT THE WISCONSIN STATE FAIR GROUNDS

It is our privilege to present herewith the plans of the new model dairy barn recently erected at the Wisconsin State Fair grounds. It is said to be one of the best planned barns in that state. It is convenient, roomy, well arranged for ventilation, light, warmth, cleaning, feeding, etc.

The barn is 30 by 80 feet, plank frame with hip roof. A look at the end bent will show the method of removing foul air from the basement, and the middle bent illustration shows how pure air is introduced. The barn is provided with two silos, one of brick and the other a stave silo. There is also a washroom wherein a supply tank may be kept. Also a feed room, box stalls, calf pens, cow stalls, horse stalls, etc.
The cattle face the center alley, which is wide and roomy and runs the whole length of the barn, being used for feeding, mainly. A feed and litter carrier runs the entire length of this alley from the silos. It also connects with the track that runs through on each side behind the animals used for cleaning, so that the same car can be used throughout the entire basement, there being three-way switches from one alley to another. All that is required when changing from stable cleaning to feeding is to unhook the manure carrier and hook on the feed carrier.

It will be noticed that there is room for twenty-four cows in this barn, besides the box stalls, calf pen, etc. The cow stalls are 3 feet 6 inches wide, and provided with swing stanchions. On one side is the James stanchions, made by the Kent Manufacturing Company of Ft. Atkinson, and on the other side will be found the Louden stalls, made by the Louden Machinery Company, Fairfield, Iowa. The barn is equipped with a hay carrier of the most modern kind; also, the barn is protected with lightning rods put up right.

This barn was put up under the direction of the State Board of Agriculture, and is said to be one of the best projects ever carried out. It is an educator, a complete, convenient, commodious, up-to-date, practical, fine-looking barn, from which anyone desirous of building can pattern. There is no sense in building a tacked-up, unhandy, ill-ventilated and poorly-lighted barn, when one can have a barn that is right for the same price if he only plans it right. That's what this barn is for—to show how to plan a barn and how to build a plank frame, which is cheaper and stronger than a timber frame.

55,000 Ton Brick Building Moved

A notable and extraordinary feat in the line of building moving was accomplished recently at Springfield, Mass., when the public library building, a 3-story brick structure, was moved 200 feet to make room for the new Carnegie library which is to occupy its former site. The old building is to be demolished as soon as the other is completed.

The weight of the building is estimated at 55,000 tons, and therefore its moving was rather unusual, although it was accomplished without accident and within the promised time. It was moved the required 200 feet in 20 days by 12 men turning screws.

After the building was jacked up on some hundreds of jack-screws, the foundations were removed, and the weight let down onto twelve 100-foot I-beams which rested on 1,000 steel rollers, 2 inches in diameter, placed as near together as possible.

The rollers rested on 12-inch timbers faced with long strips of iron ½ inch by 6 inches.

Horizontal screws pushing against the upper timbers, and held by blocks chained to an anchorage furnished by the substituted under-pinning, moved it back at the rate of 10 feet a day, or about one-quarter of an inch a minute.

Breaking the News

Marion, who had been taught to report her misdeeds promptly, came to her mother one day, sobbing penitently.

"Mother, I—I—broke a brick in the fireplace."

"Well, that is not very hard to remedy. But how on earth did you do it, child?"

"I pounded it with father's watch."—Success.
Notes on Hardwood Finishing

HOW THE HARDWOOD SURFACE SHOULD BE PREPARED, FILLED AND VARNISHED FOR BEST RESULTS—OTHER FINISHES

Edward Hurst Brown

V E R Y often the entire effect of the best grade of interior millwork, put in position by carpenters who understand their business and who take a pride in their work, is spoiled by attempting to save money by using inferior materials for the finishing or perhaps by the inability to obtain skilled mechanics to do the work. Unfortunately, the painting trade, including hardwood finishing, offers less steady work and lower wages than most of the other building trades, and of late years it has become more and more difficult to induce bright American boys to enter it. We are consequently dependent to a very large extent upon the foreign-trained journeyman painter or the inexperienced tramp painters, who have learned (?) the trade by painting bridges or barns with mixed paints, or who have shared the altogether too common belief that “anybody can paint,” and have become journeymen painters by purchasing a suit of overalls, a duster and a putty knife, without further apprenticeship.

And this is without any prejudice against the aforesaid mixed paints, with the better grades of which very good and durable work can be done, but the fact must never be lost sight of that the services of a good painter are necessary to produce satisfactory results with any kind of paint, whether a ready mixed or shop mixed; and again, the competent mechanic will produce a good job either with paint that he mixes himself or which is made by machinery in a factory, provided that in either case the paint is properly proportioned and made of good quality pigments and thinners. But to return to our subject of hardwood finishing.

Preparation of Surface

The first thing requisite is that the lumber shall be well finished, clear and free from sappy or loose or ugly knots, and perfectly smooth. The carpenter’s standpoint of smoothness is by no means that of the hardwood finisher, and if sandpaper, glass or scrapers will usually be required to bring to a perfect surface the work which the carpenters have regarded as finished. Fine steel wool, if carefully used so as not to cut away the sharp edges of projecting moldings is superior to sandpaper for producing a smooth surface in the shortest time.

The necessity for this extra care in finishing the surface is due to the fact that the varnish brings out every little inequality in the wood, and magnifies it to an extent which it is difficult for the carpenter to appreciate. Where the woodwork is to be painted, the same care is not necessary, but adds very materially to the appearance of a handsome house. Every stray blow of a hammer, which causes an accidental depression of the surface of a piece of trim causes a defect which is almost impossible for the hardwood finisher to remedy; and although nail holes may be puttied up, it is almost impossible to prevent them from showing, because, if the color of the wood is matched today, it will darken so much in a few months that every puttied nail head will show out as a light spot.

This darkening of wood, especially when coated with any varnish containing oil, is impossible to prevent; but it may be minimized on close grained woods that do not require the use of a paste filler by sealing up the pores by the use of bleached shellac as a first coat. This, however, can be used only on interior woodwork, since shellac will not stand exposure to dampness. Moreover, shellac requires considerable skill to apply properly and to produce a smooth even coating, because of the rapid evaporation of the denatured alcohol with which the gum is “cut” or dissolved. In order to make it flow more freely from the brush and to dry less rapidly, the addition of not more than 10 per cent of Venice turpentine to the gum shellac is recommended, but too much of it will cause the shellac to soften under higher temperatures or may cause subsequent coatings to crack.

After the woodwork has been made as smooth as possible, it must be carefully and thoroughly dusted, and the room swept and made perfectly clean before
any subsequent operations are begun. A dust free room is essential to a perfect surface, otherwise floating particles of dust in the air will settle on the freshly varnished surface, producing a fuzz or roughness impossible to entirely remove.

Another thing important to remember is that successful hardwood finishing cannot be done in cold weather, unless the room is kept at an even temperature, and is not allowed to become colder than 70 degrees, night or day, until the varnish has become thoroughly dry. Nor can a good job of varnishing be produced when the carpenters or other mechanics are working in the same room. If a high grade of finish is required, the painters must be given entire possession of the room, and plenty of time must be allowed, for it is impossible to produce permanently satisfactory results if any of the operations involved are hurried in the slightest.

**Paste and Liquid Fillers**

With all open grained hardwoods, such as oak, ash, chestnut or mahogany, the first operation needed is to fill up the pores of the wood with a hard drying, transparent material termed a paste filler; although if the wood is to be darkened or stained this is usually done first—but as staining is incidental rather than essential, we will consider it briefly later.

A good paste filler is a sort of paint made by grinding together very finely pulverized or ground silex, or ground quartz rock, with a quick-drying varnish to the consistency of a paste. As it requires expensive machinery to manufacture, the painter should buy a good grade of paste filler made by a reputable varnish manufacturer and not attempt to make his own filler. It is thinned for use with pure turpentine to the consistency required. In order to produce certain effects, such as antique oak and the like, the filler should be colored with pure colors in oil to the tint desired. For example, the addition of from ¼ to ½ pound of burnt Turkey umber to 10 pounds of paste filler will produce an antique oak effect. For mahogany, burnt Italian sienna is added in the same proportions. The tinting colors employed should be of a transparent nature, the following being those chiefly used: Burnt Turkey umber, Vandyke brown, burnt Italian sienna, rose pink, rose or maroon lake, drop black, lamp black and black asphaltum varnish; and for some of the green shades, chrome yellow or yellow ochre. A good eye for color is needed to produce the exact effect desired.

The filler is first rubbed into the wood with a short, stiff brush; and when it has become fairly dry to the touch, or say in about half an hour, any surplus must be rubbed off with a handful of excelsior or burlaps, rubbing across the grain of the wood to force the filler into the pores, and then carefully wiped off with a soft cloth. Pointed, hardwood sticks must be used to clean out surplus filler from the narrow quirks and moldings, as the use of a steel putty knife or tool will cause discoloration, the ground silex being much harder than steel and cutting away small particles of it. A day or two should be allowed for the filler to dry thoroughly before the first coat of varnish is applied.

Liquid fillers, so-called, are not fillers at all, but are really surfacers or first coaters and are intended to take the place of an undercoat of shellac or varnish on close grained wood, such as white pine, cherry or maple. The first liquid filler was put on the market by a Philadelphia painter about 1876, and was well made from a good varnish, a mineral pigment and turpentine. It was imitated by other manufacturers and today there are great numbers of liquid fillers on the market, some of them good, some very indifferent, and others, made from cheap rosin varnish and benzine, are worse than useless, so far as durability is concerned, for although they will prevent suction and enable the painter to get along with fewer coats of varnish, they will soon crack and cause the entire finish to perish. Unless the painter is willing to pay a good price (very little less than that of good varnish) and get a genuine mineral pigment and kauri gum varnish liquid filler, he had better use varnish altogether, or use a first coat of shellac as a surfacer. In hardwood finishing it is well to remember that cheap materials will always produce inferior results, and it is no economy to use anything but good materials, for which a good price must be obtained.

**Varnish and Varnishing**

In the selection of a varnish for interior hardwood finishing, there is little choice between the varnish sold at the same price by any of the reputable varnish manufacturers, the standard grade being sold for about two dollars and a half a gallon, while an extra light varnish of the same quality, but made of gum specially selected for its light color will sell for perhaps half a dollar higher. As a well-known varnish manufacturer recently expressed it to the writer, there is not five cents difference in value between the varnishes made by any of the leading manufacturers. There are, however, differences in the formulas used, or the exact degree of heat used in the cooking or in the other manipulations used in the manufacture, so that although the results obtained by different varnishes will be practically identical, so far as finish and durability are concerned, each one will possess its own peculiarities in working, and the hardwood finisher will find it difficult to change from one varnish to another and get equally satisfactory results, until he has become acquainted with the peculiarities of the second varnish. For this reason the specification of special brands of varnish does not always produce as satisfactory results as the architect anticipates.

Some hardwood finishers and varnish experts recommend the use of a coat of oil under varnish, while others condemn it. In any event, it will materially darken the wood. Tests made by the International Association of Master House Painters and Decorators some years ago on exterior varnishes on oak panels, showed increased durability for those portions of each
panel where a coat of oil had been given over the paste filler; but on account of the darkening effect of the oil, the writer would not recommend its use on interior hardwood trim.

After the filler has thoroughly dried, the first coat of varnish should be flowed on, using a 5-0 to 7-0 chiseled oval, elastic bristle varnish brush. For some classes of straight work, a 2½-inch to 4-inch, double thick flat brush is well adapted. The choice of tools can well be left to the workman, provided the result is an even coat of varnish. It must be flowed on, with the grain of the wood, and not rubbed out, after the manner of paint. While thin coats are necessary in painting, in order to get the best and most durable results and to permit each coat to dry thoroughly, in varnishing the coats must have sufficient depth or body to bring out its full luster and reveal the full beauty of the wood.

To dry properly each coat of varnish should be given from five to ten days, although the painter is usually so pressed for time that only two or three days are given between coats, or he is forced to use quick drying and less durable varnish. The material should be used just as it comes from the can. In winter time, varnish chills and becomes thick in storage, but can be put in a condition for use by standing the can in a pail of hot water.

After the first varnish coat is dry, it should be rubbed with curled hair or excelsior to remove the gloss, and a second coat flowed on in the same manner. This should again be treated the same way, or else lightly rubbed with fine sandpaper or glass paper. While four coats are preferable, the third coat is usually the last, and this may be left with the full gloss, or rubbed with water to a flat dull finish or to an egg shell gloss. Not all varnishes can be rubbed, so it is necessary where the final coat is so specified, to select a varnish which can be. If you are not acquainted with the characteristics of the varnish you are using, or if the label or catalogue does not state that it can be rubbed, it is best to consult the manufacturer before rubbing. Natural gloss is most durable, because rubbing removes part of the varnish, but the dull finish is considered most artistic. Nearly all varnish makers now manufacture special grades of varnish which dry with a dull gloss, producing a very similar effect to rubbed work, although the fine finish of the latter is not exactly imitated. Nevertheless, these varnishes are satisfactory in most cases and, where expense counts, may be used with good effect on the final coat.

For rubbing with pumice, a piece of rubbing felt from a half inch to an inch in thickness is used, usually mounted on a wooden block. This is thoroughly wetted with water—although kerosene is recommended by some finishers in preference, and others use specially prepared rubbing oils—a little powdered pumice is put on the felt and the surface is rubbed in long, even strokes, until the desired effect is obtained, when the surface is washed off with clean water (or gasoline or naphtha if oil be used), wiped with a piece of clean chamois leather and dried with another chamois.

**Wax Finish**

Where a soft and very beautiful dull effect is wanted many present-day wood finishers are using wax over the paste filler. In some cases a coat of shellac is first applied. One of the special floor waxes should be used, applied in very thin coats and polished with a soft woolen rag or with a special stiff brush. For vertical trim a good shoe polishing brush can be used.

**Stains**

Many beautiful effects can be produced by staining the surface. Oak, or other woods containing tannic acid, can be deepened in tone by repeated applications of dilute ammonia, which must be allowed to thoroughly evaporate. Other methods of staining have been described in a recent issue of the AMERICAN CARPENTER AND BUILDER and need not be repeated here.

Many of the varnish manufacturers have placed on the market stains and wood dyes of different kinds with which beautiful effects can be obtained. Some of these are intended for amateurs. The painter should not attempt short cut methods, but should always employ the stains and dyes made specially for painters' use, as these are the only ones with which he can be certain of giving satisfaction to his customers.

**Formula for Creosote Shingle Stain**

A good grade of shingle stain is made by thinning the oil color required to give the color to the stain with a mixture of 4 gallons of raw linseed oil, 2 gallons of creosote oil and 1 gallon of liquid dryer, says a recent issue of the Painters' Magazine. The color should be permanent and nonfading, and it is best to have it of the consistency of house paint before adding the thinners referred to.

If to be used for dipping, 1 gallon of paint to 7 gallons of the thinners referred to is sufficient. For brushing, 2 gallons of paint should be used.

For a cheaper grade, the thinners may be made by mixing 3 gallons water white 150-degree test petroleum oil, 3 gallons creosote oil and 1 gallon liquid drier.

The commercial name of the creosote required is coal tar creosote, but crude carbolic acid may be used in its place. Neither, however, should be too dark in color.

**Coming Some**

"You Americans don't appreciate art," said the man from abroad.

"We don't, eh?" rejoined the earnest patriot. "Why, we pay some opera singers more than we do baseball players!"
Panel Wainscoting
To the Editor: Maxville, Ont.
I wish to put panel wainscoting in my hall and dining-room, the former Mission effect and the latter to go with dark oak furniture. If not imposing on your good nature will you kindly publish a couple of sketches that I could have my "mill man" work from. I would like panels to be about 4 feet 7 inches high. E. J. Gooner.
Answer: The accompanying sketches for panel wainscot-
ing show about what you need. You say you want the panels to be 4 feet 7 inches high. We would suggest as a more appropriate height that of 3 feet for the hall and 5 feet 6 inches for the dining-room. The latter should be capped with a plate rail. Editor.

Dark Stain for Oak Chair
To the Editor: Deerfield, Kan.
I have been successful in making a rocking chair after the pattern in the June number, but so far have failed to find a stain that would do satisfactory work on the red oak wood. I wish to have a dark oak stain and the stain will not penetrate into the hard wood.
Will you kindly tell me in AMERICAN CARPENTER AND BUILDER how to get a dark mission stain on the oak wood?
F. N. LAROCHE.
Answer: It is customary where a very dark finish on hardwoods is desired to first apply a coat or two of water stain. Oil stains do not penetrate deeply and for that reason are but seldom used alone for that purpose. Water stain roughs up the grain of the wood but this can easily be sanded before applying the filler. The stain should be diluted with water unless an almost black effect is wanted. Use a dark filler after the stain has dried, the directions are on the cans in which it comes. Follow this with wax shellac or varnish.

It is possible the water stain may not affect your chair if you have on the oil stain. If so, a dark filler thinned with benzine applied over your oil stain will probably serve your purpose better, benzine being quite penetrating. Ira S. Griffith.

Theory vs. Practical Knowledge
To the Editor: Marshalltown, Iowa.
I am becoming more and more pleased with each number of the AMERICAN CARPENTER AND BUILDER and can hardly wait for the next. I find so many good and practical things in it from practical men. By the way, I want to pat Mr. John Stillians on the back and call him a good fellow, for hitting the nail squarely on the head and driving it home as he did in the August number on pages 594 and 595. The great trouble nowadays is too much theory and very little practice with the majority of carpenters. It makes no difference how much mathematics you may have, if you are not able to make a practical application of the principles involved you are no better equipped than the fellow who has but a smattering of "relin," "ritin'" and "rithmetic."

It reminds me of the young man that the "boss" sent to the shop to get out a ring post for a hip roof. The boss told him to take a 6 by 6 inch piece and make an octagon of it 8 feet long. Now this young man knew how to extract the square and cube root, could read algebraical formulas and had some knowledge of geometry. But he did not know how to reduce a square to an octagon. The result of his efforts was found to be, when the boss sent for the post, that he had hewed the 6 by 6 down to about 2 by 2 and still no octagon! Now if the boss had sent one of the boys who "knew the steel square" he would have laid his square diagonally across the 6 by 6 from corner to corner and pricked off the points at 7 and 17, which would be the distance from each corner to line up the stick for an octagon. I would like to carry this on
still further, but I must not take up any more of your valuable
space. J. G. Weatherby.

Portable Work Bench and Saw
To the Editor: Milton Junction, Wis.
Pardon my neglect in forwarding renewal. I am rushed
with work. Do not wish to lose a number of your American
Carpenter and Builder.
I take the liberty to send you photo of work bench and
furring down of the tail end of the rafters would show at
the ends.
Mr. Wood's last question is regular and the result would
be the same as that last mentioned above. Suppose both
gables are 18 feet wide with a rise of 10 feet. Then g and 10
would represent the run and rise of the common rafter; and
9 the length of the diagonal from 9 to 10 (which represents
the length of the common rafter) will give the cut across
the face of the board and the side of the square representing
the run will give the cut. For the miter, take the length

A "Sticker" in Cornice Work
To the Editor: Alton, Ind.
I have a problem that gives me trouble. It is this: What
figures on the square must I use to cut the planchers on an
eell-shaped building? The width of one of the gables is 18
feet and the other is 16 feet; their heights are the same in
each, 9 feet. Also what would be the figures to use if both
gables were the same width with a rise of 10 inches in 12?
Charles Wood.

Answer: Mr. Wood's problem is something of a sticker,
and we do not wonder at his finding trouble in a problem
of this kind. It is the same as the hopper miter with unequal
pitches, but it is not practical in a case of this kind, because
the roofs being of unequal pitches it is necessary that the
plate on the narrow gable be raised higher than the plate on
the wide gable which is governed by the difference in the rise
of the two roofs in the run or width of the cornice.
Therefore, the bed mold would not member; the valley would
not intersect the angle of the plates, as it would necessarily
have to set off to one side. At best it would be a bad-looking
job, one of those kind that look best at night. In a job
of this kind, we would advise furring the underside of the
tail rafters on the steeper pitch so that they will be of
equal pitch of that of the wider gable. Then the cuts will
all be regular; but, of course, this can only be done when
the ends of the narrow part are hipped in, otherwise the

A **Sticker** in Cornice Work

opening for single sliding door

To the Editor: Thawville, Ill.
Would like to ask one question: Can a 5-foot sliding
doors in one piece be hung in an opening so that it will work
perfectly? The door to slide one way only. Carl Johnson.
Answer: Yes; a door of this width can be made to slide
all right. The walls should be built as for double-sliding
doors; the track, of course, should all be one way, but there
should be a little pocket in the jamb on the lock side to
admit getting the door in and out. This pocket can be con-
cealed, as shown in the illustration, by setting in a piece of
same thickness as the jamb and covering the joints with the
stops, as shown. At the top, it is a good idea to let the top
of the door be about an eighth of an inch below the stop
which should be wide enough to extend in close to the hanger,
thus greatly hiding the unsightly opening in the head jamb
that would otherwise show when the door is open. Error.
From a Carpenter's Daughter

To the Editor: Fairfield, Neb.

I enjoy your magazine very much as my father was a carpenter and contractor all his life, and I, although a girl, was a great help to him. In those days I delighted to make out estimates and help patrons draw plans, and was a great help to my father. I admire the sparsely simple in home building—the Craftsman, Mission and Bungalow styles, few rooms and larger; more simplicity in the household machinery—rather “more home making with a little less house-keeping.” The second prize bungalow in the April number was very good—showed some personality—and however simple, yet there should be a certain amount of personality even in a bungalow. Where a family happens to consist of more than four persons a few upstairs chambers prove the cheapest when it comes to building.

I submit a plan that may serve someone. I would make both exteriors as well as interiors in Mission style; build fireplace of common red brick laid in clean white mortar; use very wide inch and a quarter casings of yellow pine stained or dyed a dark weathered brown, then wax; stain floors the same and apply hot linseed oil, two coats, and repeat once a year. I do enjoy built-in furniture of all kinds, and find that they save a good deal in keeping a home sweet and clean.

I have indicated a number of casement windows, as they give more wall space for the placing of furniture.

Nebraska is building some splendid homes the last few years, and her citizens show good taste in the planning, both inside and out. Will send a few photos of some representative homes soon. Wishing your splendid paper success, I am a farmer’s wife.

Mrs. Belle Tingley Hancock.

Can Files Be Renovated?

To the Editor: St. Croix Falls, Wis.

Kindly send me receipt for renovating files which are about half worn. I have quite a few files and wood rasps on hand and do not like to throw them away.

Thos. Peck.

Mr. Baker Takes Exception

To the Editor: Media, Pa.

I notice in the July number an article on hip roofs by G. W. Mansen in which his method of backing a hip is not correct, though the difference by the right method is not perceptible on a short bevel. Instead of taking the distance from the intersection of the base line and intersection of rafter line, he should take length of line square from line representing length of hip to intersection of line drawn square to run of hip and hip run.

I also take exception of A. Helander’s plank cutting problem. While it may look correct we know it cannot be so because we cannot make 65 square inches out of 64 square inches, no matter how we cut or twist it. If this square is drawn out accurately, cut and put together, as directed, the lines will not coincide and have four square corners. If we put these pieces together forming four perfectly square corners, it will be seen that there is an uncovered space running diagonally through the layout and this space is equal to one square inch, which accounts for the seemingly extra inch.

In regard to finding the top cross cut for a hip rafter, I have read a good many books and papers on roof cutting, but I have never seen one that explained how to get this cut, except when the hip is beveled or the run of hip is at an angle of 45 degrees. Now, since one hip out of fifty is beveled, this is generally a sticker for the carpenter. It is generally known that, on a hip where the run is at an angle of 45 degrees, by measuring out square from the plumb cut the thickness of the hip, and by squaring this point across the top of hip and connecting this point with the plumb cut, the required top cut will be given. But when the roof on each side of the hip has a different pitch this will not work. If we take the length of hip and length of line drawn square with run of hip until it intersects with the prolonged center line, it will give the cut, as shown in the illustration.

Wilmer W. Baker.

Stair Information Wanted

To the Editor: Passaic, N. Y.

I wish some of your experienced stair builders would give a layout of a stair, with a winder and the newels, indicating the riser placed at the newel and the nosing of the step and the height of the rail, as well as the panel work thereunder.

P. B.
A Device for Dipping Shingles
To the Editor: Turon, Kan.

In answer to J. R. Kemp of San Carlos, Arizona, I am sending a sketch of method we have used to dip shingles. It is simple yet does the work very satisfactorily.

Dip the shingles in the stain 2/3 their length, and place in trough to drain for a few minutes; rebail and let dry for a few days. If they are not rebailed, place them where the wind will not blow them away. FLOYD LOWE.

Belfry Design for School House
To the Editor: Wagon Mound, N. M.

Will you kindly publish in your next AMERICAN CARPENTER AND BUILDER the proper dimension and style of a belfry for a country school house 24 by 32 by 12 feet high, the roof being one-third pitch. I do not know the size of the bell. I am a charter subscriber to the AMERICAN CARPENTER AND BUILDER and I am proud of it. I look for it each month and always find something new and of great value in every issue. M. P. SMITH.

Answer: The attached sketch shows a very neat belfry design appropriate for a small country school house. It is of ample size for the size bells ordinarily used. EDITOR.

He Doesn't Understand the Books
To the Editor: Greenport, L. I.

There are a lot of books published to help the carpenter in his work, but as a rule they are very hard for many of us. I have two books. In one I find how to get the length of a hip rafter and the main rafter, but I cannot get the length of a valley rafter. The cut of the main rafter is 10 and 12 inches, but it does not tell what I should take for the valley. It says, take 17 and 10 so many times and that will give the length of the hip.

Answer: Yes, there are a lot of books on the market, and we believe all of them in the main are correct, though of course errors will slip in now and then with the best of writers. They have different ways of arriving at or explaining things, and this to the would-be learner when comparing different writers often throws him off the track. We cannot all look through the same eyes, therefore to some the same object looks different when in reality there is no difference.

In the case of the hip and valley rafter, one rests on an external corner and the other on an internal corner. Their position in the roof are identical as to pitch, consequently their lengths are the same. The measurement line should be along the center of the back in either case. This is a point not generally understood and especially so when the rafters are backed. However, this is not very often done or rather not as often done as should be for first-class work.

Then again, many times the hip alone is backed and the valley is left unbacked or rather grooved out. In that case the center of the level back should just touch the internal corner of the plates, provided there is no tail to the rafter. If there is a tail, then the exact length or depth to cut the seat cut is all the more complicated and is a "sticker" that sometimes catches the best of them and all because of the little variation of the backing, whether one or both are backed. In fact it requires practice to keep these vexing little points clear in the mind ready to apply the steel square where it should be for absolute correctness. However, the difference is so little that it is generally lost sight of; besides the plates are as liable to be as much out of square anyway and the little variations are as a rule looked upon as a matter of course. and are passed by only to be run up against in the next job. This should not be. Look up, study up, maintain the highest standard or get off of the perch. EDITOR.

Design for Large Hen House
To the Editor: Derby Line, Vt.

As I am about to build a hen house I would like to ask if you could give me any information on it in regard to plans? It is to be 200 feet long and 30 feet wide.

Geo. E. Brooks.

Answer: The plans shown on the opposite page illustrate an arrangement for a large poultry establishment which has proven practical, convenient and in every way satisfactory. These plans provide for a structure twice as wide as the space you mention. The arrangement is such, however, that half could be built now, leaving the other half to be added at some future time. The space is divided up into the "unit" system, making separate parks, 10 by 25 feet each, with coop attached. The sectional drawing shows the construction and arrangement of one of these. EDITOR.
Boat Building Help Wanted

To the Editor: Milwaukee, Wis.

I desire to thank you for your courtesy and consideration; it gives me pleasure to be a member of the AMERICAN CARPENTER AND BUILDER and to renew my subscription. I would like one of your able correspondents to give me a few hints on building a flat-bottom row boat to hold four persons. The points that trouble me are width at the rowlocks and the on building a flat-bottom row boat to hold four persons. The like one of your able correspondents to give me a few hints on ENTER AND BUILDER and to renew my subscription. I would

To the Editor: Milwaukee, Wis.

The solution given by Mr. C. W. Talbot in the August number is not correct. The principle of the "steelyards" cannot be applied in the carrying of timbers, because the weight of the timber in the problem is equally distributed from one end to the other, and cannot be shifted from one place to another as on steelyards. The three men must not necessarily be of equal weight in order to carry the timber or to find out where the two at a handspike have to place it so that each will carry one-third of the stick. The solution given by Mr. J. G. Weatherby in the July number is this: Three men, A, B, and C, carrying a stick of timber of uniform size, 30 feet long, A and B at a handspike and C at the end; how far from the front end must the handspike be placed so that each will carry one-third of the stick? Suppose A would weigh 236 pounds, B 174 pounds and C only 123 pounds but is strong enough to carry his share; where would Mr. Talbot have them place the handspike then?

It will be easily seen that A and B must carry 20 feet, and C 10 feet, if each is to carry one-third of the stick; but where must A and B place the handspike to accomplish this?

It must be remarked here that A and B will have to carry any length of the timber alone which would balance upon their handspike, whether cut off from the rest or not, because this piece does neither increase nor diminish the length or weight of the remaining part. C has only to carry one-half of the part which is connected with the balancing piece, and A and B the other half together with the balancing piece upon their handspike.

The question is now for any length of timbers of uniform sizes. Where must the two men place their handspike in order to carry twice as much as the man at the other end? If they don't know I should tell them to place it one-sixth of the length of the timber from the end, which, in this case, will be 5 feet. These 5 feet, in balance with 5 feet on the other side of the handspike, make one-third of the timber which A and B have to carry alone, leaving two-thirds, one-third to C and one-third to themselves. Each will then carry one-third of the stick of timber.

The Handspike Problem Again

To the Editor: Milwaukee, Wis.

Mathematically by extracting the square root of the sum of the squares contained in the other two sides.

As to the question of mitering siding, this can be done in a miter box by putting in a small piece of the siding at one side of the box so that the siding when inserted in the box will rest at the same angle as when on the house; then cut in the regular 45-degree angle, which will give the required miter. Nail in the regular way and brad the corners at the miters.

A. W. Woods.

To the Editor: Milwaukee, Wis.

Answer: Your idea of resurfacing the exterior walls of this old cobble-stone building is practical and all right. A good cement plaster should be used, applied in two coats, and thick enough so that a flat exterior surface is secured. The chinks between the cobblestone, where the old plaster has fallen away, ought to provide sufficient clinches for your new cement plaster coat.

Instead of the imitation squared stone effect which you propose by ruling off the surface, we would suggest a rough pebble-dash finish as being in keeping with the character of the building. This finish will be durable and make a very good appearance.

Resurfacing Old Stone Building

To the Editor: Allenburg, Mo.

I would like to ask you a question in regard to an old stone building; same is about 40 by 40 feet, 18 feet high, built in 1854. It is used for a school building. It is built out of small rocks picked up in the neighborhood. The wall is 20 inches thick. Rocks are laid in clay mortar and then plastered on the outside with lime. The walls are all in good condition, but the lime plastering on outside is mostly all gone and some of the little rocks have fallen out.

Now I would like to plaster same with Portland cement. I ask you what you think the best would be; to use same for plastering on the outside, or would it not be advisable to use same and lay off in stone fashion?

G. Lohmann.

Square Planing

To the Editor: Mexico, Me.

I see in the July number of AMERICAN CARPENTER AND BUILDER Clarence H. Taylor asks how to plane a board square on the edge. When I began my foreman showed me this way, which I have found to work all right. Hold the fingers of the left hand under the face of the plane, letting the finger nails run against the side of the board; thus gauging the plane in its course. If either side needs more taken off than the other, move the fingers, giving more weight of the plane to the side which you wish to have the longer length.

D. A. Leavitt.

To Find the Hypotenuse of a Right Angle

To the Editor: Doniphan, Neb.

I am a new subscriber to your paper and am well pleased with it. I will ask my first questions: What is the simplest and shortest way to find the hypotenuse of a right angle? That is, where it is not necessary to get an accurate length, just for an estimation, as for rafters. Also which is the best and easiest way to miter siding, and which is the best way to nail them to keep them closed?

Answer: The simplest way is to take to scale, if the full size is not convenient, the base and altitude on a right angle and then measure directly across. This will be the length of the hypotenuse. But for accuracy, it should be arrived at

P. Schneider.

Rotting Sills and Shingle Nailing

To the Editor: Browns Valley, Minn.

It has been our policy in building good houses to make a box sill and fill in between the sill and joist with stone and mortar flush with the tops of the joist. Will this mortar be liable to rot the wood or not? If this method is not advisable I wish to know what is the most economical material to use for this purpose.

In regard to nailing shingles I wish to know how close I should nail them? We nail them about every four inches. Some carpenters say it is not good to nail them more than two or three nails, as they will swell, warp and crack. We use heavy galvanized nails.

I would like to have the advice of architects and experts on these questions.

George Novotny.
Fast Barn Framing

To the Editor: Strawberry Point, Iowa.

I herewith send you two pictures of a full frame barn which I would like you to give space in your valuable paper if I am not too late or too troublesome. View No. 1 shows the barn site as it appeared at 10 o'clock a.m., and No. 2 shows it as it was at 4 p.m. This barn is a structure 36 by 62 feet, 18 feet high above basement, and is framed out of 8 by 8 inch stuff for main timbers, 4 by 4 and 4 by 6 for nailing girts, namely, hickory, elm, hard maple, and pin oak. No. 1 shows three men besides the working crew, just as we started to put the bents together, at 10 a.m., and at 2:35 p.m. the first bent was started from its resting blocks, and at 4 o'clock the raising was completed, as shown on No. 2.

G. E. GRATKE.

Information That Does Not Inform

To the Editor: Greencastle, Pa.

Have just been reading in the present August number an article by John Stillians, Fort Smith, Ark., to which I would like to attach a large O.K. He discusses the "Sticker Solved," or rafter problem. My experience has been along the same lines. I likewise have spent many dollars and midnight oil in fruitless search for the very information that the volumes and authors claim to give and yet conceal, purposely or otherwise. What the mechanical and industrial world is seeking for is education that educates, information that informs. It is easy to build castles in the air in which no one lives, and in which no one can expect to live; in other words,
education shot high over our heads. I have here two volumes on the steel square which I have shown to a number of skilled mechanics and they all say that the work may be all right if we could understand it. Now, Mr. Editor, I would like to thank the brother from Fort Smith for his article and ask him to come again, and I hope the other writers will take the suggestion up and follow along the same lines. A. J. Lohns.

Handy Saw Clamp

To the Editor: Malcolm, Iowa.

I am sending you a rough sketch of a favorite saw clamp which might interest some of your readers. It was probably invented before cast-iron saw clamps came into use. It is, nevertheless, the best thing for the purpose that I have ever run across, as it will hold a saw without any chatter or vibration which makes it so hard on the eyes when using a common cast-iron clamp.

The side pieces are made of a piece of 2 by 4 inch, about 4 feet long, ripped to form the shape. The jaws are made of two pieces of 1 by 4 inch, 26 inches long, and are shaped to fit into the side pieces. The bolts are to adjust the opening in side pieces so that the jaws will not slide down too far. If it is properly made, the jaws will slip out and in easily with proper adjustment, but I prefer bolts, as they are always there when wanted. If the device is properly made, the jaws seldom have to be adjusted. The farther down the jaws go the tighter they will be. If you can use the drawing to any advantage, you and your readers are entirely welcome to it.

A. D. Doughlas.

To Figure Strength of Timbers

To the Editor: Zanesville, Ohio.

As I have become a subscriber to your valuable paper I have a question here to ask you. The question is concerning the correct way to figure the strength of timbers. That is, suppose I had a girder that was to be put up to support a floor; it is made up of five 2 by 10 by 12-foot pieces (bolted every 3 feet) made out of Norway pine. Please give me a way to figure the strength of it and the load it will carry. Also tell me a short way to figure the safe load a joist will carry, size 2 by 10 by 16 feet, or such as are in use in the construction of buildings, warehouses and storerooms. Give me a short way to figure these out in figures, just as you would figure it in your own work.

C. A. Handsby.

Answer: The simplest formula for finding the strength of a beam is the well-known one:

$$W = \frac{b \times d^4}{9L}$$

In this, W is the breaking weight for a central load; C is a constant or figure representing the strength of the particular kind of wood in question; b is the breadth of the piece, d is the depth squared (multiplied by itself), and L is the length or clear span of opening. In a series of articles in former numbers of this magazine, the present writer endeavored to show that no particular mathematical skill or knowledge is required to solve questions of the strength of beams, etc., by this little formula. As space does not permit of reproducing these articles we would refer our correspondent to them. They are to be found in the numbers for June, August, September, October and November, 1907. In them the strength of beams under varying loads was worked out in a plain and easy manner.

In calculating joists, however, there is another important matter to be taken into consideration; namely, the deflection or bending of the piece. For, while a joist may, when tested by the foregoing formula, be quite strong enough to carry a given load safely, yet the amount of sag or deflection with that load would be such as would crack a ceiling carried by the joist. It is therefore customary to apply another formula for the deflection, in addition to the one for strength as given above. Most engineering pocket books give a combined strength and deflection formula, made by putting the two together, somewhat as follows:

$$W = \frac{8b \times d^4}{9L}$$

In this, W is the safe distributed load; S is the safe unit fibre stress in pounds per square inch (one-fifth the ultimate or breaking stress); b is the breadth; d is the depth squared; 9 is a constant, and L is the length (clear span).

To apply this to the girder made of five pieces of 2 by 10 inch Norway pine given by our correspondent, one must first find the safe unit fibre stress of that wood; namely 800 pounds. As the piece to be calculated is 2 by 10 inches by 12 feet, the sum would be worked out as follows:

$$\frac{800 \times 2 \times 100}{9 \times 12} = 1481 \frac{13}{27}$$

or say 1481 pounds. As five of these pieces are to be bolted together to form the girder, this result must be multiplied by five to give its strength.

To apply this to any kind of timber, it is merely necessary to know its safe unit fibre stress. The following table gives this for a few of the woods generally used for floor timbers; a factor of safety of 5 (one-fifth the breaking load) being allowed:

<table>
<thead>
<tr>
<th>Wood</th>
<th>Safe Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>White oak</td>
<td>1200 pounds</td>
</tr>
<tr>
<td>White pine</td>
<td>800 pounds</td>
</tr>
<tr>
<td>Georgia pitch pine</td>
<td>800 pounds</td>
</tr>
<tr>
<td>Norway pine</td>
<td>800 pounds</td>
</tr>
<tr>
<td>Spruce</td>
<td>800 pounds</td>
</tr>
<tr>
<td>Hemlock</td>
<td>700 pounds</td>
</tr>
</tbody>
</table>

It should be noted that these figures are for use with the combined formula for strength and deflection, and not for the simple formula for strength only. For the latter, the table given in the series of articles referred to above is the correct one.

T. B. Keener.

The Handspike Problem Not Solved

To the Editor: Marshalltown, Iowa.

Mr. C. W. Talbot has another "guess" coming on the "Handspike Problem." He says 7¼ feet is correct. Now 7½ feet from the end will balance 7½ feet on the other side of the handspike, which equals 15 feet of the stick carried by
To the Editor: Urbana, Ill.

I think I can give Mr. Knowlton some light on the bay window question. I once had a similar trouble with a bay window; I removed the old frame and found the water came in at the joint of the jamb and sills in the parting stop groove. There not being much show for fixing that I covered the space under the window sill with tin turned up a little at the inner edge and at ends and turned the outer edge down over the siding; then I reset the frame, and afterward I had no more trouble.

ISA F. MCINTYRE.

Mission Cabinet Design Wanted

To the Editor: Salt Lake City, Utah.

I have been taking your paper since the first of the year and would be without it. I would like to have some drawings of a music cabinet built in the mission style and using the following dimensions, 2 feet 10 inches wide inside, 15 inches deep inside and 5 feet high over all. I would be very much pleased to have some of the readers help me out on this.

HARRY C. LEWIS.

More About Jib Head Windows

To the Editor: Leakesville, Miss.

Will you, or some of your competent staff, give me the information I wish in an early number of the magazine?

I wish the lower sash to raise up through the head of the frame. I understand the construction of the frame, except the head, which must have an opening in some way so that the lower sash will raise up. Now, here is the point I wish to know: The top of the head should be fixed in some way so that when the sash is down the opening will close automatically. I would think that a light shutter fastened with spring in some manner would be the proper way, but have never seen any springs suitable for the purpose.

O. E. BAIN.

Answer: Mr. Baird will probably come as near finding what he wants in Mr. F. J. Case's answer in the last number of the AMERICAN CARPENTER and BUILDER, as he is liable to get, which is simple in construction, no springs to get out of order and always ready for use.

EDTOR.

Comment From a Reader

To the Editor: Gorham, N. H.

In the few months I have been a subscriber to your paper I have found much interest in its columns and have taken quite an interest in the questions asked and answered.

As an old timer, who did not have the advantages of a higher education, but have picked up what little knowledge I possess largely from actual experience I can feel quite a lively sympathy with John Stillians, of Fort Smith, Ark., in the position he takes in his article in the August number.

As he says, mathematics is a science that one can not know too much about; but a little careful thought will sometimes take the place of quite an array of figures.

As an instance, let us take the question asked in the March number by S. W. Hays, of Enfield, N. H., which is so easy it seems to me that any practical man who gives it a careful thought does not need a pencil and paper to solve it. Its length being 12 feet (the number of inches in a foot) it follows that the width in inches multiplied by the thickness in inches will give the number of feet board measure in the stick.

Now it is to be supposed that his stick is a true taper; and, if it is, and is 12 inches square at one end and 6 inches square at the other, then the middle or average of the stick must be 9 inches square; 9 times 9 equals 81, the number of feet board measure in the stick.

Now let us take that "Timberman" problem. Of course any solution to be accurate depends on considering the matter as one of lines in a perfect triangle and not of the actual condition of the average tree and river bank.

Now your old mechanic marks out many problems by scale draft instead of figures; and let us suppose he did not know the rules in regard to triangles, but had a good steel rule and a rule; he would solve the problem as follows: To accommodate the dimensions of the square he will have to reduce the problem to a scale of 1½ inches equals 1 foot.

Now, 50 feet, the width of the stream, divided by 4 equals 12½; which take on one side of the square. Next, 100, the height of tree, divided by 4 equals 25, which must be the sum of the other two sides. Now hold the end of rule at 12½ on one side of the square and raise the rule against the other until the figures represented by the rise on the other side of the square, and the hypotenuse, represented by the rule, equal 25. This you will find at 15½ on the rule and 9¾ on the square, which multiplied by 4 to reduce back to feet gives 9¾ times 4 equals 37½, height of stump, and 15¾ times 4 equals 62½, length of piece broken off. The sum equals 100, whole height of tree.

All this is done several times quicker than I can tell about it, and with little geometrical knowledge, but by a simple working method.

I was much pleased to see in the July number the method of obtaining the side cut of jack rafters used by Reed H. Deming, New Milford, Ohio. This is a method I have used for more than 30 years, and it is absolutely correct on any pitch and is so easy that anyone who uses it once will never forget it, as he may a combination of figures.

I lay off the rise on any piece of lumber 2 inches thick with two parallel lines, squaring across one of them on the edge for more than 30 years, and it is absolutely correct on any pitch and is so easy that anyone who uses it once will never forget it, as he may a combination of figures.

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A Contract That Paid a Profit

The building of Squire Reynolds' house was a big job and brought forth very keen competition among the local builders. The plans called for the erection of a remarkable handsome home, complete in every detail and beautifully finished throughout.

Clem Windsor figured on the job just as low as he knew how all the way through. He was a young man and the securing of this contract together with its successful completion would go far toward adding to the reputation he was endeavoring to build. When the day came for the opening of the tenders most of those who had put in bids were on hand. One by one the envelopes were broken open and the amounts read off. Windsor could hardly conceal his satisfaction as he listened to the reading of the figures. So far he was below everyone else. He did not see how he could help securing the job, for he had figured his profits down to the very lowest margin. Already in his own mind he had commenced to scheme out little ways by which he could economize to make something out of the work besides reputation.

And suddenly his face fell.

George Stevenson's bid was read and the gross figures were actually below the bare costs that Windsor had estimated. Although Windsor could not understand where he expected to make a profit, Stevenson got the job. Work on the building progressed rapidly, and from time to time as he passed it Windsor cast curious glances at it. That Stevenson must be losing money he felt absolutely sure. Finally, as the building approached completion, he could not restrain his curiosity any longer, and one day instead of passing the place as usual, he turned in, and with a show of nonchalance sauntered carelessly up the steps.

Stevenson, who was standing inside, was in no way deceived by Windsor's assumed air. He met the unsuccessful bidder in the hall with a grin.

"Well, Clem," he said, "have you come in to see me lose money?"

"I'm not sure yet," laughed Windsor non-committally. "But what I would like to know is where you're going to make any money?"

This time Stevenson laughed outright.

"Come with me," he said, taking Windsor by the arm, "and I'll let you into the secret."

Together they ascended the broad staircase and entered the big sitting-room on the second floor. As he went in Windsor...
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could not help noting the remarkable finish of the beautiful hardwood floor. It was this floor that had been one of the sticking points in his estimate, for particular stress had been laid on the fact that the work must be done in first-class style, and to do it the way Stevenson had done it Windsor knew must have cost considerable money. Stevenson watched him closely with ill-concealed satisfaction.

"Isn't that pretty fine," he questioned. Then he led Windsor to the next room where one of his men was busily engaged in polishing the floor. He stopped him at his work and took hold of the scraper himself.

"Here," he said, "is the secret of my low bid, and here also are my profits. You know as well as I do what it would cost to have scraped all the floors in this big house by hand in the old way. It would have cost a tremendous price. And it was right there that all you fellows fell down. It was because I had a Weber double-acting floor scraper that I was able to get this job. The Weber double-acting floor scraper is probably the most complete machine of its kind made, and will plane, scrape, sandpaper and polish a floor to perfection.

Perhaps the chief advantage which the Weber possesses over other floor scrapers lies in the fact that it can be operated both forward and backward and that it can be used in confined spaces where ordinary scrapers are worthless. There is no other scraper on the market that I could have used for the halls and vestibules and for the interiors of closets. Then if you will watch the man over there you will see that by setting the spring board on the side of the machine down one inch, and by also setting down a set screw on the opposite side, he can use the machine along close to the base board. That little change he made brought the knives down 1/5 of an inch; also on the side nearest the base at the same time also brought the handle away from the wall, thus giving him ample room in which to operate the machine.

"Don't they wear out," asked Windsor, "and don't they cost lots of money?"

"Wear out, nothing," replied Stevenson. "This machine is built practically all together of malleable iron, and ordinary usage will not wear it out. As to the cost, I would hesitate to say how many times over this machine has already paid for itself. But the Weber has other advantages, for instance, you can sharpen the blades without removing them from the machine by the Weber automatic sharpening device. Again, the flexible frame prevents the Weber from jamming and chatter or leave waves and creases in the floor. I tell you the machine is perfection itself. With its several attachments it will do practically anything that anybody wants done."

"Where do you get this machine," asked Windsor, now thoroughly aroused.

"Write to John F. Weber, president of the Weber Manufacturing Company, 670 71st avenue, West Allis, Wis.," replied Stevenson, "and ask him about his free trial offer. He has so much confidence in the value of his machine that he doesn't ask anybody to buy it until they have tried it, and he will send one to you or any other carpenter or contractor on free trial."

Windsor jammed his hat down over his ears and started for the door.

"I will write tonight," Stevenson heard him say.

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Price—(All Shades)—¼-gallon size, $1.50

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Mix Johnson's Plasto-Filler with water to the proper consistency, and apply with a putty knife.

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is entirely different from any filler on the market. Try it and see.

We want you to know, too, how much better Johnson's Under-Lac is than shellac or varnish. It forms a thin, hard, glossy, elastic veneer over the wood, which will not show scratches, water-stains or heel-marks. One coat of

Johnson's Under-Lac

and one coat of varnish will give a higher gloss and more durable finish than three coats of varnish without the Under-Lac. For a higher gloss we recommend a coat of Under-Lac over Wood Dye or Paste Wood Filler, and then one coat of Johnson's Prepared Wax, for that "hand-rubbed" effect. Price $2.50 per gallon.

Now, it is a generous sample of these three articles which we send you, entirely free and post-paid; also our text book on the proper treatment of floors, woodworking and furniture.

Don't forget to mention the color of Dye you want.

Racine, Wis.

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
is a vital element, and so there is an increasing demand for builders' derricks that will do the work that was previously done by laborious and costly handwork. In this connection we would direct special attention to the Sasgen Builders' derrick which has recently been placed on the market and demands consideration on account of many strong points.

In the first place the Sasgen derrick is light, portable and easily moved and set in place. It is strongly built and powerful in operation. It is intended for hand power and is on the circle swing principle so that it is adapted for hoisting stone, iron, timbers, joist, flooring, door and window frames and other material used in building operations. The Sasgen derrick has rapidly gained in popularity since it was first introduced to the contractors of the west, and we are informed that there are over three hundred of them in use at the present time in this city. Contractors speak most highly of the derrick for it is constructed for hard use, made of selected wood, finest malleable castings and high-grade steel hoisting cable. It is so simple in operation that by removing two nuts and one bolt it becomes compact enough for one man to handle readily. It is manufactured and sold by Sasgen Bros., 665 Lincoln avenue, Chicago. They are comparatively newcomers in this field and are establishing a trade that reflects credit on their business methods. Those who are interested can obtain prices and further information by addressing the company as given above.

9-Inch Universal Woodworker

The Bentel & Margedant Company, Hamilton, Ohio, have a woodworking machine in their 9-inch "Economy" which they claim to be the latest and best of their well-known Universal woodworkers, notwithstanding the fact that it is the least expensive. It is a machine that they have brought out to meet the requirements of those wanting a strictly first-class machine at a minimum cost.

It is suitable for performing a great variety of work. With each machine there is a direction sheet on which many different operations are illustrated and more fully explained. The frame of the machine is cast in one piece with the base large and well spread on the floor, and with broad incline supports for the table brackets on which they are adjusted to and from the cutter head obliquely by means of the hand-wheels shown in V slides provided for the purpose, with ample means for taking up any natural wear that may ensue.

The table tops proper rest in slides on the top of the brackets and can be moved and set horizontally to any required distance from the cutter-head or mandrel. They are each 36 inches long and are 12½ inches wide including the recess in front, which is 3 inches in width for receiving the gaining
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It is suitable for performing a great variety of work. With each machine there is a direction sheet on which many differ-
ent operations are illustrated and more fully explained.

The frame of the machine is cast in one piece with the base large and well spread on the floor, and with broad incline supports for the table brackets on which they are adjusted to and from the cutter head obliquely by means of the hand-
wheels shown in V slides provided for the purpose, with ample means for taking up any natural wear that may ensue.

The table tops proper rest in slides on the top of the brackets and can be moved and set horizontally to any required distance from the cutter-head or mandrel. They are each 36 inches long and are 12½ inches wide including the recess in front, which is 3 inches in width for receiving the gaining

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We Want To Tell You How

You can save not only the dealer's profits but his excessive charges for installation and repairs.

You can deal direct with the manufacturers.

The Jahant Down-Draft Furnace

Only Ten Dollars Down and Ten Dollars a Month With Freight Prepaid East of the Mississippi River.

This wonderful furnace has proven its superiority over others during the last thirty years. It is without a doubt the best heating system ever devised.

It saves from one-third to one-half in fuel bills, because the patented down-draft burns hard or soft coal, wood or lignite, without cinders or clinkers, giving the full heating value of every particle of fuel.

THE JAHANT DOWN-DRAFT FURNACE

is scientifically correct. Every part is cast of the best New Gray Pig Iron; no sheet steel is used; the fire pot will last a lifetime; cracking is impossible.

A strong "Guaranty Bond" goes with every JAHANT, which allows a three hundred and sixty day free use of the furnace.

You run no risk, as we supply special plans, full instructions and give free, all necessary tools, so that any man who can drive a nail can successfully install a JAHANT.

Let us tell you something about the conveniences and good points of our furnace, its economy, its health-
fulness and how you can save money.

We have an interesting and money-making proposition to make to every carpenter and builder.

Write today for our book.

THE JAHANT HEATING COMPANY

"Building furnaces for thirty years".

100 Main Street, AKRON, OHIO

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
We want you to know about Carey's Roofing—and why it is in a class by itself—different and better. Every architect, every builder, every dealer will profit by this knowledge.

We want you to understand why this famous roofing has given perfect protection on buildings for eighteen and twenty years;
And, on inspection, proved to be in better condition than when first applied—the outer surface a more efficient resistant to wear and weather.

The wonderful inner compound is so prepared and tempered by our special process that it is permanently live and flexible.

Extreme heat will not melt The Carey Roof. No tar to run, no paper to crack and crumble. Cold, wind, ice, snow, and soaking rain—and sparks and burning brands—will not affect it.

has been the highest type of roof-construction for a quarter-of-a-century.

A compact, indivisible sheet of high-grade materials, scientifically combined. Absolutely standardized—uniform in manufacture, quality, thickness and weight.
The most skilled workman cannot produce a roof upon a building with the same degree of accuracy—and quality. And with a 'Built-up' roof there is no determining how the job will turn out until it is too late to change it.

You can prove Carey's Roofing before it is applied. Anyone can lay it. The Carey Patented Wide Lap insures one perfect, smooth and watertight covering that outlasts the building itself.

It's easy to buy Carey's Roofing—we have 46 distributing points; sold by leading dealers everywhere.

Let us send you a large sample of Carey's Roofing to prove its quality. Compare it with every other roofing material.

Judge of its strength and elasticity. And, remember, that Carey's Roofing actually improves with age.

We'll gladly send, also, our book about The Carey Roof Standard, illustrated with photographs of factories, business blocks and other buildings—Carey-roofed. It's full of valuable information.

We suggest that you use the coupon, and mail it today to—

The Philip Carey Manufacturing Co.
30 Wayne Avenue, Cincinnati, Ohio

COUPON
The Philip Carey Mfg. Co.
30 Wayne Ave., Cincinnati, Ohio
You may send me your book about The Carey Roof Standard also a free sample of Carey's Flexible Cement Roofing.

My name...
From name...
Address...

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
or cross-cutting frame. The adjustable fence and bevel rest furnished with the machine is adjustable in and out across the full width of the table and can be set to any bevel.

The machine is also furnished with the saw board and with the adjustable cross-cutting and gaining frame shown in the illustration, and with a rabbeting iron and panel steel. It will take a cutter-head up to 9 inches long, one of this size being furnished with the machine, same being either the company's patent triangular shear knife head or a slotted head as may be preferred. Other heads for any required purpose are furnished upon order.

The mandrel is made of the best tool steel, is 1 3/4 inches in diameter and is carried in long boxes, the outer box having a strong and rigid outside bearing resting on three taper supports and quickly and conveniently removable for change of heads by loosening the hand screw shown beneath.

An adjustable boring and routing table similar to that supplied on the other Universal woodworkers is furnished when ordered, but is not shown in the illustration. It is mounted on the reverse side of the machine, is convenient and well arranged, the mandrel having a shank hole to receive the bits and also being threaded to receive a universal chuck.

**Ready Reference Book**

The "Ready Reference Book" on roof framing, published by E. Ochrle, of 2567 Dodge street, Omaha, Neb., is meeting with great favor among the carpenters who have purchased it. Its size is such that it can be readily carried in the pocket ready for use at any time. It is accurate and a very big help to those not thoroughly familiar with roof framing and to those who use it is a big time-saver.

In this book the length of rafters of the various pitches, i.e., 1/4, 1/3, 1/6, 1/4 and 3/4 are given, and also a scale for polygons showing figures to be used on square to get the different cuts. Better write for one today.

**Would You Break Your Neck for $1.00?**

"Would you break your neck for a dollar?" That was the rather startling query made by one of our prominent advertisers last month. The Patented Window Attachment Company, 51-53 North State street, Chicago, Ill., are demonstrating to the satisfaction of many large builders that this query, startling though it is, does not exaggerate. They are proving that their window saves times and money and may save life.

It is interesting to note that this company has recently installed and got contracts for such buildings as the Illinois Eastern Hospital for the Insane, City National Bank building, the Wm. H. Radike residence, the Fair store, J. G. Knecht & Co. department store, Dr. A. J. Lauch's residence, all at Kankakee, Ill. Also from all elevated stations of the Philadelphia Rapid Transit Company, of Philadelphia, Pa., and the following apartment buildings in Chicago: Jos. Duplissis, 54th street and Lexington avenue; W. K. Gore, 59th street and Wabash avenue; Nels Jensen, on Pemberton.
4620 SATISFIED
Hess Furnace Customers

Bought Our Heating Outfits on the
Same Conditions We Now Offer You

If the Furnaces and Outfits had not been all we claim, and had they not been easily and
properly installed under our simple, clear plans and directions,

We Would Have Lost a Fortune

and Been forced to Quit Business Years Ago

WE BACK OUR GUARANTEE WITH A FREE TRIAL UNTIL JAN. 1910

This Free Booklet,
which bears the title: "Modern Furnace Heating," clearly explains
principles that cannot be ignored if
the heating of any building is to be ac-
complished perfectly and, at the same
time, economically. This booklet is
written so anyone can easily understand
the diagram illustrations and principles
involved. It covers the entire heating
proposition thoroughly and contains
heating information of much value.

Burns Any Fuel
Besides any kind of coal, gas or wood,
any other fuel, such as chips, twisted
straw, corn cobs, etc., may be utilized
and money saved.

We Give a FREE TRIAL Which Insures a REAL TEST of the
Complete Outfit After It Is Installed

Buy Direct of Us—the Real Manufacturers—and Save All Middlemen's Profits

ON FREE TRIAL
UNTIL JANUARY, 1910

We will send you a Hess Steel Furnace and complete heating outfit, including pipes, registers,
fittings and everything needed, for from $25 to $100 less than you can buy from dealers, and
deliver it at your station, freight prepaid. You may place the purchase price in the hands of your
local banker, who will hold the money until January, 1910, while you test the heater.

If the test is not satisfactory to you
in every way, you may return the goods at our expense and the banker will return your money.
Send us a rough sketch of any building that you wish to heat and—without any charge or obligation on your part, we will
have our experts prepare a simple, clear plan, which you can easily understand, showing every detail of the furnace, pipes, registers, etc.,
in their proper places, with the exact cost to you of the complete equipment.

Hess Warming and Ventilating Co., 679 Tacoma Bldg.
CHICAGO, ILL.
There's Money for You in Steel Ceiling Work

And you can easily handle it. Our construction is planned to simplify erection and reduce number of pieces to handle, thus saving time, labor and expense. Any good mechanic with the aid of our working drawings can easily do the work and secure a neat, snug-fitting, workmanlike job.

The idea back of Amatite is the most complete line of artistic Steel Ceilings in existence AND OUR CATALOG PROVES IT.

Berger's "CLASSIK"
is the most complete line of artistic Steel Ceilings in existence AND OUR CATALOG PROVES IT.

Write for it TODAY. Ask for No. D-55.

THE BERGER MFG. CO., Canton, O.
Atlanta Philadelphia Boston Chicago
Minneapolis San Francisco St. Louis

THE day for painting roofs has gone by. A roof that needs constant looking after in order to keep it from leaking is a makeshift. It isn't the kind of roofing that the thrifty, up-to-date man wants.

The idea back of Amatite was the insistent demand for something better than the "smooth surfaced" or so-called "rubber roofings," which were always needing painting.

Amatite meets this demand. You do not have to spend one cent on Amatite after it is on the building. It needs no painting, because it has a real mineral surface on top.

Amatite is easy to lay. The nails and liquid cement for laps are furnished free, and are enclosed along with directions for laying, in each roll.

The work of putting it down can be done by anyone, as it requires no experience.

Now, a roofing that is as durable as Amatite, that is proof against everything but time itself, is surely worth investigating.

Any one of the offices below will take pleasure in supplying further information and prices.

BARRETT MANUFACTURING CO.
New York Chicago Philadelphia Boston
Cincinnati Minneapolis Cleveland St. Louis

The special advantages claimed for the "Turnbull Universal Window" are as follows:

1 — This window can be washed outside and in, the cleaner standing on the floor.
2 — It is dust proof, also air tight and water proof.
3 — There is no danger to life or limb in cleaning this window, as the cleaner stands on the floor inside the building.
4 — This window slides up and down the same as any ordinary window sash.
5 — It can be made both in sheet steel and wood.
6 — It is cheap and durable.
7 — This window slides up and down the same as any ordinary window.

Leading architects are now specifying this window and are glad to acknowledge that it is a desideratum and fills a long felt want.

This window is raised and lowered with cords and weights, the same as any ordinary window sash. Then the inner part of the upper and lower sash is fitted with a part that opens on a pivot or hinge, just the same as a door is opened and shut, so that the outside of either the upper or lower sash can be cleaned while you are standing on the floor. When these parts are closed the window assumes the appearance of an ordinary window. Both inner sashes open and shut like a door without any interference with the cords or weights.

Every reader of the AMERICAN CARPENTER AND BUILDER should write and investigate this proposition. You cannot afford to let any such developments and improvements in building practice go by unnoticed.

Sharpening Stones for Carpenters

A sharpening stone made exclusively for the use of the carpenter is decidedly a novelty, but when the stone has all of the advantages and characteristics of the new Carbournum round combination bench stone, it becomes more than a
Here is a demonstration that demonstrates

"Double the Heating Surface with only the same Grate Area"

WE ARE UNPREJUDICED—these two boilers are our own make; one is the Andrews Locomotive Steel Boiler, made substantially as strong and durable as the standard steam-power boiler; the other is our make of Cast Iron Boiler, as good a boiler as can be made of cast iron and recognized in the heating trade as standard. We sell both as you may order, but we tell you the truth about how much better is the steel boiler—

Better—Costs More—and Worth It—Saves Coal

A Heating Plant that Pays for Itself
Hard coal used by other heaters, 11 tons at $8.75 per ton (the cost at Minneapolis), equals $96.25
Hard coal used by the Andrews Locomotive Steel Boiler and Hot Water Plant, 7 tons at $8.75 per ton equals 61.25
Saving per winter, 4 tons at $8.75 per ton equals $35.00
35x10 equals $350.00 saved—the cost of an Andrews Hot Water Plant.
In ten years you have saved coal enough to pay for the plant.

H. A. Argue, Winnipeg, Can., says: “The Andrews System is a great saver of fuel. In 1907 in my 9-room house I burned 7 tons of coal, while my neighbors in the same size house burned from 11 to 13 tons.”

SEND US YOUR PLANS (OR A ROUGH SKETCH WITH MEASUREMENTS) OF YOUR HOUSE FOR FREE ESTIMATE OF COST

ANDREWS HEATING CO.
1061 Heating Building, Minneapolis

1061 Marine Building, Chicago
**Grainlure Roofing**

This great pier was roofed nine years ago with Grainlure Roofing. At the present time it shows no signs of wear, and is expected to give excellent satisfaction, without attention or repairs, for at least ten years longer. Unlike the ordinary ready roofing, which is adapted only for temporary buildings and sheds, Grainlure Roofing may be economically used on all kinds of structures. Its unusual weight, 140 lbs. to the roll, gives to this roofing unparalleled durability. It can be laid by any one who can handle a hammer. Grainlure Roofing has a surface of sea-grit, thoroughly imbedded into its composition, which makes it fireproof and takes the place of the paint or coating.

Send for free Sample and Booklet, and learn about this best of all roofings.

**EASTERN GRANITE ROOFING CO.**

1 Hudson St., NEW YORK CHICAGO ST. LOUIS

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**BIGGER PROFITS**

FOR THE CONTRACTOR
Who Uses The
WATROUS
NO. 17
SCREEN HANGER

The same pieces, arranged to suit, will hang either a full or a half screen from either the top or side. Storm sash should be hung from the top, but this is the only way to hang a screen.

Only four screws to set, and make more money on the job. Mounted working model sent free postpaid to dealers or carpenters. Write to-day.

E. L. WATROUS MFG. CO.

DES MOINES : IOWA

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**An Adjustable Rabbet Strip**

In a new house, one of the greatest annoyances is that of swollen doors. Exercising the greatest care, it seems impossible to prevent this, and particularly in the case of an outside door it frequently becomes necessary to remove the door.

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**Hargrave Column Clamp**

The above cut is an illustration of Hargrave's column clamp, made by the Cincinnati Tool Company, Norwood, Cincinnati, Ohio. As will be seen, this clamp is distinctly different from others on the market in the method of operation. It works on the principle of a double rack and pinion with a pawl and ratchet to hold the clamp engaged. By this method you engage and disengage the clamp on the work quicker than by any other way, saving the cost of the clamp in a few days' work. The parts throughout are made of malleable iron and steel, with the lightest and strongest chain on the market. The clamps are put up with four feet of chain, but other lengths can be furnished. Six clamps can be put on a column by two men in one minute, and can be released, ready for the next column in thirty seconds. Descriptive circulars may be had by writing to the Cincinnati Tool Company, Norwood, Cincinnati, Ohio.
If You are Tired Being a Hard Working Carpenter or Builder then Make Yourself the Highest Grade and Highest Priced Man in Your Place

To do this you must be a good Draftsman, not one of those "would be" ones, no, but a first-class man, with actual, practical drafting room experience.

It will pay you well to learn this right from a practical man with twenty years' experience who will instruct you personally—individually on high-class architectural drawing, complete building designing and detailing in all branches;

Who will qualify you at home in a few months to double your earning capacity

Don't waste time and money trying to learn from books or printed lessons made for all alike, the same as patent medicine; you can only learn this right on practical work from a practical man.

Free This Month A high-grade Complete Drawing Outfit, including a $13.85 Set of German Silver Tools.

If you want to be the "BEST MAN" write me to-day. Address—

Chief Draftsman

Div. 17 Eng's Equip't Co. (Inc.) Chicago
Nothing else gives such life and staying quality to a roofing as Trinidad Lake asphalt.

Genasco
Ready Roofing
is made of Trinidad Lake asphalt and gives lasting resistance to sun, air, rain, heat, cold, and fire. It is mighty important to know what your roofing is made of.

Be sure you see the Genasco trademark and get the roofing with a thirty-two-million-dollar guarantee. Mineral and smooth surface. Write for the Good Roof Guide Book and samples.

Largest producers of asphalt, and largest manufacturers of ready roofing in the world

PHILADELPHIA

New York San Francisco Chicago

BUY A BOVEE FURNACE
Direct from the Factory
AND SAVE $50.00 TO $100.00
ON YOUR HEATING PLANT
They Actually Save from One-third to One-half of the Fuel

We have one of the best equipped furnace factories in the west and make more than 30 different furnaces of seven leading styles and can furnish our customers with practically any size or style of furnace they may desire, either upright or horizontal, sufficient to heat a large church or school house, down to a cottage heating plant at a price with all pipe, registers and take and cost.

Our furnaces are the only furnaces having a perfect ventilating system for every part of the house. We ship our furnaces cut to fit. Any handy man can install them without the aid of a timber. Our catalogue and full specifications free.

Bovee Grider & Furnace  Works 50, 8th Street  Waterloo, la.

Read and Think This Over

The carpenter making the most shavings usually gets the smallest pay, and the contractor doing the most sweating, usually is the lowest bidder and loser.

There is a reason for this carpenter to be out of a job, and from the hinges, plane it, and deepen the hinge recesses in order to make it close. This causes considerable extra work for the builder, as well as bother to the householder, and the trouble does not end here, for if the door swells again, the operation has to be repeated, and finally when it shrinks back, a space is left between the door and jamb, which makes necessary the use of weather strips.

All of this trouble can be overcome by preparing an adjustable rabbet strip to take the place of the usual rabbet or jamb; this must be 1 1/4 inch thick, and the ends of it have to be flush with top and bottom edges of the door. The strip is bored and countersunk for five adjusting screws which measure 2 1/4 inches over all; one of these is put in 4 inches from the top, one 4 inches from the bottom, and the remaining three at equal spaces between. After the screws have been inserted so that the tops of the heads are even with the front of the rabbet strip, a washer and nut is run on the end of each screw; the nut is tightened with the fingers, and when in position is fastened with a small set screw as shown in the diagram. The end of the screw is then put in an iron bracket, the other end of which is fastened to the back strip. Up to this point the work can be done on a bench.

The rabbet is then placed in position, and fastened by screws which are run through the jamb into the back strip; it is also held by a small flat casting—one end of this has a hole which fits over the end of the bracket, and the other end is nailed to the studding. Blocks of wood are nailed to the studding in spaces between the five adjusting screws, and the casing may be nailed to these.

It takes perhaps half an hour longer to fix rabbet strips this way, and costs a little more, but when compared with the amount of time and trouble saved, to say nothing of probably ruining the door, the extra expense is insignificant. Each time the door swells a few turns of the screws with an ordinary screw driver makes room for the door to close, without taking it from the hinges and planing, and when the door shrinks, the rabbet strip is just as easily moved back; so there is always a perfect fit.

This arrangement is not an untried one; it was designed by a practical architect and builder, and has been used with great success for several years. One householder said he would rather lose quite a little money than have a house built without door jamb adjusters—for the outside doors anyway.

The fixtures are now being manufactured by the James L. Taylor Manufacturing Company, Bloomfield, N. J., who will be glad to furnish any further information desired.
Asbestos

"Century" Shingles

"The Roof that Outlives the Building"

Figure out the cost of various roofings to your client. Allow for painting and repairs.
Where does he come out on a cost-per-year basis? In convenience and comfort—in security from roof troubles?

Asbestos "Century" Shingles make an absolutely permanent roof—weather-proof—time-proof—fire-proof. No painting—no repairs. The first cost is the final cost.

Made in numerous shapes and sizes, in three colors—Newport Gray (silver gray), Slate (blue-black) and Indian Red.

Ask your Roofer for new quotations. Write for Booklet "Roofing 1909."

The KEASBEY & MATTISON COMPANY, Factors, Ambler, Pennsylvania

TIME WILL TELL—BUT NOT ON

"First Cost is Easy To Lay."

The very name "GAL-VA-NITE" carries with it a positive feeling of satisfaction. The carpenter or builder who either specifies or uses this high grade ready roofing on a building can rest assured that the owner will be satisfied.

GAL-VA-NITE marks that degree of perfection among roofing materials which characterizes it as the "STANDARD" of moderate priced ready roofings. It has made good in all climates and under all conditions. The fact that it needs no painting or after attention when once on the building, makes it especially in demand by house owners who have long since tired of the expense and trouble of patching up leaky roofs.

GAL-VA-NITE is waterproofed with a triple coating of mineral asphalt and weatherproofed with a heavy "armor-plating" of flaked mica, which makes it impervious to the ravages of rust and the dangers of flying sparks and fire-brands.

Better let us send you FREE SAMPLES and ROOFING BOOKLET. A postal today will bring them to you. Ask for DETAIL 9. Address the manufacturers.

UNION ROOFING & MFG. CO. 1100 East 7th St. ST. PAUL, MINN.

WE HAVE DISTRIBUTING WAREHOUSES IN THIRTY-FIVE CITIES

"BRADFORD REDS"

Ask the Man WHO BOUGHT THEM.
Or
The Bricklayer WHO LAID THEM.

Bradford Pressed-Brick Co.
BRADFORD, PA.

BRICK MANTELS,
ROMANS and
ORNAMENTAL SHAPES

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
From tip to handle the Simonds Saw shows the result of utmost care.

The very fit of the handle is exactly right to give a perfect grip with an easy "balance" and just the right "hang."

The steel from which the saw is made is the famous Simonds steel, made expressly for and used only in the Simonds Saw.

Its temper is as nearly perfect as human thought has yet achieved. Tempered by our own secret process it holds a keen cutting edge in a marvelous manner, requiring but little attention or sharpening.

When you buy the Simonds Saw you are getting the highest grade saw made.

Thousands of experienced carpenters testify that

SIMONDS SAWS ARE THE BEST

And They ARE The Best

Protect yourself against imposition in buying saws by looking for Simonds trade mark. Whatever saw you find that on you are safe in buying, and don't buy any other unless you are prepared to be disappointed.

If your dealer does not keep the Simonds, let us know and we will see that you are supplied.

SEND FOR "SIMONDS CARPENTER GUIDE" MAILED FREE

This booklet will tell you about Simonds Saws and give other information of real interest and value.

SIMONDS MANUFACTURING CO.

Fitchburg, Mass.

Branches in leading cities

for the sweating and swearing contractor to be out of money. It is a fact that more contractors go broke than survive on the first job, and more money is lost than made by using the old foggy guess rule, or thumb measure.

At this age of competition only the best will survive; the most successful man, whether carpenter or contractor, is only the best educated, trained and experienced man.

A carpenter or contractor that is not a first-class draftsman is soon a "dead one," and passed by as not up-to-date or competent to handle the best work with the most money in it. What's the use being a "dead one" while being alive?

Mr. F. V. Dobe, of the Engineers' Equipment Company, Chicago, Ill., who has been at the head of a large business in this field for nearly twenty years, is now giving personally a practical drafting room instruction, of an exceptionally high grade kind and quality; not the kind of "hash" furnished by some schools that teach from printed plates for all alike, but special individual instruction applying to the requirements of each man in his particular line. His instruction is given by mail, and the work can be done at leisure at home. His announcement appears on another page and should be carefully read by any ambitious man who is anxious to be something better than the average.

It Stays and Pays

The editor of the AMERICAN CARPENTER AND BUILDER has just received an exceedingly interesting and valuable book from the Kawneer Manufacturing Company, Niles, Mich., containing working drawings and details of construction of the Kawneer system of store fronts adapted to all conditions. This book is being distributed to architects and builders, and should be in the reference case of every reader of this journal.

From a structural standpoint the nature and quality of the materials entering into the store front of a business building will determine the cost of maintenance and measure the percentage of interest on the investment. In fact, records compiled during the past few years have proven the show window to be the greatest trade pulling factor in the life of a retail business.

To the architect, the client's interests are paramount. It is the earning power of the sum invested, whether the client be owner or tenant, that is to be seriously considered in the selection of a store front construction. If in design the construction is architecturally correct; if it is thoroughly adaptable to the architect's originality in design; if it is durable and all the finishes of the various parts are brilliant and attractive, it will force upon you the conviction that here is an up-to-the-minute store; a store filled with dependable and trustworthy merchandise. Such a store front can never fail to strengthen the display and draw new customers.

If, on the other hand, the materials are heavy and unsightly, and in design are indicative of methods and materials employed for many years past, it will have a tendency to repulse, and stamps the establishment as one generally behind-the-times.

The Kawneer system of store fronts was designed by an architect who had long practiced his profession and the vital characteristics—trade pulling power, low cost of maintenance and permanency—have always been held as the most important points in its development. It offers relief from the old cumbersome construction, which is made up of such materials as will quickly rot and rust, that consume many inches of valuable display space, and that year after year call for constant repairs.

The engineering and drafting department of this company is ready at any time to give information concerning the installation or use of the Kawneer system of store fronts, whether the case be a special one requiring detail drawings or an ordinary one. Estimates of Kawneer material complete for any store front will be sent upon request for same.

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
These pencils are made for all around office use. Soft, smooth, strong graphite and selected, straight, grained cedar. Smooth writers, long wearers, easy sharpeners. Supplied with good rubber erasers that erase without smudging or scratching.

**E. C. Simmons Office Pencils**

Sold by leading dealers; one dozen in a package, 50 cents. If not at your dealer’s, write us for free sample and we will tell you where you can find them.

**ADDRESS DIV. No. A. C. Simmons Hardware Company (Inc.)**, St. Louis and New York, U. S. A.

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**AN EDWARDS METAL SPANISH TILE ROOF**

COSTS NO MORE THAN A GOOD TIN ROOF

Artistic and Ornamental in appearance and is positively guaranteed to be Fire, Lightning, Rain, Storm and Wind proof.

Its extreme lightness (about one-eighth that of slate), durability and moderate cost commend it to those wishing something out of the ordinary in roofing.

Manufactured from best quality Worcester Grade Terne Plate, furnished painted or galvanized (galvanized after being formed) size 10 x 14 inches.

Descriptive Booklet sent free on request.

**The Edwards Manufacturing Co.**

"THE SHEET METAL FOLKS"

401-417 Eggleston Ave., CINCINNATI, OHIO

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**Congo Roofing**

GUARANTEED By a Surety Bond

TO CONVINCE the public that 3-ply Congo Roofing will really last ten years, we furnish with every roll a bond of the National Surety Company backing up our guarantee. THIS BOND gives you absolute certainty that our promise will be made good.

WE DON'T CONSIDER that the bond is necessary, but it serves to show how firmly we believe in the durability of our product.

ANY MANUFACTURER could say as we do, that his roofing will last ten years, but we show that we mean business when we back up the guarantee with a genuine Surety Bond.

THE ONLY THING for us to do under these circumstances is to make a roof which will stand the test and outlive the guarantee period.

That is what Congo will do.

OTHERWISE, we could not afford to bind ourselves over to a Surety Company, and thus insure the thousands of Congo roofs which are being laid every year all over the country.

**FREE SAMPLE**

WE SHALL BE GLAD to send you a copy of the bond without charge. We will also send you at the same time a sample of Congo, so that you will see the reason for our confidence.

United Roofing & M'F'G. Co. Successors to Buchanan-Foster Co. 555 West End Trust Building, Philadelphia, Pa. Chicago San Francisco

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**Recommended by Insurance Experts**

The Petz System has the approval of the leading insurance companies as a safe construction that offers no danger to plate glass. This cannot be said of every bar offered you.

Besides giving you the lowest rate of insurance, the Petz Bar offers you a maximum of window space, light, strength and artistic beauty. Easy to install; glass goes in from the outside.

Our booklet, "Modern Store Front Construction," contains illustrations and descriptions of our different forms of bars. Write for a copy at once.

**DETROIT SHOW CASE CO.**

491 WEST FORT STREET DETROIT, MICH.

For sale by Pittsburgh Plate Glass Co. at all branches.

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This wonder worker in building construction is used as a substitute for sheathing as well as lath and plaster. It is made of kiln-dried, divised fir, impregnated in hot Asphalt Mastic, and surfaced with sized card and oil. It is cut at the factory in 4 x 4 ft. sheets, which are nailed to studs, ready for wall paper or paint.

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Consult Sweet's Index (1909) pages 248-249.

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Ready Roofings! Metal Roofings! Roofing Pitch and Roof Coatings!

$39 buys this complete 11-room hot water heating plant for only $39! Everything complete with nickel trimmings. Each plant complete with nickel trimmings.

Hot Water or Steam Heating Plants Bath Room Outfits with all Plumbing Fixtures and Pipe sold direct to you at manufacturers' prices.

You can have a modern hot water heating plant in your home, even though you live away from a city. The cost is low. Fuel bills reduced one-half. Install it yourself. It’s easy. Now is the time to purchase guaranteed material at low cost. Act now and save money.

Through our policy of buying entire factory lots of merchandise and the purchase of a great deal of material at forced sales we come into possession of immense quantities of high-grade building material and machinery. Note the various items and prices on this page. These and many others in OUR NEW CATALOG (just off the press), offer an unusual opportunity to you to purchase guaranteed material at low cost. Act now and save money.

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We guarantee our claim of quality—a point exclusive with this house. Goods are shipped on 30-day open account, and if they do not open up to your satisfaction, simply ship them back to us. We will pay the freight both ways. This Guarantee of Quality policy makes it absolutely necessary to handle only the best grade goods—for it would be too risky to handle doubtful goods.

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**SOMETHING NEW FOR YOUR HOME**

Made of Solid Smooth Steel—Finished in Finest Everlasting Baked White Enamel Inside and Out—Has Adjustable Enamed Steel Shelves.

**BETTER THAN WOOD AND COSTS NO MORE**

No home is complete without a Hess Sanitary Bath-Room Locker. It is germ and vermin proof.

Style "A" Locker is made to recess into the wall and projects one inch from face of wall. It has a beveled plate mirror 16x24 inches and measures 19x24 inches inside. Below the mirror is an open shelf 19x36 inches. Style "B" is the same size and finish, made not to recess into the wall, but to be suspended on the wall.

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Order from your dealer. If he will not supply it send us the price and we will ship the locker direct to you, prepaying freight charges anywhere east of Missouri and north of the Ohio rivers.

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**APOLLO BEST BLOOM Galvanized Sheets**

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These sheets have been giving just such results for many years. For prime quality, uniformity, ease of application, long service and all-around superiority, use Apollo Best Bloom Galvanized Sheets, "Standard the World Over".

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You see men around you who are holding fine positions—who are getting high salaries. Have you ever thought why this is so? Why is it that these particular men hold such positions and not you? It is not always because of "pull" or luck. In fact you must admit that there is only a small percentage of men who hold such positions through "pull." Most of them have earned their positions; they made some definite, earnest effort to acquire the ability that enables them to competently hold places of responsibility and high salary.

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- Any kind of material—wet or dry, fine or coarse—is mixed thoroughly, and with ease. And the mixing drum is open to view all the time.
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- In short, it’s just as simple in construction and operation as you would judge by the illustration.

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Our catalog gives prices and particulars.
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South Bend Machine Mfg. Co.
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We’ll prove before you buy that this machine will make better blocks—make them with less cement—and more sizes than higher priced machines. We know this is a strong statement, but we will give you an actual demonstration in your own home town, before you accept it—and you can operate the machine yourself.

Price
$40.00

Send for our Catalog. It gives practical common-sense reasons for our claims. If they look reasonable to you, send for a machine on fifteen days’ free trial.

Twenty-One Sizes of Chimney and Porch Molds for
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Made of the best steel castings. Many designs and patterns to select from. Send for information and illustrations of the different designs.

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THE "NEW OLIVER" AUTOMATIC BLOCK MACHINE

With the "Oliver" all changes for making all the different sizes of blocks are made without the use of a wrench. Simply pick out one set of plates and place in another. The "Oliver" makes blocks running every inch from 2" to 24" in length, and from 4" to 12" in width; also 4", 6", and 8" height blocks.

The "Oliver" makes porch piers blocks (both hollow or solid), from 16" up to 24" square, faced on all four sides. One movement of the lever releases all plates from block, the reversing of the lever closes and locks the machine strong and rigid. Study its principles! Write for free illustrated catalogue, full particulars etc. It will simply pay you.

Concrete Stone Mould & Machine Co.
CLARK'S LAKE, MICH.

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Compare these prices with the prices you are now paying, then bear in mind our Special Building Materials and Mill Work Catalog contains from five to six thousand special bargains. Every piece is at least as low or lower than the average wholesale price.

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$50.00 Buys This High Grade Bathroom Outfit!

Clean—Sanitary—Odorless—Newest Designs
- Best Appliances—Finest Nickel Trimmings

Here is an example of our ability to save you from 40 to 60 percent in the purchase of high grade plumbing fixtures. We guarantee that every article used in this outfit is absolutely brand new and will make your home beautiful and comfortable.

THE BATH TUB is genuine white porcelain enamelled, with heavy roll rim and very graceful shape.

THE LAVATORY is beautiful, spotless white porcelain enameled with full set of nickel plated trimmings.

THE CLOSET is the latest and most sanitary, vitreous siphon jet. Constructed of vitreous china.

THE ACCESSORIES include bath seat, nickel plated soap cup, two towel bars, and toilet paper holder.

NO JOINTS TO WIPE, all threaded pipe connections.

This is our No. 2 outfit, and our price of $50.00 absolutely includes all of the plumbing fixtures shown in the illustration, plus the accessories. This is but a sample of the many different styles that we can furnish. Prices range in price from $50.00 to $250.00. Our prices will save you one-half of what your plumber would ordinarily charge you.

We furnish a written binding guarantee with every outfit that we sell. We guarantee that we will exchange or refund your money if for any reason you are not absolutely satisfied.

INSTANTANEOUS WATER HEATER AT $20.00

Solid brass heavily N. P. Instantaneous Water Heater. Heats the water as fast as it flows through it. Capacity 25 gallons. Takes up little space. Economical; most rapid heater on the market. Automatic safety, reversible spout; guaranteed broad hood and perfect draft. Put through two rigid inspection tests before shipment. Saves hot water the moment you turn on the gas.

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Genuine white porcelain enamelled heavy cast iron roll-rim; modern design; complete with heavy cast iron brackets, enameled iron roll-in drain board. Fuller hanging faucet and trap to wall. Sinks fit sink 18x30. Only $11.50.

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It is a superlative article that increases in demand after 26 years in use. She only absolutely protected or covered Lock. No chance here for the lock to flood and leak. 

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Yours very respectfully,

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Minneapolis, Minn.

Largest Mfrs. of Concrete Machinery in the World.

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**HERCULES BLOCK MACHINES**

**ARE THE FASTEST, SIMPLEST, STRONGEST AND BEST MACHINES BUILT**

AND WE CAN PROVE IT.

THEY EXPAND TO MEET EVERY DEMAND

**THE ONLY** machine making any size of stone from a 3 inch block to a 6 foot water table.

**THE ONLY** face down machine that allows for a really coarse WET mixture with fine facing.

**THE ONLY** machine on which four 16 inch stone can be made at ONE time, or two 30 inch, 24 inch or 32 inch stone at one time.

**THE HERCULES IS AN OLD ESTABLISHED MACHINE**
built along correct lines and endorsed by the leading contractors and builders.

They are used in all parts of the world.

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**PEOPLE WILL TALK**

When a man builds a house, all his friends call. Every caller looks over the FURNACE, looks for the NAME, asks all about it. The first Winter that man has lots of company; it's a New House and a New Furnace, and people like to see how new things "go." If the furnace only half heats the house, they "go" and talk about it; he "says things" too. That's one kind of "free advertising." Now, suppose the owner of the house buys a "Front Rank" Steel Furnace of you; some questions are asked: "Where did it come from?" "How does it work?" etc. Mighty good ad for you when the owner says: "That furnace is all right; it heats fine and doesn't burn much coal." And all his company go and talk: "How nice and comfortable that house was." Over 12,000 "Front Rank" Steel Furnaces in use in our own city, St. Louis; other cities in proportion. There's been lots of building; Summer will soon be over and Winter will be here. See the point? Want the Agency?

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**Anchor Machines Make Continuous Air Space Blocks**

The wall that's guaranteed frost and moisture proof.

A perfect dead air space from cellar to garret. Standard Machine makes blocks 8x24 in.—any width from 8 to 13 in.

Junior Machine makes blocks 8x18 in.—any width from 8 to 13 in.

All blocks tied together in construction by four quarter-inch galvanized iron rods 8 in. long and turned 1 in. at each end, guaranteed rust proof and everlasting.

Write for Catalogue and Special Prices.

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**By NATURE "PEERLESS"**

**Strongest**

**Anchor Concrete Stone Co., Rock Rapids, la.**

**PEERLESS PAID**

By NAME "PEERLESS"

By use of the "Peerless" with material mixed, one man can turn out over 12,000 Brick Per Day

12,000 Brick Per Day

The Wonder of the Present Day

The Sensation of ALL the Shows

This machine is a marvel of simplicity and durability. It has been brought to the highest standard of labor-saving and profit-sharing efficiency, and stands alone and in a class by itself.

No other machine of like character has ever been invented, so far as we know, that can produce one-quarter the number of brick in the same time as the Peerless.

The Peerless is in general use throughout the United States, and its friends are numbered by the thousand.

Why? Because Brick are made face down and delivered face up. Brick are of uniform size with sharp edges and true to the square. Brick are more firm and durable than pressed brick. The Peerless makes ten bricks at one operation.

Our catalogue tells you all about it. Write for one to-day.

Peerless Brick Machine Co.

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**Anchor Machines Make Continuous Air Space Blocks**

The wall that's guaranteed frost and moisture proof.

A perfect dead air space from cellar to garret. Standard Machine makes blocks 8x24 in.—any width from 8 to 13 in.

Junior Machine makes blocks 8x18 in.—any width from 8 to 13 in.

All blocks tied together in construction by four quarter-inch galvanized iron rods 8 in. long and turned 1 in. at each end, guaranteed rust proof and everlasting.

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**"TRUS THE MAN CON"**

**JOIST HANGERS**

**Strongest**

as shown by University Tests.

Made from OPEN HEARTH STEEL.

Saves cutting and weakening of timber.

Saves labor in installation.

Lowest First Cost.

All styles and sizes for brick and Concrete Walls, Steel and Wooden Beams.

Write today for prices to Specialty Dept.

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A Failure at Fifty

Out of a job at fifty—is the fate of the untrained man.

Business requires not only natural ability but special training.

The Trained Man Can Defy Old Age

The American School of Correspondence can fit YOU for congenial, well paid positions, in your early years, and make your services valuable in your old age. Training only can compensate for the energy of youth.

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Occupation

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Concrete Roofing Tile Machinery
Manufacturers in United States
Europa and New Era
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Handsome, Sanitary, Enduring, Economical
The crowning triumph of mechanical skill and genius
Costs less than any other Roofing Material, presents a much handsomer appearance; outwears all other Roofing.

Made in practical sizes; all colors; not affected by heat or cold; does not absorb the carbonic acid of the atmosphere; will not radiate heat. Lowers Insurance Rates. The Manufacturing of Concrete Roofing Tile is one of the most profitable industries in the country. We Build Roofing Tile Machinery. Information cheerfully furnished. Write for catalogues.

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If you want a machine which builds the best and strongest hollow blocks, 6", 8", 10" and 12" thick, veneer blocks 3", 4", 5" and 6" thick, all of three rock bevel and plain face, 4" and 6" high, and all lengths up to 24", a machine which builds circular blocks, angle blocks of any desired degree, porches 12" to 24" square chimney blocks of all sizes, gable blocks, joint blocks, in fact everything in the block line, then drop us a line and we will acquaint you with the most complete machine ever made.

The Mogul Invincible Block Machine

Wet Process is Right.
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No car in the world compares with the Brush Runabout in low cost of maintenance or in simplicity, durability, convenience, reliability and ease of handling. We make these claims knowing our ground absolutely. They are based on fact. No other makes have proven during the many years we have been manufacturing with the automobile business, as well as the two years we have been manufacturing and selling the Brush Runabout.

No car in the world compares with the Brush Runabout in low cost of maintenance or in simplicity, durability, convenience, reliability and ease of handling. We make these claims knowing our ground absolutely. They are based on fact. No other makes have proven during the many years we have been manufacturing with the automobile business, as well as the two years we have been manufacturing and selling the Brush Runabout.

You are probably surprised at this statement. You may even say: "Why, I don't believe I ever saw one of your cars!" We don't doubt it, even though there are over 2,000 of them in use. When you divide this number over the United States and eleven foreign countries, there isn't a very thick line in every locality.

But in a few months you will see the Brush everywhere. Watch for the little gray car with the black stripes—and you will always see it deliver the goods.

There is a larger demand for the Brush this year than we can supply, even though we are running our factories twenty-four hours a day. This we know.

No, possibly you are not interested in what the Frenchmen are doing; but you are interested in a tried and proven automobile that you can buy for $550. A car that will carry two passengers and baggage over any road (up Pike's Peak, if you want to go) and carry the goods. It is easily operated—one you can maintain for less than half what it costs to keep a horse and two-passenger vehicle. If it were possible we would like nothing better than the opportunity to take you through our factories and show you how the Brushes are made. This, with a chance to demonstrate the performance of the car, would settle the question to our mutual satisfaction.

BRUSH RUNABOUT CO.
761 Baltimore Ave., DETROIT, MICH.
Established 1906

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every builder should have my little works and be a constant reader of the "Cement World," the leading paper of its kind published.

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ARE SCIENTIFICALLY MADE. They are an improvement over old style saws—are made on new principles, different from any other, which make them cut easier and faster. WE CANNOT TELL HERE. There is so much to know about Atkins Silver Steel Saws that we cannot tell it in this space. Won’t you drop us a postal and let us send you our free book, “Saw Sense”? You ought to know about Atkins Saws anyway. Your dealer will show them to you, but write for free book and time book, with space for keeping time and tables for figuring wages. Write to

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It does not require an expert to use a typewriter. Any man can use one with slight practice.
Complete Water Supply Systems

Here are illustrations of four complete water works plants. Each one of these water systems is furnished complete, ready to set up, as shown in the illustration. To get the plant ready for operation, it is only necessary to add pipe from the pump to the source of supply and from the tank to the fixtures.

And then you will have a water system that will provide all the conveniences which would be possible with the best city water works system. This means an abundance of water delivered to all connections—bathroom, kitchen, laundry, lawn, barn, etc.; and that supply will have strong pressure behind it.

Limited space makes it possible to show only four combinations of

The Kewanee System of Water Supply

There are over seventy standard combinations in which the Kewanee System is furnished; and each plant is complete in every detail. Where a standard Kewanee System does not meet the requirements, a special Kewanee System will be constructed, assembled and tested.

There are over ten thousand Kewanee Systems in successful operation. They are being used for country and suburban homes, public institutions, schools, apartment houses, and even for small towns.

The Kewanee Pneumatic tank used in each Kewanee System is an air pressure tank. It is buried in the ground, or located in the cellar, or placed in a special pump house. It is superior to the elevated or attic tank because it cannot leak, freeze, overflow or collapse; and it will last almost indefinitely.

Kewanee Pumping Machinery has been designed and built for the exacting requirements of air pressure service; and our pumping rigs have obtained an enviable reputation for efficiency.

The Kewanee System is not an imitation—it is not a substitute. It is the original water supply system which involves the use of air pressure instead of gravity pressure. It is the standard for high quality; and every plant is backed up by a liberal guarantee of satisfactory results.

Write for our beautifully illustrated catalog; and when you have a water supply problem to solve let our engineering department submit complete specifications and estimates.

As a special favor, please mention the American Carpenter and Builder

KEWANEE WATER SUPPLY CO.
KEWANEE, ILL.

1212 Marquette Bldg. 305 Diamond Bank Bldg.
CHICAGO, ILL. PITTSBURG, PA.
1566 Hudson-Terminal Bldg., 50 Church St., NEW YORK CITY.
The MAN Who Stood Still!

HE man who stood still! You pass him on the street every day. If you take one moment now, you can easily recall at least one man who reminds you of this picture. Day after day he follows in the same groove. In good health and in bad he has got to work. Growing older and older, he sees ahead no relief from the ceaseless toil that he has known all through his life. There is no opportunity for him to cease for a single day the everlasting “humdrum” that he has known for so long. He is the man who stood still.

When he had the chance he failed to seize it. He allowed other men, no smarter, no abler, no better than he, to crowd him out. One by one his fellow workers passed him by to better and more profitable work. They left him always standing on the threshold of success. But they left him behind. He heeded not the beckonings of opportunity. He is the man who stood still.

And now at sixty, at seventy or at eighty years you may see him any day if you care to look—a good carpenter, a good builder, a good contractor perhaps—but that's all; good in the sense that he can do certain things simply because he has done the same thing over and over again—but not good enough to try the new difficult work, the modern up-to-date jobs; the kind that pay good money. No, he cannot do these things—he never learned how. He is the man who stood still.

You don't want to stick to the plane, the saw and the hammer all your life. If you are a contractor or a builder don't you want bigger work than just barns, sheds and now and then a house or two?

If you are a draftsman, an apprentice or assistant in an architect's office you don't want to remain in your present position any longer than you have to; you want to make your present work the stepping stone to a bigger position, which will be your life's work.

You don't want to stand still and see your friends step ahead to enjoyable, well paid, independent work, simply because they "snap up" the same opportunities, the same chances that are offered you. It is the natural ambition of man to want to keep up with his fellows.

The only way that you or any other man can keep up is through study—study of your chosen work. If there is a certain part of your work that you don't thoroughly understand then some time when that kind of work has got to be done some other man is going to step up ahead of you and do it. He learned how. KNOWLEDGE IS THE GREAT LEVELER. There is no true independence where there is lack of training.

You have the chance now within your grasp to get this necessary training. This advertisement is an absolutely direct appeal to you. No matter how good a position you hold now—no matter how much work you are getting—no matter how well you are paid for it—this advertisement holds as much interest for you as the man who is actually looking for work.

At no risk to you—without the slightest obligation on your part—we offer you the really great opportunity of perfecting yourself in your life's chosen work. Don't pass this page by until you have made up your mind to give the rest of this advertisement careful study. Look at the picture again at the top of this page—look at it carefully. You owe it to yourself and to those who may be dependent upon you to take advantage of every possible chance for bettering yourself.

You cannot afford to be the man who stood still.
The up-to-date mechanic in every kind of work trains his brain even more carefully than he ever trained his hand. That is the slogan of Twentieth Century Success—the trained mind in a trained body.

The man who uses the compass, the steel square, the chisel or the saw has got to have a true eye and steady hand. He learns in his apprenticeship how to train his eye and hand to the top notch of efficiency. Too often, however, this same man of the trained body forgets to train the mind that directs the work of the body. This kind of a man with the untrained mind, while he may be able to do mechanical work well enough, cannot do brain work and is bound to get in a rut in the long run. It takes a trained mind to read plans and blue prints; that's why so many workers live and die in the same kind of a position. You have seen the result on the first page of this advertisement. The untrained man becomes THE MAN WHO STOOD STILL.

At the cost of thousands of dollars and years of experience of hundreds of the best known practical building experts, architects and construction engineers, we have collected and prepared the material for the greatest, most comprehensive, the most practical, thorough and understandable CYCLOPEDIA of CONSTRUCTION, CARPENTRY, BUILDING, and ARCHITECTURE ever before even conceived.

Twelve Great Big Massive Volumes and one extra large volume of 350 pages of actual plans, drawn by foremost architects. Selected for their excellence, economy of design and popularity along with the building classes. The volume of plans is portfolio size, and is in itself worth the special price asked.

YEAR'S Subscription for the complete set.

The contractor and builder can use these plans to get business by showing them to prospective builders. The man who intends to build will find exactly what he wants, saving time, money and expense. The carpenter, draftsman and apprentice can use them to immense advantage for study and improvement in connection with the regular features of the Cyclopaedia.

The only reason that we can make you an offer like this is because The Radford Architectural Company, publishers of the Cyclopaedia, are the largest publishers of architectural and building books in the world and in addition the Radford Architectural Company is the largest architectural establishment in the world.

DO YOUR THINKING WITH
The difference between the man at the desk and the man at the bench is training—the kind of training that demands well paid positions of dignity and importance.

We don’t mean by this that the desk job is always better than the bench job. We don’t mean that you should change your present work. We do mean, however, that you must combine more of the desk man’s kind of training with your work if you want to continue a live factor in your trade.

The desk man uses one kind of tool that too often the bench man neglects entirely. That tool—the best one in the whole kit—is books; practical books that tell how to do your work in the easiest, the best and latest ways; books that tell you all about each and every feature of your work to the smallest detail; books that keep you in touch with the biggest and smallest details of building construction.

Government Statistics prove that the average desk man earns $22,000.00 more in a lifetime than the average bench man simply because of this main fact—he trains the brain as well as the eye and hand.

We have made special arrangements with the publishers of the American Carpenter and Builder so that we can offer one thousand sets of the Cyclopaedia to readers of the paper simply as an advertisement. We have further arranged to include the paper in our offer. We know that you will be interested in this stupendous work which applies so particularly to you. This set of books has not been advertised before anywhere and is not advertised in any other publication. We are saving the cost of advertising the first edition and deducting it from the regular price of the books, so we can make

A Bargain Advance Sale

One thousand sets, the first from the press, go to the first applicants who use the coupon on the next page.

WORKERS AND OF TOOLS

We are about to go to press with this mammoth Construction Cyclopaedia. The cost of getting together this set of books has been incalculable. The task of preparing it has been gigantic. It has taken the entire time of hundreds of writers and editors. Our entire organization has had a hand in preparing it and we have picked outside help here and there from the best and most practical material available. We want to advertise this set of books at the start in the most effective way, and we believe that we can do this by selling this first edition if necessary at a loss for the sake of the advertising it will give future editions. You can reserve a complete set now for $18.80 instead of $79.00.

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MASSIVE PORTFOLIO SIZE VOLUME OF PLANS

See Next Page

THE BOOKS BEFORE YOU
You can almost hear the man at the desk say: "Kelly, this job has got to be done right. I haven't anyone else to send and you will have to do. If you had ever studied that set of books there you would know how to do this work now. But there is no time now to find out; do the best you can and let this be a lesson to you to learn more about your own work.

Why, man, I am finding out new things every day; finding them out through these books. It is the way I hold my job—THAT'S MY TOOL CHEST."

SMALL LIST OF CONTENTS

To Realize their Tremendous Carpenter
Correct Measurements Possibilities of Steel Square
Steel Building Test Questions, Practical
Steel Square Framing

This set of books is built from the ground up. It's for the practical man. It tells the how and why of everything pertaining to building construction without difficult mathematics.

"Be practical, thorough, self-explanatory"; that's the instructions under which every page of this stupendous work was written. We are going to press NOW with the first edition. CUT THE COUPON AND MAIL IT NOW; YOU CANNOT LOSE ANYTHING. You will save $60.20 if you finally buy after Company

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Address __
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"National" Butts and Hinges have four distinct points of superiority over the old style products. Four tangible reasons why most carpenters and contractors insist on seeing the name "National" on every hinge and butt they use.

The first reason is because they save labor. A highly paid mechanic is entirely unnecessary. Any carpenter of ordinary ability can hang twice as many doors, using "National" Butts and Hinges, as a first class man could using common ones. There is absolutely no chance of anything going wrong—the method of hanging the Way" is simplified to the last degree.

How Strength is Increased

The second reason is an important one. The screws used in the ornamental leaf of "National" Butts are subjected to a shearing strain—not a drawing strain. This alone enables them to sustain enormous weight, far greater than common butts can possibly do.

Slot in False Tip

The third reason lies in the fact that the lower tip has a slot for a screw driver. This slot enables the contractor to tell at a glance which is the false tip. Then the ease of removing pin from butt is a point much admired.

"National" Individuality

The fourth reason is their artistic appearance—their individuality. "National" Butts and Hinges are furnished in steel, brass, bronze, etc., in all the standard finishes—or we can match any special finish desired. Plated to match finish of wood gives fine results.

Made in sizes from 1 1/2 to 4 1/2 inches inclusive;—a size for every purpose. Suitable for exteriors and interiors of public and private buildings.

The simple principle, real practicability, and the thousands already in use, have proven them to be the standard in butt construction.

Send for Free Booklet

"Ornamental Ideas" is the booklet that gives useful pointers on the butt and hinge question. Carpenters can obtain it free simply by mentioning their dealer's name.

Sterling Illinois
You Can Buy Material for Complete Flight of Stairs for $23.33

Our Stock Designs Admit of Numerous Variations

We have made the question of stair business a careful study, and illustrate on this page a line which is at once adaptable to the small and modest cottage as well as to the more elaborate home. When we say study, we refer particularly to the style of construction, for instance of our posts, the correct size of all moldings, in order that the assembled effect may be harmonious and complete. Likewise, the turning of the balusters and shape of rails are especially adaptable for these specific purposes.

With the many styles illustrated in our Millwork Catalog an infinite variety of arrangements of stairs are possible, and it is a very rare exception when special work will be required for any particular purpose.

List of Material Required for Stairs Shown Above

- 16 feet Face Stringer
- 18 feet Wall Stringer
- 24 feet Base Molding
- 13 Steps
- 8 feet Wall Stringer Extension
- 14 feet Rail
- 16 feet Fillet for Sub-Fillet
- 924 feet Sub-Fillet for 14 Balusters
- 14 feet Balusters

Total Cost $233.33

Dealers' Prices $233.33

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You get a high standard of workmanship, superior quality of lumber, choice designs, prompt shipments and guaranteed safe delivery. You get low freight rates and quick delivery. These are facts, and should appeal to you at once. Send us your order for Stairs to-day.

You WILL BE SATISFIED AND SAVE $66.00 OR MORE.

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