If all of you could know the American Carpenter and Builder Subscribers as we have come to know them, you would appreciate what is meant by the phrase, "Gilt-Edge" Subscribers. American Carpenter and Builder Subscribers are "Gilt-Edge" Subscribers. For years we have been working with them and for them, and have had many business dealings with them. It is a real pleasure to get acquainted with them through the medium of correspondence; it is a still greater pleasure to meet them personally, face to face. We know them. They are Progressive, Ambitious, Wide-awake, Dependable. They are "Gilt-Edge." Each one is doing a little better work—and a little bigger work—this year than last; and next year his work will be still better and his operations more extensive.

American Carpenter and Builder Subscribers hold an extremely important place in the building world. They are practical men—authorities not only in carpentry work but in all things pertaining to building. Many of them draw up their own plans, recommend and specify all the materials to be used, and then get out onto the job and do the work. Some of these men are known by the name, "Architect and Builder," some "Contractor and Builder," some "Carpenter and Builder." However called, such a man is the Whole Works in his community when any building is to be done or improvements are to be made. Outside the largest cities he is without question the most important personage in the building world today.

These men are "Gilt-Edge." They are the readers of the American Carpenter and Builder.
It's a Pleasure To Use Fine Saws

Saws that hang just right---that run easiest---that cut fastest---that saw to the mark---that take a sharp cutting edge and hold it

We have made a lifelong study of saws. Long before many of you were born, E. C. ATKINS & COMPANY were already making Saws. We know better than anybody else what the high class mechanic wants in a saw, and we know how to make saws that give satisfaction.

Is This the Kind?

Do you want a saw that sharpens easily, that holds its tension, that will receive a very sharp cutting point and hold it? Do you want a saw that cuts fast and easy and true and that hangs just right, so that it will run with the least exertion? Then you should by all means use an ATKINS SILVER STEEL SAW, because they will do these things for you.

Guarantee

These are rather broad statements to make, but we back them up by the broadest possible guarantee. ATKINS SILVER STEEL SAWS are not only guaranteed to be perfect in material and construction, but we guarantee them to give perfect satisfaction. Listen to this. If your ATKINS SILVER STEEL SAW, for any reason does not cut faster, run easier and hold its edge longer than any saw you ever used—take it back to your Dealer and get your money back or a new saw. No argument—no proof is necessary; don't hesitate—just take it back and get your money—that's all. If your Dealer even hesitates, show him this advertisement and, if necessary, let us know. We'll see that you get satisfaction. Can we make it stronger? Can we give you better protection?

The reason we can do these things is because we know all about our saws. We make them ourselves.

Silver Steel

SILVER STEEL is the finest material that has ever been used in Saw Blades. It is made of virgin ore and contains the very highest ingredients and is manufactured under an exclusive formula. It is as fine as the steel that is used in most high grade razors, and when we tell you that it will receive a sharper cutting edge and hold it longer than any other steel, we know what we are talking about.

Taper Grinding

ATKINS SAWS are the only saws which are ground on an actual taper from the tooth edge throughout the entire blade toward the point on the back. They are different from the thin back saw which is simply ground off along the back while ATKINS SILVER STEEL SAWS are ground on the actual taper throughout the entire blade.

The Handle

Many of our SILVER STEEL SAWS are made with the old style straight across handle, but most high-class mechanics prefer the Perfection Handle, because it is scientifically constructed and saves the wrist and saw arm.

Go to your Dealer and ask him to show you a genuine ATKINS SILVER STEEL SAW and note these things for yourself. If your Dealer does not carry them in stock, he will order for you from his wholesale house. Insist on an ATKINS SILVER STEEL and see that our name is on the blade.

OUR FREE OFFER. If you will send us ten cents in currency or stamps, we will forward you free of charge, a high grade carpenter's nail apron, also our Saw Sense book, illustrating and describing our most popular saws, together with a carpenter's time book and wage scale, also a great deal of useful information in regard to High Grade Saws. Address

E. C. ATKINS & COMPANY, Inc.

INDIANAPOLIS, INDIANA

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
WILLIAM D. REICHENBACH
CONTRACTOR & BUILDER
Rockford, Ill., Mch. 20, 1911.

This is to certify that I bought a Portable Saw Rig of you and will say it has saved me many times its cost in the one year I have had it. It has never cost me one cent for repairs. At one time it took the place of three good husky men. Our hand rip saws are scarcely ever used. The dado attachment is especially handy in window frames. I do not see how any contractor can get along without one. I would not sell mine at any price if I could not get another like it.

Yours respectfully,
Wm. D. Reichenbach.

WRITE FOR OUR ATTRACTIVE FOLDERS
Portable Saws and Builders Hoists
GEORGE D. SMITH
814 FISHER BLDG.,
CHICAGO, ILL.

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

IS NO EXPERIMENT. Its work since 1903 has established a standard for finely surfaced and polished floors. It is the only machine whose work is specified by leading architects and used in the best government buildings and will surface and polish any kind of a floor from common pine to the finest parquetry.

IT IS THE ORIGINAL and only two-roll, self-propelled, dust collecting machine, that surfaces close to the wall and can be used in small rooms. Anyone can operate it.

ITS WORK IS RAPID, regular smooth and even because the power that drives the rolls, also propels the machine at the same ratio of speed. It has surfaced and polished millions of square feet of the finest floors in America and Europe.

GET A MACHINE that does first class work and in paying quantities, that is fully guaranteed and sold on its merits.

Write for Our Free Book, "Surfacing Floors as a Business."

Manufactured by The American Floor Surfacing Machine Co., TOLEDO, O.

We Make Panels of any Thickness and Any Kind of Wood — Curved or Flat.

FOR Wainscoting Ceiling Mantels Doors Counter Tops Partitions Cabinets Shelving Drawer Bottoms

Our products excel in Quality and Durability, because we concentrate our best efforts in their manufacture. We specialize in Panels and have the facilities for producing best results.

Try us with your next order. Send us your specifications and ask for our prices.

AMERICAN VENEER CO.
Specialists and Manufacturers of Built-up Veneer Panels
We appreciate small orders as well as large ones
12 Market St., - - KENILWORTH, N. J.

Do Your Next Job of Floor Scraping at Our Expense with a Little Giant Floor Scraper

Sold only on its merits. A request brings it to your door, freight prepaid. Try it out, if you are convinced it is the best floor scraper on the market, pay for it. If not, return it at our expense.

The Little Giant has scraped millions of square feet of floors. Cuts right up to the baseboard and into every corner. Easy to operate. Will scrape floors quicker, cleaner, and cheaper than any other machine on the market.

Ask us for our special price on this machine.

Hurley Machine Company
31 S. Clinton St
CHICAGO
NEW YORK: 1011 Flatiron Bldg.
DETROIT: 246 Woodward Avenue.

TWO MINUTE Lever Lock Mortiser

It Chisels the Opening for Locks Greatest Time and Labor Saver

One builder wrote us last month: "You may expect an order for 3 machines as the carpenters are going crazy about my machine. The more I use it, the better I like it."

Think This Over Builder

Our patent double edge, side cutting chisel can cut more wood, four times more rapidly and 100% less exertion than any boring bit. Mortise to be of the same size.

Sent on trial to any reliable contractor
Our Butt Mortiser and Rule Gauge sent for 75 cents

A. W. Miller Mfg. Co.

Main Office:
CINCINNATI, O.
Western Office:
RIVERSIDE, CAL.

-A WONDERFUL NEW ELLIPSOGRAPH AND DIVIDER

Called the Kelley

Draftsmen, Pattern-makers, Mechanics, etc., can now obtain an instrument which will draw an ellipse of any given major or minor axis, just as readily as an ordinary compass will draw a circle. For carpenters, builders and contractors its use is a necessity for saving time and doing perfect work.

Price, Complete $3.00
We positively guarantee satisfaction. Send $3.00 for this unique instrument and we will send one by return mail and pay charges. It will pay for itself in a saving of time, labor and worry.

J. T. KELLEY
WEST, RUSH NEW YORK

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

TRY THEM ALL-KEEP THE BEST
T'WILL BE A WEBER IF GIVEN A FAIR TEST

Weber Tools and Appliances stand for themselves—

Try the WEBER
Double Acting
Floor Scraper

Folding Saw-Filing Vise
Also ask your dealer to show you the Weber Folding Saw-Filing Vise—the Saw Vise you want. Has a rigid grip and is almost noiseless. You will find it the most convenient tool you ever had on a job, or in your shop. It takes up no more room in your hand box than an ordinary hammer.

Wax Polishing Brush
and Sander, Brush sits square and even and imparts a high gloss. Sand-papering block admits turning paper one-half around, greatly lengthening its life.

Write For Free Trial
I want you to try the Weber Double Acting Floor Scraper on my 5 to 10 days free trial offer.

JOHN F. WEBER, President
WEBER MANUFACTURING CO.
670 71st Ave., West Allis, Wis.

FLOOR SCRAPER SATISFACTION

That's what the Acme Floor Scraping Outfit assures. In fact it is guaranteed to do satisfactory work or no pay is asked for the outfit. My free trial offer relieves you of all responsibility. You take no chances, for if the machines do not meet with your approval after you have worked with them for one week, just ship them back to me at my expense. Read what contractors had to say in April:

Gladbrook, Ia., April 22, 1911. Jos. Miotke, Milwaukee, Wis. Dear Sir—Your floor scraper was received a few weeks ago, and will say it is the best machine I ever saw. Please find enclosed draft for the outfit.

Very truly yours,
Paul Cuthbertson.

Sumter, S. C., April 17, 1911. Jos. Miotke, Milwaukee, Wis. Dear Sir:—I have used the Acme floor scraping outfit and am very much pleased with it. It is exactly what I want and you will, therefore find check enclosed for the same. With best wishes, I am, Yours very truly.

W. F. Carr.

Logansport, Ind., April 11, 1911. Jos. Miotke, Milwaukee, Wis. Dear Sir—Your floor scraping outfit arrived a short time ago and I have used the scraper on maple flooring and it does the work better and easier than any other machine I have ever used. The sharpening device certainly is a wonder. You can't help but get a good edge on a blade. I cheerfully enclose check in payment of the outfit. Yours respectfully.

L. E. Wickersham.

If you want booklet and full details of my free trial offer, drop me a line now

JOSEPH MIOTKE, 247 Lake Street, MILWAUKEE, WIS.

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
Prize-Winning Letters
GIVING
PRACTICAL IDEAS FOR CONCRETE WORKERS
CEMENT WORLD
"THE WORLD'S GREATEST CEMENT PAPER"

Announces a Prize-Winning Contest, open to everybody, for the purpose of gathering and printing information on all subjects pertaining to the cement industry. This competition is open to all the world. We especially invite cement men, contractors, builders, engineers, and all other workers in the building industry to participate. We want real, live, practical articles that will be of practical help. What is bothering one man to-day may have been successfully worked out by some other man yesterday. Tell him how it was done.

One Hundred Dollars in Cash Prizes will be Paid.
For the Best Letter on any of the following subjects, $5.00 each.
For the Second Best Letter, $3.00 each.
For all other Letters published in this contest, $1.00 each.

1. Best Letter about Proportioning Materials for Various Kinds of Concrete Work
2. Best Letter about Making and Laying Concrete Drain-Tile or Sewer Pipe
3. Best Letter about Sidewalk Laying with Wooden or Steel Forms
4. Best Letter about Waterproofing, Staining, and Coloring Concrete
5. Best Letter about Reinforcing with Expanded Metal or Wire Mesh
6. Best Letter about Making, Coloring or Handling Cement Brick
7. Best Letter about the Manufacture or Use of Concrete Blocks
8. Best Letter about Cement Troubles and How to Avoid Them
9. Best Letter about Cement Stucco in House Construction
10. Best Letter about Finishing Concrete Surfaces

CONDITIONS GOVERNING THE CONTEST

Letters are to be from 500 words to 1,000 words each. When possible, descriptions should be accompanied by sketches sufficiently clear to allow draftsmen to make finished drawings to accompany the article when printed.

Letters are to be judged by the practical value of the ideas presented.

Anyone can contest for any or all of these prizes, whether a subscriber to the Cement World or not. Letters will be printed in the first available issue of the Cement World. The contest will be open from June 1, 1911, to August 1, 1911.

Checks for prizes will be mailed within ten days from the date of the issue in which they are published.

CEMENT WORLD is the Best, Largest and Most Practical Trade Magazine of Cement Construction. Edited by Men with Practical Experience.

Each number contains perspectives, elevations, floor plans and details of Modern, Moderate-priced Residences of Cement-Plaster, Concrete Blocks and Stucco, with all information: Schoolhouses, Churches, Farm Buildings, Garages, Barns, etc.

More illustrations, more pages of reading, more practical information than any other Cement paper. Special Articles of interest and importance to builders of homes make each number extremely valuable. The contents of the Cement World are exclusive and copyrighted.

SUBSCRIPTION PRICE, $1.00 PER YEAR, PAYABLE IN ADVANCE
Sample Copies sent on request

See Our Special Free Book Offer on Page 117.

CEMENT WORLD
"The World's Greatest Cement Paper"

241 So. Fifth Avenue, - - - - CHICAGO, ILLINOIS

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
In the STANLEY CONCEALED RATCHET BIT BRACE are embodied improvements and refinements in mechanical construction not previously contained in any Bit Brace.

The novel features of design, together with the highest quality of workmanship and material, place this tool in a class by itself as to strength, durability and convenience of operation.

NOTE PARTICULARLY—The Cam Ring which governs the Ratchet is in line with the Bit—a great advantage in working and that the Ratchet mechanism is completely protected, so that it is always free from dirt, grit and moisture, and retains oil for a long time.

In the Clutch mechanism, free teeth are in engagement when working as a Ratchet, as against one tooth in other forms of Ratchet Braces.

They are highly nicked and have Cocobolo Ball-bearing heads and Cocobolo handles.

Stanley Rule & Level Co.
New Britain, Conn. U.S.A.

The Only Self-Setting Plane

Over 25 years ago we commenced to make the Self-Setting Plane. They are stored in every state and Canada. Thousands of carpenters use them doing work easier, better, quicker, saving time, trouble and temper.

Every issue of this paper has had our ad in it. If not sold in your town, we will send you a Beech wood plane on trial on receipt of one dollar less than list price, and if you return it at our expense within 30 days of receipt we will refund your money. If you want more than one we will allow you dealers' discount.

In writing, if you mention this paper and send us the addresses of 10 plane users—no matter where they live—we will send you a carpenter's hard tough pencil. Remember this when the cost will cost you nothing if you return the plane at our expense. If the plane is not satisfactory, or planes are being sold. This offer is good while this ad appears.

GAGE TOOL CO., Vineland, N. J.

THE FOLDING DRAW KNIFE

The old draw knife's straight out handles wouldn't pack in any chest. And its edge was always nicking. A great bother, long confessed. Doing work easier, better, quicker, saving time, trouble and temper.

If your hardware dealer does not keep it, we will send it to your address postage paid.

A. J. WILKINSON & CO., 180 to 188 Washington St., BOSTON, MASS.
Amazing "DETOIT" Kerosene Engine FREE!

Amazing "DETOIT" Kerosene Engine shipped on 15 days' FREE Trial, proves kerosene cheapest, safest, most powerful fuel. If satisfied, pay lowest price ever given on reliable farm engine; if not, pay nothing.

GASOLINE GOING UP!

Automobile owners are burning up so much gasoline that the world's supply is running short. Gasoline is up to 15% higher than coal oil, still going up. Two pints of coal oil do work of three pints gasoline. No waste, no evaporation, no explosion from coal oil.

Amazing "DETOIT"

The "DETOIT" is the only engine that handles coal oil successfully; uses alcohol, gasoline and benzine, too. Starts without cranking. Basic patent—only three moving parts—no valves—no sprockets—no gears—no parts which wear out. Mounted on skids. All sizes, 2 to 20 h. p., in stock ready to ship. Complete engine tested just before cranking. Comes all ready to run. Pumps, saws, threshes, churns, separates milk, grinds feed, shells corn, runs butter-making plant. Prices (stripped), $29.50 up. Sent any place on 15 days' Free Trial. Don't buy an engine till you investigate amazing, money-saving, power-saving "DETOIT." Thousands in use. Costs only postal to find out. If you are first in your neighborhood to write, we will allow you Special Extra-Low Introductory price. Write!

DETROIT ENGINE WORKS, 495 Bellevue Ave., DETROIT, MICH.

Launch Complete $94.50

16, 18, 20, 22, 24, 25, 26 and 26-footers at proportionate prices. Family Launches, Speed Boats, Auto Boats, Hunting Cabin Cruisers. A New Propeller to Demolishing Agents. 84 different Models ready to ship, equipped with the simplest price lists mailed free.

DETROIT BOAT CO., 1185 Jefferson Ave., Detroit, Mich.

NOTE—Our Special brand Clamps have notchses on the bottom of the bar, instead of on the top.

Per pair, 1 foot: 2.70, 2 feet: 3.70, 3 feet: 4.80, 4 feet: 5.90, 5 feet: 6.90, 6 feet: 8.50, 7 feet: 9.50, 8 feet: 11.00, 9 feet: 12.50, 10 feet: 14.00. These clamps have steel bars and screws and malleable iron parts. The New Adjustable and Perfection Clamps are made in the following lengths and sizes:

Hargrave's New Adjustable SPECIAL Clamp.

Hargrave's Perfect Special Clamp.

Hargrave's Joiner's SPECIAL Clamp.

THE CINCINNATI TOOL CO., CINCINNATI, O.

A New Modern Up-to-Date Jointer of Unique Design


H. B. SMITH MACHINE CO.
SMITHVILLE, N. J., U. S. A.

Branches: New York, Chicago, Atlanta, Shreveport

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
168 Sets of Machines Sold to Contractors
Since Jan. 1, 1911

MACHINE No. 1
Chicago No. 5 Combination Saw Table

Used for Cutting Off, Ripping, Mitering, Grooving, Boring, Tenoning, Etc.

MACHINE No. 2
Chicago 12" Jointer and Planer

Used for Planing, Jointing, Shaping, Matching, Rabbeting, Grooving, Chamfering, Beading and Making Mouldings.

These Two Machines
for $170.00, including belt for saw arbor, countershafts, 1 14" rip saw, 1 14" cut off saw, 5 boring bits—1", 1/2", 3/4", 1", 1 1/2" and 1 pair of jointer knives. Ask for price on one if you cannot use both.

Send for our Special Catalogue today. We issue a catalog of machines especially adapted to Contractor's and Builder's use.

Chicago Machinery Exchange
1219-1227 Washington Boul.
CHICAGO, ILL.
BUY A BAND SAW THAT IS DURABLE

Crescent band saws satisfy those practical, experienced mechanics who need strong, substantial tools.

The reason CRESCENT band saws are so popular is because they have earned a well deserved reputation for durability and accuracy where hard service is demanded of them. Each day they are pleasing some of the most exacting band-saw operators in every civilized country, and as you appreciate what it means to have a thoroughly dependable, well-built, practical band saw, you should certainly look into the merits of the CRESCENT line before you order.

Send for a catalog telling about these splendid machines, and our line of Saw Tables, Jointers, Borers, Swing Saws, Planers, Planers and Matchers, Wood Workers, Disk Grinders.

THE CRESCENT MACHINE CO.,
224 Main Street
LEETONIA, OHIO

Universal Trimmers

No Pattern Shop Complete Without a Fox Trimmer

We are the original builders of Wood Trimmers, having built the Universal Wood Trimmer for 25 years. You receive the benefit of our experience as builders of these tools.

20,000 Satisfied Users Testify to FOX EFFICIENCY

Prices Range From $22.50 to $150

Write today for our complete catalog of trimmers

FOX MACHINE CO. 2211 FRONT STREET
Grand Rapids, Mich.
SEE THAT 
COMPO-BOARD

Is In Your Specifications

It is the most satisfactory wall lining yet devised. It will last longer than lath and plaster. Compo-Board is easily and cheaply put on, and the walls will look well as long as the building stands. They will never be subject to any kind of wall papering or lining. It is more durable than lathing on the walls. Will not crumble, crack or fall off. Can not be marred by jamming furniture into them.

Compo-Board makes dry, warm, moisture proof, fire resisting walls, ceilings and partitions. The rooms will be free from drafts, warm in winter and cool in summer.

Not only is Compo-Board a superior wall lining, but it has many uses around the house, in offices and factories.

Compo-Board is made of thoroughly seasoned, kiln dried strips of lumber well glued together. They are covered with a thick coat of cement on either side and an outside covering of thick paper.

You can buy it in strips four feet wide and 1 to 15 feet long, any length you want in even feet.

Send for Booklet and Sample

It explains the many uses and advantages of Compo-Board and you can get an idea of what it is from the sample.

NORTHWESTERN COMPO-BOARD CO.

5777 Lyndale Ave. No. Minneapolis, Minn.

The border of this advertisement is a cross section view of Compo-Board.
The NOVO Gasoline Engine

The NOVO gasoline engine in four sizes from 1 1/2 to 6 H.P. is especially adapted for use on portable and stationary machinery of every kind. It is very light in weight, absolutely self-contained, gasoline being in the base and the water contained in tank around the cylinder, which is guaranteed not to burst from freezing. The upright form and low height for vertical engine, and small size of base adapts it for use on any machine requiring a self-contained power.

We should be pleased to furnish manufacturers or users of portable machines of any kind with full information, weights and sizes of our different engines.

We make three sizes of gasoline hoists for builders' use.

THE HILDRETH MFG. CO., 151 Willow St., Lansing, Mich.
C. E. BEMENT, Secretary and Manager

Ten Substantial Reasons Why You Should Purchase the Climax Line of Furnaces, Stoves and Ranges—and no other.

1. Because the line has been well and favorably known in every city, village, and cross-roads in the United States, for more than forty years.
2. Because the line we sell directly, or indirectly, and have field agencies to look after, and take care of our business, as well as that of our customers.
3. Because you get a Factory Guarantee on your whole outfit.
4. Because your heater is made by, and installed by practical men—ones WHO KNOW HOW TO DO IT.
5. Because you can burn any kind of fuel in the CLIMAX—even the refuse from other Furnaces.
6. Because the furnaces are made by stove-plate Molders, of stove-plate material; all brand new, and not half old junk.
7. Because of improved principle of combustion, giving you over-draft, natural kind of draft.
8. Because equipped with large double feed doors—big enough to drive in pony and cart.
9. Because has a Cast-iron Smoke Pipe.
10. Because we sell all our heaters under the strongest guarantee, that they will do the work—or no pay. Beware of traps for the unwary.

THE TAPLIN, RICE-CLERKIN CO., MFRS., AKRON, OHIO
Send for Catalogue No. 186.

L. S. STARRETT SAYS:

"If you find any tools better than Starrett Tools, buy them."

Send for free Catalogue No. 186.

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

We are showing many new tools and new designs of older tools in our

New No.
10
Catalog

Every carpenter should send for it.

It is mailed without cost to you and some of the hints you will get from it may prove very valuable.

Send now.

Goodell-Pratt Company
Toolsmiths
GREENFIELD, MASS., U.S.A.

"A Bit Of Utility"

Guided by its circular rim—instead of its centre—the Forstner Labor-Saving Auger Bit will bore any arc of a circle, and can be guided in any direction.

Doesn't matter how hard the wood is, no consequence whether it is full of knots, or the grain awkward to negotiate. The Forstner Bit works with equal smoothness under any condition and leaves a true polished surface on every job.

Unequaled for Delicate Work

Supersedes chisels, gauges, scroll-saws, or lathe tools combined, for all kinds of delicate work. Cabinet and pattern makers and carpenters are enthusiastic because they do more work than other bits and cost no more.

We can offer something special in the matter of price on sets packed in a sensible box. Send today for particulars and catalog.

The Progressive Mfg. Co.
Torrington, Conn.

CORDESMAN, MEYER & CO.
Manufacturers of
WOOD WORKING MACHINERY
41-45 CENTRAL AVE., CINCINNATI, OHIO

Write for Catalog Showing Our Line of Machinery for Carpenters and Builders.

Universal Woodworker.

Variety Woodworker.

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
MAYHEW 60° MITRE BOX

This box embodies more distinctive features than any other made
Designed for Simplicity, Accuracy, and Durability.
Strictly a right hand tool for mitering.
Box embodies a new feature in reversing the principle commonly used on other boxes.
Any of three saws may be used—Panel—Hand or Back saw.
Saw guide adjustable for any thickness of saw.

Extreme mitre to 60° without makeshift. May be used as a stationary or pivot box by use of the pin posts.
In mitering duplicate cuts there is no restriction on length.
Will cut compound mitre.
Parts take down into space 10" x 10" x 4" inches.
Weight 15 lbs. complete.
Box contains full directions for use.

PRICE EACH, $10.00

H. H. MAYHEW COMPANY, SHELBURNE FALLS, MASS.

GOODELL MITRE BOX
Made of STEEL - Cannot Break
First in Quality and Improvements
Automatic Stops for holding up saw.
Corrugated Backs Graduated.
Gauge for duplicate cuts and many other features
Send for Circular "C"

GOODELL MFG. CO., Greenfield Mass.

"SEAVEY" MITRE BOX
Meets Every Requirement

Special Offer
On return of this "Ad" and $2.00 one of these Mitre Boxes will be shipped to any reader of "Carpenter & Builder." Offer good for 30 days from date of issue.

Portable—Can be carried in the Tool Kit

SMITH & HEMENWAY CO. 150-152 Chambers St. New York City

Tapes & Rules are Standards of Accuracy, Durability and Workmanship
SEND FOR CATALOG
THE LUFKIN RULE CO.
SAGINAW, MICH.
Make the Roof Fire-Proof

J-M Transite Asbestos Fire-Proof Shingles offer the most perfect fire protection known, because they are made of Asbestos (rock) fibre and Portland Cement—both minerals. Are absolutely proof against fire, water, acids, gases and chemical fumes, and are not in the least affected by the most severe weather conditions, except that the longer they are exposed, the harder and tougher they become.

J-M Transite Asbestos Fire-Proof Shingles

Are moulded under hydraulic pressure into a homogenous mass. They never rot, decay, warp or split like wood shingles. Are tough and resilient, but not brittle, so do not break and fall off like wood or slate. Weighing only about half as much as slate, they save considerable in freight, and there is no danger of breakage. These shingles are excellent non-conductors of heat and cold.

J-M Transite Asbestos Shingles are easily put on with ordinary woodworking tools. Come in many different sizes and shapes to meet all conditions, and in colors of natural gray and Indian red.

Ask our Nearest Branch for Booklet

Residence of Mr. Patrick McCauley, Brooklyn, N. Y.
Covered with J-M Asbestos Shingles
A. J. McManus, Architect

J-M Transite Asbestos Shingles

For Canada:—THE CANADIAN H. W. JOHNS-MANVILLE CO., Limited
Toronto, Ont.
Montreal, Que.
Winnipeg, Man.
Vancouver, B. C.

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.

Do Not Delay but send for the ABC PROTRACTOR SQUARE TODAY. It is the ONLY PRACTICAL FRAMING tool on the market and gives lengths as well as cuts and bevels. It is a great TIME SAVER.

We guarantee the tool, and if not satisfactory return it in 30 days and get your money back. Price with illustrated directions $2.00.

Crookston Tool Co.

Andrews Heating Co., 1165 Heating Bldg., Minneapolis, Minn.

Send us two or more names of persons who are interested in or want to buy Hot Water Heating Plants and we will send you this scale. Back inches are divided into 5, 10, 12, 16, 20 and 40 parts. Also free catalog on request. Mention this paper.
From an economy standpoint

STAR HACK SAW BLADES

FOR MACHINE USE, 12 x %

Surpass all other Blades. Eliminate carrying in stock Blades of varying widths and thicknesses with different numbers of teeth to the inch. They are made of the best material. Possess great strength and durability. Ask for and insist upon getting the Blade with the ★

ALL DEALERS KEEP THEM

WRITE FOR LEAFLET.

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DON'T SEND THE JOB TO THE MILL

That's the Expensive Way—the Wrong Way

An enormous saving in time and labor can be accomplished by installing practical machines

**OSHKOSH PORTABLE SAW RIGS**

Do the work of about 8 carpenters, and is the only saw rig known that has a swinging saw that can be held stationary for rip-sawing. It is made in two sizes.

Size No. 1—14" Saw, 6 H. P. Size No. 2—20" Saw, 10 H. P.

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That's the Cheaper Way—the Right Way

Oshkosh Logging Tool Co., 316 S. Main Street

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We guarantee that our chisels will hold their edge all day with one sharpening, even if used on quartered oak across the grain.

Chisels look simple, but there is no tool of which such hard work and varied service is required. Recognizing this we have given the choice of the steel, regardless of cost, and the design of these chisels, the most extensive study and experimentation, and in their manufacture the greatest care and highest order of skill is employed.

**SPECIAL OFFER**

To further increase the number of carpenters who insist on having B. M. Co. Chisels, we will sell direct to readers of the American Carpenter and Builder, express prepaid any chisel or set of chisels with privilege of returning after ten days trial if they do not prove to be the BEST EVER USED.

BRAUNSDORF-MUELLER CO., Elizabeth, N. J.

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
AUGER BIT ESSENTIALS

THE FIFTH REASON WHY RUSSELL JENNINGS BITS are unsurpassed is the accurate DOUBLE TWIST which provides two smooth passages for the removal of chips.

Repeated tests have proved conclusively that the double twist is the best for auger bits.

Although it is sometimes claimed that the cheaper form, the bit with the solid center, clears easier, the claim is not substantiated by trial. Ask the carpenter—he knows.

RUSSELL JENNINGS MFG. CO. CHESTER, CONN., U. S. A.

ASHLAND Folding Scaffold Bracket

Best and strongest bracket made. Used on any kind of siding. Adjusts to any space studding or pitch of roof instantly. Just the thing for carpenters, timbers, painters, and brick masons. Folds instantly. No pins or bolts used in adjusting. One bracket easily carries 1000 pounds put up on 4-10d nails. No contractor can afford to be without a set. Every man who uses them orders again. Pay for themselves on first two jobs in time and material. For prices and information, write.

Ashland Folding Scaffold Co. Ashland. Ohio

"Last a Lifetime and Give Satisfaction To the End"

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The celebrated Barton Planes and Edge Tools for carpenters and other woodworkers are unequalled by any other made for keen, hard, smooth cutting edges. If your hardware dealer does not handle the celebrated Barton Tools send direct for catalogue. Be sure to specify "CARPENTER'S CATALOGUE."

MACK & COMPANY, 20 BROWN'S RACE ROCHESTER, N. Y.

Insure your work by remembering that it is the "IRWIN" Auger Bit that bores as true as a die and as clean as a whistle.

Only direct solid-Center-Stem pressure on the hand filed, sharp edge of a genuine "IRWIN" Auger Bit can be depended upon to bore true into even the end of lignum vitae, the hardest of wood known. Experts know this test—"The Irwin Test."

Made in fifty styles and sizes—one for every purpose.

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BICKNELL'S JOINTER, SAW and COMBINATION MACHINE

SIMPLE DURABLE

Not too many machines in one but enough.

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BICKNELL MANUFACTURING & SUPPLY CO. Originators of Handy Tools JANESVILLE, WIS.

COMPLETE OUTFIT Hand and Foot-Power MACHINERY

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Write for particulars.

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"YANKEE"
Push Brace No. 75

Drives a 3/8" auger into hard woods and a 3/4" into white pine quicker and easier than a Bit Brace. Drives and draws screws—takes all the small tools and works in close quarters where a Bit Brace cannot be used. Bearing down on the handle drives it with that quick and easy motion of the "Yankee" Spiral Driver.

Have You Seen the "YANKEE" Line?

There are 35 Styles and 75 Sizes each a Labor Saver. Our New Yankee Tool Book tells about them. A postal brings it.

Your Hardware Dealer Sells the "Yankee"

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ALL STEEL
SASH PULLEYS

No Nails No Screws
Just Bore 4 Holes

The time saved by the "Grand Rapids" will actually pay for the pulleys.

You can't afford to use old style pulleys.

Write for free samples and prices.

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GALESBURG, ILL.
Manufacturers of the FAMOUS Willis Skylights and Ventilators
PERFECTION

ELEVATORS

The Best Value for the Money in the World
Mechanically Correct

Dumb Waiters, Carriage and Store Elevators, Sidewalk Hoists, Etc., Etc.
Our Elevators are noted for their EASY RUNNING and SERVICEABLE QUALITIES. They are practically self-contained, and can be erected by any carpenter in a few hours. We furnish plans for erecting.

The Low Cost Will Surprise You
State your requirements, giving capacity, size of platform and number of feet to travel and we will name our lowest money saving estimate.

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ORR & LOCKETT'S CABINET MAKERS' BENCH

THIS illustration shows our regular Cabinet Makers' Bench. This bench is made entirely of maple. The top is made of 3⁄4 inch strips glued together to prevent its warping. The working top of this bench measures 78 inches long and 24 inches wide. We also make a smaller size, 60 inches long and 20 inches wide. These dimensions do not include the screws. 34 inches high.

Neck—We furnish with this bench our Continuous Screw, Rapid Action Roller Nut Vise. The simplest and best screw vise on the market. Jaws 10 inches wide, 4 inches deep, opening 12 inches.

Price of Bench including Vise............$14.00

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ESTABLISHED 1872
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Richards-Wilcox
Any Dealer
GET CATALOG

Richards-Wilcox Mfg. Co.
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Next machine you buy, order a— Rothmotor
to drive it individually.
You will be pleased.
You will be gaining some profitable experience in economy.

Ask
ROTH BROS. & CO.
1422 West Adams Street,
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When $13.95 (if you send cash with order) pays for a dozen 4 ft. brackets, every pair of which will carry a ton in weight without even springing, does it pay to go on using wooden brackets, or putting up staging? Consider also that once equipped with these, you don’t have to be bothered continually with broken or worn out brackets, for The Taylor Brackets last a lifetime. Besides, there’s a big gain in time: one man can put them up and take them down alone.

If you’d like to be shown, write for terms of our special trial offer. It will pay you.

JAMES L. TAYLOR MFG. CO., Poughkeepsie, N. Y. U. S. A.

Dumb Waiters

In the December issue of this magazine there was an inquiry for working drawings for a Dumb Waiter. There has never yet been made a dumb waiter which would meet all requirements equally well, and best results will be obtained therefore by selecting the dumb waiter best adapted to the particular job in hand.

The Sedgwick Machine Works, 128 Liberty Street, New York, will send to any builder or carpenter on application their catalogue “K” which shows various types of Dumb Waiters and Hand Power Elevators. Every builder should have this catalogue for reference and then whatever his requirements, he can select the particular size and style of dumb waiter which will best meet the conditions. Machines only or complete outfits may be purchased.

In addition the Sedgwick Machine Works will furnish working drawings free of charge to any builder who will write them what his needs are.

Let us send you this book for FIVE DAYS FREE TRIAL

SEND no money—just mail us your name and address. Your book will reach you by return mail. Keep it 5 days—use it—then either send one dollar or return the book.

STANDARD HANDBOOK OR ESTIMATING DATA
EVERY MAN IN THE BUILDING TRADE NEEDS IT

Name
Address
The Builders’ Auxiliary Co.,
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The American Combined Level and Grade Finder

All progressive and up-to-date Carpenters, Contractors and Mechanics should have one of our levels and grade finders. An instrument with which at one glance you can get the true slant on any line or grade, either in degrees, inches or percentage, or all at one time, and will at once give the exact distance needed to plumb up to a true level.

The most practicable, durable and convenient instrument of the day. In addition to ordinary mechanical work the American Combined Level and Grade Finder will prove serviceable in cutting off rafters, laying off and leveling buildings, getting height of any object and is useful in dozens of ways.

The longitudinal recess shown in cut is well worth the low price of the instrument.

Write at once for large list of testimonials and special introductory price given only to first applicants with privilege of taking agency.

American Level & Grade Finder Co., Railroad, Pa.
Insulate Screw Driver

This tool is designed expressly for Electricians' use.

The blade of crucible steel, hardened and tempered, is embedded in a handle of hard rubber of a texture that eliminates brittleness. It will not work loose.

The rubber handle is milled grip with projecting rings which prevent the hands from slipping down on to the blade.

The hard rubber handle acts as insulation.

Disston Insulate Screw Driver is something new.

Most practical electricians' screw driver ever made.


custom made
Fly Screens

Our work is far superior to the usual output of local mills and has a style and finish not obtainable from those who do not make a specialty of fly screens.

Our screens are made from kiln-dried lumber and have waterproof coped joints and the frames are weather proofed before finishing coats are applied.

Our grades of Wire Cloth, enameled, galvanized, genuine bronze, fastened by the most approved method.

The "Automatic" Screen is the cheapest, good custom made screens yet produced. Kinking cords or ribbons, useless weight pockets, misfit pulleys and reluctant balances, and saving all the time, labor and expense of fitting them in.

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

Sold by hardware dealers or direct from us.

Correspondence solicited. Representatives and side lines travelers wanted all over the world.

Automatic Sash Holder Company
277 Broadway, New York City.

Caldwell Sash Balance

Does away with weights and cords, and VASTLY more durable.

Makes sashes work perfectly.

Permits greater window space in new work, as box frames are not necessary.

May be applied to old windows without altering sashes or frames.

Wrote for circular to the
Caldwell Mfg. Co.
13 Jones Street, Rochester, N. Y.

Bovee Furnaces at Manufacturer's Prices

SAVES 50 PER CENT of COST; 40 PER CENT of FUEL

Most Durable, Most Economical Furnace Sold

Has a perfect ventilating system for every part of the building

Residence Heating Plant

Hot air registers in five rooms; cold air return in two rooms; 40-in. Furnace, 26-in. Fire Pot, 28-in. Combustion Chamber, 10,000 cubic feet Heating Capacity.

Special Price, $65

Church and School Heating Plant


Special Price, $95

Horizontal Furnaces with large doors or larger furnaces and more piping at proportionately low prices.

Bovee Grinder & Furnace Works, 50 8th St., Waterloo, la.
In introducing our "GREYHOUND" brand of Saws to the trade, we have departed from our usual custom in naming instead of numbering the saw. This saw will be known as our "GREYHOUND" and will be the only Bishop brand of saw known by name.

We have had a Chemist experimenting for years to originate a purity of steel with a fine grain and tough body that would stand up under such a fearless warranty as we place on our "GREYHOUND" brand of saws. We now have it. We know its worth as well as its value. As workers of steel we understand it. We had to name it and we have christened it Bishop's Refined "GREYHOUND" Steel, associating our trade mark with its name. We have in this "GREYHOUND" Saw blade a purity of steel that is tough, tempers accurately and even—together with the special way it is made—enables us to guarantee that this "GREYHOUND" brand of Saws will cut faster and run easier in all kinds of wood, hold its sharpness and set longer than any other makes of good Saws in the world. We Refund the Money if 30 days' trial does not prove our guarantee. Our pride is quality with an honest opportunity for the purchaser to judge. Each Saw is tagged with our warranty on it. No expense has been spared to make this Saw the most perfect in the world.

We invite correspondence with anyone who has our "GREYHOUND" brand of saws in use. Made in both straight and skew back. Packed One in a Box.

In workmanship this saw possesses all the skilled mechanical features known to the art of saw making. The hang of the blade has been carefully studied and adjusted, to suit the fancy of the most critical. If this saw cannot be found in the Hardware Store and they will not order it for you, write to us. Price for 26 in. saw, $3.00 delivered. We make anything in Carpenters' Saws.

"SEE THAT CORNER"—Notice that rails lap over stiles, which prevents the splitting of plowed edges, so common with most screens, but not with ours. They cost no more than the inferior.

Your local mill cannot compete with us. We are SPECIALISTS in WINDOW and DOOR SCREENS and run our factory all the year around. Get your screens direct.

Fly Screens and Screen Doors for residences, apartment houses, hotels, clubs, hospitals, schools, and all places requiring ventilation.

Made to Order Neatly and Promptly From a single screen or door to a thousand. We use the best grades of wire, black enamel, galvanized and copper bronze, etc., fastened by the most improved Standard Shoulder Strip Method; can never sag nor pull away, which makes the wire taut and firm.

MR. CARPENTER, BUILDER or CONTRACTOR, write for FREE copy of our 1910 illustrated catalogue.

STANDARD SCREEN CO. 1648-1850 W. 14th St. CHICAGO, ILLINOIS

MODERN STORE FRONTS ARE OBTAINED BY USING

The Coulson Patent Store Front Construction

WRITE FOR CATALOGUE E-800, AND FOR PAMPHLET DESCRIBING THE COULSON DRAINAGE SILL.

J. W. COULSON & CO. Office and Factory, 234-236 N. Third St., COLUMBUS, OHIO

Coulson Corner Post

When writing advertisers please mention the American Carpenter and Builder

Coulson Drainage Sill
Economical Power in a Millwork Shop

This vertical moulder is one of many machines in the shop of a Philadelphia contractor, all operated by an 8 H.P. Otto Gas Engine.

This engine has been running for about 8 years, with the usual complete satisfaction, operating (besides the moulder shown) a band saw, sander, swing saw, sticker and other machines.

The Otto is used just as effectively for outside hoisting work or for portable rig saws.

Over 100,000 Otto engines have been installed—Reliability, Efficiency, and Fuel Economy were the deciding factors in making the sales. Remember the Otto will afford a saving year in and year out during the life of the engine. Manu an Otto sold in the 70's and 80's is giving good service now.

Let us bring the facts to bear on your individual case, and prove what the Otto can save you each year. Simply state the conditions to be met, horse power required, and fuel you wish to use. Our figures will surely interest you.

Special literature for each type sent upon request.

The Otto Gas Engine Works
3204 Walnut St., PHILADELPHIA, PA., U.S.A.

Manufacturers of
Gas and Gasoline Engines Portable Air Compressors
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Electric Light Engines Suction Gas Producers
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Designed for
GASOLINE DISTILLATE ALCOHOL LIQUID FUELS
NATURAL ILLUMINATING PRODUCER GAS

Largest and Oldest Manufacturers of Internal Combustion Engines in the World.
FOOT, HAND AND POWER

WOOD-WORKING MACHINERY

For Carpenters, Builders, Cabinet-Makers, and Other Wood-Workers

Built For Hard Work, Accurate Work And Long Service

ONE MAN with one of these machines will do the work of four to six men using hand tools; will do it easier, will do it better.

WE GUARANTEE each machine to be thoroughly practical and accurate. Machines sent on trial, and if not found entirely satisfactory, may be returned at our expense.

Enterprising mechanics are quick to see the superior merits of our machines. It will pay you to investigate these advantages.

SEND FOR CATALOG "A"

THE SENECA FALLS
Manufacturing Co.
218 Water Street, Seneca Falls, N. Y., U. S. A.

CARPENTERS' TOOL SATCHEL

Especially adapted for jobbing trips. Made of heavy canvas with steel frame for lock and key, leather handles and strap. Contains 3 saw pockets, bit and chisel rolls. Can't rip. Durable and convenient. Send for Catalog showing our line of Mechanics' Tool Bags.

CARPENTERS’ TOOL SATCHEL

EXCELSIOR BAG & MFG. CO., Inc.
TROY, N. Y.

DO YOU WANT SLATE?
Roofing Slate for Houses, Barns, Sheds and Railroad Stations. Clean and ornamental, rain, wind and fireproof. Blackboards, for Schools, Colleges, etc., are being used all over the World, need no better commendation. It is just the thing.
Structural and Electrical Stock, Steps, Sink Tops, Wash Tubs, Window Sills, etc., superior to all other stone for such purpose.
Slaters' Supplies, Hand-made Slaters' Tools, Snow Guards, Slaters’ Cement, Nails, Pelt, Slate Punching, and Cutting Machines, etc.
Write for prices and I will tell you all about Slate.
D. McKenna, Marlinton, Pa., U. S. A.
JAMES CRAIG, Manager

Best grade cedar canoe for $20

We sell direct, saving you $20.00 on a canoe. All canoes cedar and copper fastened. We make all sizes and styles also power canoes. Write for free catalogue giving prices with retailer’s profit cut out. We are the largest manufacturers of canoes in the world.

DETROIT BOAT CO., 344 Bellevue Avenue, DETROIT, MICH.

Clogged CASSENS MFG. CO.
EDWARDSVILLE, ILL.

4 Tools in 1

Combination Saw Sharpener, Saw Setter, Tool Grinder and Sander

As a Saw Sharpener, it sharpens cut-off or rip saws 8-in. up to 26-in. Rip saws can be sharpened square or bevel, and are kept perfectly round and ground even at all times.
As a Saw Setter, Remove plate in front of wheel and insert anvil, which is beveled for different degrees of set.
As a Tool Grinder it is furnished with a 12-in. emery wheel and has movable table 10x8-in., which can be tilted so small knives may be ground rapidly and accurately.
As a Sander, The face plate is 14-in. diameter and furnishes a convenient means for sanding and smoothing up stock.

Write for full particulars and price. Manufactured exclusively by R. B. McKIM CO., Inc., 116 Pearl St., Boston, Mass.
Get Acquainted
with the
Grimm Woodworker
A Complete
Planing Mill
OUTSIDE OR INSIDE
A Wonder Worker

Rochester, N. Y.

Gentlemen:—My large machine is all set up and running fine. If you care to refer any prospective buyers to me, I think I can convince them that there is a saving in using it as we are turning out work and all kinds of it.

Yours respectfully,
(Signed) M. S. STROMME.

GRIMM MANUFACTURING CO., 46 Erie St., Buffalo, N. Y.

OLDS DIAPHRAGM PUMP

For pumping, excavations, cofferdams, trenches, etc. Handles 3000 gallons per hour on one pint gasoline. It is a money saver every minute. Engine can be removed and used for other purposes and easily replaced. Construction the most durable possible. We also make a full line of gasoline engines, pumps and hoists. Write for catalogue.

SEAGER ENGINE WORKS
Lansing Michigan
Olds Gas Power Co., 2112 Central St., Kansas City 1007 Farnum, Omaha 204 N. Los Angeles St., Los Angeles 65 Beverly St., Boston

THE IVES PATENT WINDOW STOP ADJUSTER

Prevents dust, drafts and window rattling

Send for Sample and Catalogue Free
1 piece of metal, will not cup, bend or turn in tightening screw.

THE H. B. IVES CO., Sole Mrs. New Haven, Conn, U. S. A.
Genasco is the roofing of the age. Its foundation has stood for ages past.

It beats shingles. They warp, crack, split, and rot—more so now than ever before (lumber is getting scarcer, and shingle-quality is becoming poorer every year).

Beats tin, which rusts and needs painting regularly. And even with tin, tin doesn’t last like it used to—quality has deteriorated here, also.

Coal tar roofings have the same old faults they have always had—get soft and melt in the summer sun, and get brittle and crack in the cold, and leak.

Genasco

the Trinidad-Lake-Asphalt Roofing

is the one roofing that lasts. It is made of Nature’s everlasting waterproof.

Trinidad Lake Asphalt has withstood the suns and storms of centuries; and in Genasco it gives this same lasting resistance to sun, rain, snow, wind, heat, cold—and even fire.

The oily nature of this natural asphalt keeps Genasco alive and strong to defend itself; and this is why Genasco is lastingly waterproof.

The Kant-leak Kleets waterproofs the seams of Genasco without cement, and prevents nail-leaks besides. It gives the roof an attractive appearance.

Ask your dealer for Genasco mineral or smooth surface roofings with Kant-leak Kleets packed in the roll. Guaranteed, of course. Write for samples and the Good Roof Guide Book.

THE BARBER ASPHALT PAVING COMPANY

Largest producers of asphalt, and largest manufacturer of made roofings in the world.

PHILADELPHIA

New York San Francisco Chicago

Fale’s Patent Variable Bench Plane

Is the Best That Money Can Buy

Constituting

Carpenter’s Plow, Dado, Filletter, Matching, Sash Hollows, Rounds, Beads, Side Rabbits, Snipe-Bill, Case Moulding, Chamfer, Quarter Rounds, Nosing and V-Planes, etc.

Standard Set $7.90, at Your Dealers

Or write for circulars to

OTIS A. SMITH, Rockfall, Conn.

MARSH-AYER BOXES cost more to manufacture than any other; but they cost you no more. We are satisfied with a small profit, and you get more for your money.

Saw and all attachments are included.

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<tr>
<th>Size</th>
<th>Saw Capacity at Miter</th>
<th>Price</th>
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<tr>
<td>A26</td>
<td>26x4 7 inches</td>
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<td>C30</td>
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Illustrated circular on request.

H. C. MARSH COMPANY

606 Race Street Rockford, Illinois

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
What about Paint Oil?

There is not enough linseed oil in the world at the present time to go around. Two years of flaxseed shortage has produced a serious condition. The condition is so serious that a few plain words are justified and should be of intense interest to every painter, dealer, property owner and any one else interested in paint or painting.

One of the foremost paint companies in this country takes up this question in a recent letter, and brings out the following interesting facts:

In the first place, there is an actual shortage. The situation is caused by crop failure, not by manipulation by speculators or holding back stocks by farmers. The high prices of linseed oil are therefore justified.

Keep that fact in mind.

In the second place, there is no substitute for linseed oil for outside painting.

Keep that fact in mind also.

The serious shortage of linseed oil makes the search for some other worthy paint oil highly desirable and entirely praiseworthy. But do not let the fact blind you to that other fact, that, so far, the worthy substitute for linseed oil has not been found.

The unprecedented situation has caused to spring up many new paint vehicles with all kinds of extravagant claims. Some say, “better than linseed oil.” Others are more modest. They say, “as good as linseed oil.”

The wise painter will not be tempted by any of these unproved claims. Try them, if you wish, in a small experimental way, but remember that no paint oil has yet made good except the old time-tested linseed oil.

Dealers who care for their customers’ welfare and their own reputations will be just as cautious. Property owners have nothing whatever to gain by allowing anything but pure linseed oil to be used. The latter is high, it is true, but the painting job will not be much greater than usual, and he had better pay the difference.

Having indicated the safe attitude to take toward the new claimants for attention as paint oils, let us sound a warning against that greater danger, adulterated linseed oil, masquerading as pure.

To palm that off on anyone is merely theft. It is theft of more than the amount one over-pays for the material. The total stealing is the amount represented by the damage the material causes.

Painters and dealers may guard themselves by dealing with only reputable concerns. A price below the market at any time, but especially at such a time as this, is suspicious. It should be a signal of danger to the buyer, like a suspicious pressure on your watch pocket in a crowd.

Let us summarize the safe course:
Refuse adulterated linseed oil altogether. Be on the lookout for new paint oils, but do not trust them till you have proved them good by adequate tests. Stick to pure linseed oil for serious, outside painting.

**The Home Builder—Substantial Citizen**

The best citizen of any community is the man who owns his home. Home building is equivalent to nation making. The foundation of the best society is the hearthstone. Upon it is erected the greatest glory of the world’s greatest achievements. It indicates stability, sturdy character and honest worth. A people without permanent homes never becomes a nation, but remains a tribe. It does not progress, but stands still and deteriorates. It cannot have the highest sense of morality, because the home is the bulwark of morality.

What is true of a people is similarly true of an individual. Home-making and home-building are essential to character development. They produce honesty, sincerity and truth. The dishonest man, the hypocrite and the untruthful man—they are not home-makers, but, if they become builders at all, they are as the man who built upon the sand.—Finance.

**Criminal Carelessness**

Nearly all the great fire disasters of the past few months have been due to carelessness of one form or another. The factory fire at Newark, N. J., in which twenty girls were killed and fifty seriously injured, was due to gross carelessness in the handling of gasolene. The shirt-waist factory fire in New York in March, where nearly 150 were killed, was due to a match or cigarette carelessly thrown in the masses of cotton clippings which covered the floor. In both of these cases, the carelessness of the occupants was added to by the negligence of the owners of the building in failing to provide proper fire escapes.

These conspicuous disasters should serve to call attention to the fact that a majority of all fires are likewise due to carelessness of one form or another, and cost the United States $234,000,000 last year, with every indication that 1911 will greatly surpass that amount. Most of these fires are easily preventable, by the exercise of reasonable care on the part of the property owners in the construction and protection of their buildings, and on the part of the tenants by ordinary precautions and watchfulness.

The recent disasters have shocked the public into attention and interest in the matter of the fire waste, and the probability that the aggregate property losses will reach a quarter of a billion dollars this year, at the present burning rate, should stimulate states and municipalities to action, and should bring home to the individual his personal responsibility for this ruinous waste.
We have often wondered what one of the old time builders would say if he were to "come back" and see the methods in use by the builders of today.

We hear a good deal about things not being as they used to be in the "good old times," that the work is slapped together in a great hurry now, and that the best materials are very apt not to be used—at least unless they will show. All of which is probably more or less true. Still, there is another side to the matter; and it is by far the more important side. The spook of an old-time builder, spooking around the building site where a piece of modern construction work is under way, might be grieved at a few things he would see, but he would certainly be astonished and a little bit incredulous, amazed and yet pleased, at the labor saving methods he would see in use.

If one of the old time builders could "come back" he would certainly be most forcibly struck by the free use of power equipment in present day building operations.

Portable saw rigs and portable variety woodworkers are now to be seen in increasing numbers "out on the job"; and they are revolutionizing the work of the carpenters and carpenter contractors. Material hoists, gas or steam operated, have long been a necessary and important part of the equipment for putting up large buildings; but the old timer would note that on the smaller sized jobs, as well, the builders are now enjoying the benefits of power hoists. He would see that small size material hoists have been devised, operated by gasoline engines, electric motors, and in some cases hand operated, which greatly lighten the work of handling the materials and are adaptable to the needs of the small size building operations. As to concrete mixers—granted that the old timer would know a concrete mixer if he saw one—they would be found to be power driven with a compact engine, usually gasoline, mounted right with the mixer. If Mr. Spook had ever worked on one of the old time concrete mixing boards or had ever paid the bills for shovel mixing, this would...
certainly appeal to him and strike him as rather too good to be true. Then turning to the wood working and pattern shops, the convenient little power generator would be found busily at work also, turning out more good work in a day with the assistance of one man than five men—and good ones too—used to do by hand.

The illustrations show some typical pieces of power equipment that would be found in use, that are especially adapted to the needs of the carpenters and building contractors. These photographs not only show what these machines are, but a number of them demonstrate clearly the work that they are able to do. They are very suggestive of work being done at a profit.

The owner of one of the machines here illustrated, the portable saw rig, writes as follows: "I bought this machine last May and it has been running like a 'trooper' ever since. It actually saved me $100 in mill work on the first job I used it, in about a month. Have been using it during the winter season in my shop, doing all kinds of work with it, from window frames to paneled work. In ripping up scrap lumber and sawing bridging, it would pay to own one. If this were the last one to be had money would not buy it from me."

This letter is typical of many that have been received from practical builders concerning their investments in power equipment. For high quality work, done at a saving of labor and time (which means money) the power driven machinery takes the prize.

To conclude: As the old timer spooks away, his heart goes out in sympathy for the many old timers who are still with us trying to compete with their old time methods against modern labor saving equipment.

*Use of Magnets in Surgery*

The employment of magnets to draw out needles from the flesh is a new feature of modern surgery—an extension of their use to recover minute steel chips from the eyeball. Says the *Literary Digest*.

"Large electromagnets have been used for more than twelve years in ophthalmology to extract foreign bodies from the eye—bits or needles of magnetic metals such as iron, nickel, or cobalt. Messrs. Theuveny and Raoult-Deslongchamps are using regularly and successfully, a very powerful electromagnet to extract such bodies from lodgment in tissues other than those of the eye, using the X-ray as an aid. The metallic body is exactly located by means of two radiographs taken in two different planes. Then the foreign body, usually a needle, attracted by the magnet, raises the skin and forces its way through, adhering to the instrument. In a certain number of cases it is necessary to make an incision of very small size at the top of the cone formed by the skin, and the needle or other metallic body finds its way through this.
HERE are just a few items of interest in the wood-working line, to let you know that I am still a contributor to the paper, that all men in the building business should be privileged to consult regularly. My notes will pertain to the bench, the building and the machine, and I will give them as they crop up to me.

When gluing up table tops, wide pilasters, or any other flat stuff, instead of joining the edges perfectly straight, give them a slight concave, this enables the mechanic to use only one clamp (in the center) and brings the ends up very hard, which is the first place the joint is apt to come apart. It also facilitates the work inasmuch as the worker has only one clamp to contend with and gives the balance of the clamps for other work.

A centering tool: Allow me to give you an idea of a very handy tool made by a mill man and found at times useful by a turner and others for centering circles. Take a piece of birch, or any other hard wood, make it about 12 inches long and 3\(\frac{1}{2}\) inches wide. Shape it as illustrated; the hook makes it handy to hang up. Bore two holes through, being careful to space them exactly the same distance each side of the edge, A, and so that the imaginary line connecting the holes is exactly at right angles to the edge, A. Put a \(\frac{1}{4}\)-inch dowel through each, so the dowel sticks out each side about \(\frac{1}{2}\) inch. In use, keep the dowels bearing against the edge of the circle, or disc and mark along the edge, A; slide the tool around the circle and mark again across the first line. The intersection gives the center.

A wood turner may center his balusters thus to save time while turning, say for 3-inch, 4-inch or 5-inch balusters. They are hard to get in the lathe centered without going all over them with a marking gauge or such appliance. Here is a way to center the baluster while you are putting it in the lathe to turn. Drive a 20d nail in the lathe shears, down, so that the head comes just to the center of the baluster.

Take a file and file the edge of the head, so that it will give a scratch on the end of the baluster each way. Do you catch it?

In making money drawer tills in a shop that is not hooked up to do such work regularly. I have done this many times with success. Lay out on the back of the block the scoop-out holes—say \(3\frac{1}{2}\) inches or whatever the size wanted. If it has only three holes or so, or is short, you can screw it on the lathe face plate; run slow speed and turn them out with a gouge allright. Of course it will be much out of center and will flop around a good deal, inviting the turner to get a good belt in the slats, but that must be watched. If the till is a long one, say 18 inches or two feet, it will have to be hand sawed apart; then after the parts have had the cups turned in them they are clamped up, glued and nailed. The crooked line gives better and longer gluing surface than a straight line, and gives nailing place better too. Got him?

In turning very heavy columns in yellow pine, or any other wood that will not bear up its own weight between centers, bore a hole in the tail stock end and drive a hickory or locust plug in for the cup center.
to push against. Keep well oiled. I've had to do this once and have seen other lads have trouble likewise with the soft wood tearing and wearing out. This scheme fixes it.

**Gauge for sawing miters:** I have a very useful shop, rip or cross-cut saw gauge, used in cutting miters, either right or left, such as in heavy mouldings, trim, etc. The iron top saw table has two grooves or ploughs in it, running lengthwise, one each side of the saw. I take two pieces of hard wood ¾ by 6 by 24 inches and cut each one on hand saw, then miter them together at point "x," so as to make a square angle, or 90 degrees. Then I screw two pieces, as at A, across the top to strengthen it and keep it square; and screw a piece on each side bottom edge, to slide in groove in saw table. Shove the gauge up to the saw and cut kerf all the way through the miter, except a couple of inches at the top. In use, this is one of the handiest saw gauges I have ever seen. It will stay true.

**To level or plumb with a steel square,** use a cord with a weight, such as a pocket knife, or heavy nail. Attach to the tip end of the tongue; sight along the edge of the tongue and when the cord coincides or is parallel with the edge, the tongue is plumb and the blade is level.

**Many times a carpenter is called upon** to build a stand with sawed legs, Louis XV, etc. I have a way to saw these that has always given good results. I saw not quite out at the various points, as at "X," so that the slab will not fall off, then turn over other side and saw. When finished, a sudden jar will shake off the slabs and the leg is ready to clean up. Stop sawing at points "x" each time and saw in direction of arrows.

**Here is a way to lay out rope balusters, table legs, etc.** Take a piece of building paper, cut a series of lines or slits the width apart the rope is to be wide. These cuts are parallel all the way across the paper from end to end, leaving about 1 inch on each end to keep them together. Wrap it around the post or baluster or leg, etc., then mark with a pencil through the slit on to the wood.

**Well curbs:** Many times carpenters in the country are called on to build circular curbs for well tops, etc., and want the curb the proper diameter for 13 brick, which is the usual number of brick used. The required diameter is 3 feet 5 inches. The well curb is usually made of two thicknesses of ¾-inch spruce or hemlock.

I have seen two circular rip saws put on the same mandrel with a wood washer between them, in order to cut double the quantity when ripping small stuff. One strip runs between the gauge and the saw; the other runs between the two saws.

**Here is a centering block used by turners on corner blocks,** which is adjustable and quick. Take a piece of wood ¾ by 6 by 18 inches long, one piece ¾ by 6 by 12 inches long and two strips ¾ by 1¾ by 12 inches long. These will make it. In use, adjust and set the sliding stop so that the sharpened wood screw will mark the center of the size blocks to be turned.
A chute plane is a very handy thing for a man at the bench for making miters. Take a piece of oak 7/8 by 5 inches by 2 feet long and fasten on one side of it a piece of 7/8 by 2 inches by 2 feet, and on this a short piece of 7/8-inch stuff with a miter on one end. The moulding to be planed or shaved off is placed up against the edge of this short piece, while the plane is slid back and forth with its side rubbing against the 5-inch piece and its bottom or cutting edge against the 2-inch piece.

When making joints in small pieces, it is often handier to turn a foreplane upside down and rub the pieces across the knife (or bit); sort of a Japanese way, opposite the Yankee.

Just a few words about the splines in the miters of cabinet trim; the way to get a good job and a quick one too, is to put a small, thick saw on the variety moulder; then shove the mitered end of the trim up to the saw and let it cut into the trim until it shoulders up against the collars, then pull out; this will leave a segment shaped hole. Proceed in same manner for the opposite piece. This requires a spline piece convex convexio (that is some geometry, eh?); this is shown at A-A; it is just thick enough to fill the saw kerf. At C is a view, showing the spline in position. Remember the grain of the spline should run the narrow way for best results.

A Slam at Winding Stairs
By A. W. Woods

The things that have long been fuming within us and wanting to be said concerning winding stairs, boiled up and quite overflowed on reading the following:

To the Editor: Manchester, Iowa.

Would you kindly explain how to build and lay out a winding stairway—one that has a wind at the bottom and a straight string the rest of the way. Also how to build a wind where the wind is not square. What I would like is the rule to go by.

M. E. M.

The best way to build winding stair is to lay them out full size and take measurements from the diagrams. The main thing is to keep the treads at the center of the stair the same width as those of the straight part.

But pardon us; we cannot enthuse on winding stairs worth a cent. At best, they are a nuisance in the common dwelling house. In fact, should not be used at all, except in large stairways where more show than utility is desired—that is, where there is plenty of space to make decent wind, so that if a person should take a header in coming down the sensation would come on gradual and pass off the same way. What we object to is the narrow winding stair with the treads running to a feather edge at a corner or to a newel post. A header in that case comes on quick and is altogether too much one-sided. To make the wind elongated, that is too much and we draw the limit. We graduated in this kind of stairwork many years ago and received our self imposed degree.

It all happened this way. We had charge of the draughting department in a University and in the class was a young man, one of the handsomest of God's noble creatures. One evening he togged himself out to attend some class function—and he wasn't going by himself either—which might have had something to do with his head for the time being, but anyway in coming down the stair, he took a tumble and in the act his head went through a window-pane, a piece of which laid the side of his cheek open from near the corner of his mouth almost to the ear, lacerated his tongue and injured the roof of his mouth. Well, the doctor patched him up as best he could, and in a week or ten days he was able to resume his work, but he was a sadly disfigured young man, and all because of that dinky winding stair that should never have been built.

We said then, no winding stair for us, and we have been standing pat ever since. In fact, the older we get the patter we are. No, no! None for us.

In planning a house we make it a point to take all the room that is necessary to give a comfortable stairway with square turns where turns are necessary and plan the rooms to work to it as best we can, and if crowded for room, why we just make the house larger to accommodate the stair.

We go on the principle that it is better to have the ups and downs in the home as pleasant as possible with no cause for unexpected jars. Remember this, and when you build your house, profit thereby, as we know you will, and you will always have something to be thankful for, even if dished out in these homely remarks.
HE three essential things to know in framing a hip and valley roof are as follows:

First,—the size of the building;
Second,—the shape of the corners; and
Third,—the pitch of the roof.

We say essential, because these parts must be fully understood before proceeding with the work; or blunders, if not utter failure, will be the ultimate result.

Knowing the relation of these parts, other parts can readily be developed and brought into use to fit any condition, regardless of shape, size or pitch that the building may have. In short, to know the parts is to know the whole subject of cause and effect in roof framing.

The accompanying illustration exemplifies the cause and effect in connection with the steel square, which we will endeavor to explain in as few words as possible.

In this example, we have taken a 10-inch rise to 1-foot run. Twelve is used on the tongue of the square, because it represents a 1-foot run and is therefore the starting point. Ten is used on the blade because it represents the rise in inches for a 1-foot run. The shape of the corner of the building on which the hip is to rest, should be known, also what the figures are on the square, to give the miter for the angle.

Now, as we said before, 12 on the tongue is the starting point, so 12 must be the part to take on that member; that being the case, we trust everybody knows that (for a square corner) it must be at a like point on the blade as 12 and 12. Now then, with the pitch and miter established (see the solid lines from tongue to blade), we are ready to branch out. Come and go along with us and do not drop behind, or you will get out of hearing distance.

Twelve and 10 will give the seat and plumb cuts of the common rafter; the former on the tongue and the latter on the blade. Now, suppose we could take hold of the common rafter at the top and stand it up straight; sighting across to the edge of the blade, it would strike at 15½; then 12 and 15½ will give the cut across the face of the roof boards and also the side cut of the jack; the former on the tongue and the latter on the blade.

Now, we will let the common rafter down again to its original position and pick up the other end and lift it up until it is level with the top, and plumb down to the tongue; we find it strikes at 15½; then 10 and 10 will give the miter for the roof boards to fit into the valley or over the hip. The cut is on the latter; we say latter, because 10 is on the blade.

Now, this is good, but it only applies to a square corner. We do not like it because the same operation does not apply to any other corner, so we let the rafter down again to its original position and try something else that will apply to all alike. So we will throw out a line from the toe of the foot of the common rafter and at right angles to it, to a point directly under the top or highest point of the common rafter, which we will call co-pitch. This being done, we will swing it around until it rests at a point directly over the toe of the common rafter; sighting across to the blade, we find it strikes at 18½; then 12 and 18½ will give the same cut as last mentioned above; but this time the cut is on the tongue. This is good because it applies to any shaped corner the building may have; better mark this down in your block, so that you may always have it handy.

But say,—before we quit this, let us find a method for a butt miter, which is useful in building hoppers, or say for building a gable on the side of a roof that is already built and where you do not care to tear off the roof boards, but, nevertheless, you want to make a good, tight job of butting the gable roof to those of the main roof. Go to the upper end of the common rafter and throw out a line at right angles to it to a point on a level with the foot of the rafter. This line we will call the complement pitch. Now swing the lower end of this line around to a point on a level with the top of the rafter, as at opposite 10 on the blade and plumb down from the end of it and it will be found to strike at practically 13½ on the tongue; then 13½ and 12 on the blade (tangent of common rafter) will give the cut, which is on the latter. This is good, because the formula applies to any shaped hopper; but in doing it, look out that you do not get your lines crossed because the figures to use on the tongue must be its tangent.

We are now through with the gyrations of the com-
mon rafter and will now take up the miter for the square corner and see what relation it has to the framing of the roof. As we said before, it is 12 and 12 on the square, and either side gives the cut because the miter is at the half-way place between horizontal and perpendicular, or 45 degrees, and is therefore the same from either side. This, of course, does not occur in any other corner.
To begin with the miter in reference to the outer edge of the plate, this lies in exactly the same position as the run of the hip to the run of the common rafter. See? All right. The length of this line from 12 to 12 is practically 17 inches (lacking only .0297 of an inch). If you do not believe it, pick up the lower end and lift it up to a level with the top end, as at A, and plumb down and you will see that it strikes 17. Then 17 and 10 will give the seat and plumb cuts of the hip; the former on the tongue and the latter on the blade. Ten in this case is used because it is the rise of the common rafter. The next thing is to find the side cut of the hip. A line from 17 to 10 represents the length of the hip, then take hold of this line at the top and swing until it stands straight up. Sighting across to the blade, it will be found to strike 19 17/24 on that number; then the square placed at 17 and 19 17/24 will give side cut of the hip, the latter giving the cut.

But hold on! Here is a point,—a vital point,—mark this down in your block; if its full take another. Seventeen is not used because it is the length of the run of the hip as is generally supposed. Oh, no! It gives correct results as far as the square corner is concerned, but it is misleading. Then why is 17 used? Because it is the tangent which is the same as throwing out a line from the upper end of the miter line and at right angles from it and to a level with the foot of the hip rafter, as shown. This line we will call the tangent of the hip. Now, take hold of the lower end of the tangent line and swing it around to a point level with 12 on the blade, as at A, and it will be found that it coincides with the point previously described for the run of the hip; but this does not occur in any other than the square-cornered building. However, by taking the tangent of the miter or run of the hip, we have a general rule that applies to all corners alike.

In the illustration, we have shown the side of the square on which the cut is obtained for all of the above described cuts, but remember they are for the rise of 10 inches to the foot.

To find the cuts for the 9-inch rise, the pitch line would drop to 9 on the blade. Proceed as before.

In the case of the half pitch roof, the pitch line would show the same as the miter line and the whole diagram would be developed from that one line; and, while the diagram would be apparently simplified, it is misleading because the same parts must naturally exist as here shown, yet in the half pitch they are intermingled—as for instance 12 and 17 in the half pitch give the fact cut across the roof boards, the miter cut for the edge of the board and also the butt miter. Three in one, with no way of readily distinguishing what determines one from the other! Consequently the would-be learner is left stranded; his lines crossed and he can go no further.

**Built-In Seats and Settles**

**GOOD IDEAS AND SUGGESTIONS FOR THOSE WHO DRAW PLANS AND FOR INTENDING HOME BUILDERS**

In point of economy, artistic effect and convenience, nothing is quite so satisfactory as built-in furniture when it is wisely adapted, well constructed and rightly used. So often it supplies the little touch of comfort and decoration that we are all striving to attain in our homes. Take the built-in seat or settle for instance. It has a stability that does not belong to the detached piece, and it produces a harmony that is delightful. More than this, it can be so constructed as to be one of the most useful articles in the house. Built-in seats are often made with the top hinged, the body of the seat being a roomy box; which, in a hallway, serves as a convenient receptacle for rubber, porch cushions, shawls, etc.; in a bedroom, as a shirtwaist box; and in a living-room, to hold magazines, books, games, etc. There is always need for just such a handy place in a home, and the built-in settle meets the need, at the same time contributing to the artistic effect of the room and supplying an extra sofa or seat.

Note the charming effect derived from the placing of two harmonious settles at the sides of a fireplace. With high back and graceful ends, they complete the room and give a cozy, comfortable atmosphere that suggests long winter evenings around the bright fire. Again, the settle may stand directly in front of the fireplace. In this arrangement, which is both con-
Convenient and attractive, the top of the settle is much lower than in the foregoing, being on a level with the edge of the table which stands against it.

The hallway settle is of still another type. Its length is usually governed by that of the side of the staircase, with back and arm pieces of corresponding size and height. Occasionally, there is a high shelf above for bric-a-brac,—but this all depends upon the proportions of the hallway.

The built-in seat that one finds in a bed-room or a den is usually of a smaller model. It may occupy a space on one side of a corner, when the back is in the form of paneled wainscoting, and the arms follow the same simple lines. Or, it may be built on the two sides that form the corner,—a cozy, attractive nook that could not be utilized to better advantage. Another choice spot is offered by a bay window in the living or dining room, and this, when piled with cushions, may be one of the most effective features of the room.
UNIVERSAL specification which can be used for all classes of electrical equipments, is a subject that has been before the architects throughout the entire United States and has never been solved. The Western Association of Electrical Inspectors appointed a committee to prepare specifications, one which could be adopted for all classes of dwellings, one for store and office buildings, and another for factories, but when submitted to the association it was decided that although great care and considerable thought had evidently been given the matter, the specifications did not meet the requirements, and it was finally decided impossible to construct a universal specification. Inasmuch as the Western Association, composed of men of ability in electrical engineering, have come to the above conclusion, I am inclined to believe that the most advisable method for you to adopt in making specifications would be to state the number and location of lights; the kind and location of switches, the location of cutouts, the place where the service is to enter, where the meter or meters are to be located, and the kind of wiring, whether knob and tube, rigid or flexible steel conduit or moulding. State that the wiring must be neat and in a workmanlike manner and in conformity with the rules of the Board of Fire Underwriters. It would also be well to add that before the first installment is paid a letter of approval must be secured by the contractor from the Board of Fire Underwriters.

I have observed in many specifications obsolete and irrelevant terms indicating that a general specification such as those published in book form had been selected and filled in to suit the installation that it was intended to cover. As a consequence the specifications were lengthy, contradictory and misleading. It is this embarrassment, I am informed, that the architects are endeavoring to avoid, and consequently I suggest that the specifications be brief, explicit and free of any statement as to how the equipment should be installed excepting that it must be done in a neat and workmanlike manner, etc. By adding that the material and workmanship must meet the approval of the underwriters and conform to their rules in every respect and detail it covers everything that you might mention and saves you considerable time and possible errors. As the Underwriters’ rules only take care of the capacity of wires and not the drop in voltage, it would be advisable in large installations that the maximum percentage of drop be specified.

Specifications are important and necessary in connection with electrical construction, yet there are numerous other very vital features which should receive close and careful attention. One is the time when the electrician is permitted to perform his work. Too often has the electrical work been installed at the same time as the plumbing and heating and frequently with the result that the electrical installation, which was possibly first class and worthy of praise, has become extremely menacing, occasionally resulting in a fire, owing to having been disturbed and crossed with pipes and other objects. I would advise that the electrician be prevented from working until all other mechanics are through and the house ready for lathing. Then, after the equipment has been inspected, you will know positively that it has not been disturbed. I would also advise that the lathers be permitted to work only after you are assured that the equipment has been inspected and accepted. This suggestion, however, refers only to concealed knob and tube construction, as rigid steel and flexible steel conduits are not subject to the same misuse.

The Underwriters’ rules permit 660 watts, or twelve candle power lamps, to a circuit which the electrician takes advantage of. Frequently after the equipment is completed it is decided when fixtures are being purchased that more lights are desired in some of the rooms than originally intended and consequently the circuits become overloaded. To avoid this, it might be well to specify eight lamps to the circuit as is being done in other towns and then there will be ample capacity to add more lamps, fans, curling irons, etc. To facilitate the work of the electrician and avoid errors and disputes it would be well to furnish him a blue print upon which the location of the fixtures and switches and various devices should be designated. The symbols most favored and most prominently used in designating the kind and location of switches, brackets and fixtures and the number of lights on each are those adopted by the National Contractors’ Association, which, I believe, will be pleased to furnish them on request.

With the advance of electricity for domestic purposes, the architect finds that he has new problems to solve and an ever increasing responsibility. It is but very recently that a new appliance has been introduced that is destined to become more prominently used as time advances and that is the vacuum cleaner. The installation of this apparatus, also flat irons and all heating appliances should receive special attention and an individual circuit should be installed for each the size wire depending upon the capacity of device.
MODERN thought concerning sanitation and domestic science have so emphasized the important relation between pure food and health that the modern refrigerator has been perfected. In its present improved form it would hardly be recognized as of the same genus as the old-fashioned zinc-lined ice-box. It is getting to be more and more the custom among the architects to make the refrigerator an organic part of the house—in other words, to “build it in.” To do this it is not necessary, as is generally supposed, to go to the additional expense of having the refrigerators built in the house, or even built to order. All of the prominent refrigerator manufacturers now make a complete line of their goods for this special purpose, adapted to any ordinary arrangement.

A few of these many arrangements for built-in refrigerators for kitchen or pantry are shown in the accompanying drawings. It will be noticed that in all cases the refrigerator has a door in the back or end, opposite which door in the wall of the building is usually placed. This allows the refrigerator to be iced from the outside. The many advantages of this arrangement are obvious. Details to the scale of 3 inches equals 1 foot for the construction of this outside icing door, and frame for the same, in both brick and frame buildings, are given on the following page.

This door in the wall of a house, which covers the icing door in the refrigerator, should be larger than the latter by 2 inches at the top, 2 inches at the bottom, 3 inches at the fastener side, and 5 inches at the hinge side. In case of a very thick stone or brick wall, the opening should be still larger, thus allowing the ice to be handled more easily through the opening.

The refrigerator should be either delivered in advance before the placing of this door in the wall, or exact measurements of the size of the door, the distance from the corner of the refrigerator and the height from the floor should be obtained from the manufacturer.

Most of the manufacturers are now willing to work with the architect and act upon his suggestions as to finish and design. By so doing, the refrigerator being built of the same material as the surrounding woodwork and finished in the same color, is made an organic part of the house. It is of course necessary in order to do this, to have the refrigerator shipped from the factory “in the white.”

On the second page following will be found a plan of a pantry containing an unusually good arrangement of built-in refrigerator and the adjoining cupboards, cases, etc. This plan is given as a model arrangement and shows how the refrigerator can be iced from the outside and so placed as to be convenient to the kitchen, pantry and dining room. In this connection details are also given of the various cupboards, cases, drawers, etc., all drawn to the scale of ¾ inches equals 1 foot.

Everyone is familiar with the fact that cold air falls and warm air rises; modern refrigerators are built on this principle. The cold air of the ice chamber is sent directly into the compartment beneath, and as it becomes warmer, rises through the other apartments, cooling the provisions in its course back to the ice-chamber. This forms a constant circulation of air as long as the ice cake lasts. As soon as the air from the storage compartments strikes the ice all moisture condenses and drains through the drain pipe out of the refrigerator. All odors and gases which have been gathered by the air in its circulation through the food compartment are absorbed by the melting ice, leaving the air dry and pure.

It is always economy to buy a good refrigerator. All refrigerators should be provided with a drain pipe leading to the laundry tub or sewer, and the best make of refrigerators are provided with a water-sealed trap, which prevents warm air, sewer gas, insects, etc., from entering the refrigerator through the drain pipe and yet made in such a manner as to be easily removed for cleaning, which should be done as often as once a week. This removes the refuse matter which accumulates from even the cleanest ice.

**Full Page Plates Showing Complete Details are Presented on the Two Pages Following**
Six Ways of Arranging Built-in Refrigerators.

Arrangements for Refrigerators to be Iced from Outside

Detail of Icing Door in a Brick Building.

Head

Sill

Jamb

Detail of Icing Door in a Frame Building
DESIGN FOR A PANTRY CONTAINING A BUILT-IN REFRIGERATOR

DETAILS OF CUPBOARDS, ETC.

SCALES

PLAN — 36" = 1'0"

DETAILS — 36" = 1'0"
Mistakes in Warm Air Furnace Heating
THE FACTS CONCERNING THREE ACTUAL CASES WHICH SHOW WHAT TO AVOID IN FURNACE WORK
AND HOW TO "SIDE STEP" COMMON MISTAKES

In a series of papers in The Master Sheet Metal Workers Journal, Mr. M. H. Smith has discussed the question of warm air furnace heating, taking up especially some all too frequent and prevalent mistakes that are made. Some of the mistakes in warm air furnace heating arise from a lack of knowledge of the laws and forces that govern heating engineering, but this lack of knowledge, less politely termed "ignorance," is totally inexcusable, he maintains, because the information that would dispel this mantle of ignorance is as free as the air we breathe, to those whose ambition will develop a desire to read and study.

Some of the mistakes are due to gross and inexcusable carelessness, but these may be avoided by the furnace man whose pride in the result of his work should prompt the exercise of reasonable care.

Some of the mistakes are due, neither to ignorance nor carelessness, but are without difficulty directly traceable to the architect and builder, whose interest in the subject of efficient warm air furnace heating—a subject of vital importance and considerable interest to the occupant of the house—ceases when the deluded purchaser has paid for and accepted title to the property, and frequent experiences in the mistakes of warm air furnace heating warrant the assertion that the fault too frequently rests with the architect and builder.

A Furnace "Mistake"

For example, a house completed less than a year ago in a certain small town, presents a striking example of the "mistake" which cannot be placed in either the ignorance or careless column. In this case the question was not what will it cost to satisfactorily warm the dwelling to be erected, but how much of an outfit that looks like a heating plant can be furnished and installed for seventy-five dollars? What a proposition to emanate from a contractor's office!

The construction of the house was begun, and in due time the plans and specifications for the heating were passed to the tinner, who, in spite of his better judgment, proceeded to install the plant in accordance with the architect's plans and specifications.

The specifications stipulated a furnace by name and number—one that has a casing 32 inches in diameter and a fire pot of 13 inches average diameter, and this to warm a stone and frame dwelling entirely exposed, containing nine rooms, kitchen and bath, and aggregating—considering wall and glass exposure—fifty-six thousand gross cubic feet. The specifications further provided for 8 by 10 inch registers in each room, four runs of 8-inch warm air pipe from the furnace to four risers 2½ by 9 inches each, one of the risers intended to warm three rooms, and three of them intended to warm two rooms each.

The house, when nearing completion, was sold—likewise the purchaser, who, perhaps having experienced some disappointments in warm air furnace heating, asked for a larger furnace and agreed to pay through the architect an additional sum for a larger sized furnace. The same careful (?) consideration induced the architect to merely order the larger furnace, and when reminded by the tinner that the round and partition piping was neither large enough nor enough of them, was told that no change in the plan of piping, flues and registers would be considered. This heating plant was completed as arranged by the architect, and when tested during the subsequent cold weather proved, as might have been expected, a miserable failure. Now, the architect, the contracting company, the builder and the tinner are each busy trying to convince the purchaser of the property that some one of the other three is responsible for the mistake.

Note the original plan:

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>House contains gross cubic feet</td>
<td>56,000</td>
</tr>
<tr>
<td>The No. 32 selected furnace would heat gross cubic feet</td>
<td>10,000</td>
</tr>
<tr>
<td>Maximum limit of piping for the No. 32 furnace, inches, area, is</td>
<td>280</td>
</tr>
<tr>
<td>Four 8-inch horizontal pipes, inches area</td>
<td>200</td>
</tr>
<tr>
<td>Four risers or partition pipes, 2½ by 9 inches, area</td>
<td>100</td>
</tr>
<tr>
<td>Aggregate area of nine registers, in inches</td>
<td>360</td>
</tr>
</tbody>
</table>

Notwithstanding the furnace specified was entirely too small for the proposition, it was, nevertheless, of greater efficiency than the round horizontal piping, and very much greater than the risers or upright pipes, but
how much more unevenly balanced is the amended proposition:
The No. 40 furnace used with heat gross cubic feet ................................. 54,000
Maximum limit of warm air piping, inches area 440
Four 8-inch horizontal pipes, inches area 200
Four risers or partition pipes, 2½ by 9 inches, area 100
Aggregate area of registers in inches 360

We know that a warm air furnace heating plant is measurably elastic, but neither the intended furnace nor the larger substituted one would be sufficiently elastic to cover the defects in this exhibition of an architect's heating engineering ability.

Another Example

Plans were presented for the erection of a bungalow, warm air furnace heating specified. Mr. Smith examined the plans, showing six rooms, kitchen and bath to be heated, and recommended the use of a certain No. 35 warm air furnace of modern type, the specifications of which might be briefly stated as:

Diameter of casing in inches .......................................................... 35
Average diameter of fire pot in inches .............................. 18
Diameter of smoke collar, in inches .......... 8
Heating efficiency, in gross cubic feet .................. 35,000

(Gross cubic feet means the actual cubic feet plus the net wall and glass exposure multiplied by seven and one-half and seventy-five respectively.)

The bungalow, by measurements from the plans submitted, measured 33,400 gross cubic feet.

The tinner who installed the plant put up a creditable job, mechanically speaking, but for some unaccountable reason reduced the smoke pipe from eight inches to five and one-half inches, the effect of which was a sluggish, lifeless fire and a complaint from the house owner that only cold air came into the rooms through the registers. The tinner was called in, his inexperience prompted him to close off all air supply at the runs of warm air pipe and to perplex the owner, tended an air duct eight inches from the basement in which the furnace set) and extending an air duct eight inches in diameter from the base of the furnace to a west window in the basement.

Of course the result of this example of engineering was the admission of only sufficient air to fill one of the runs of warm air pipe and to perplex the owner, who said, "At first we had air from all the registers, now we obtain moderately warm air from only one register at a time." At this stage the writer was called in, and a brief examination disclosed the entire difficulty, namely, insufficient draught. The diminutive air duct was removed, an adequate air supply taken from the basement, the smoke pipe increased to eight inches. Result, a brisk, active fire, improved combustion and all the rooms of the bungalow satisfactorily warmed to a temperature of 70 degrees in zero weather.

In this instance the funniest mistake, first, was the needless reduction in the diameter of smoke pipe; second, in attempting to supply air for warm air piping aggregating 350 inches area with one 8-inch pipe—fifty inches area.

Insufficient Air Supply

Another example of inexperience on the part of a tinner, and a condemnation of warm air furnace heating on the part of a house owner was presented during the past winter. Mr. Smith was called in to determine, if possible, why only one room at a time could be warmed. A brief examination of the system disclosed many mistakes in the heating plant, chief of which was an insufficient air supply. The maximum warm air pipe efficiency was about 360 inches area, the furnace, however, having been installed with two runs of 10-inch and two runs of 9-inch and two runs of 8-inch warm air piping, aggregating 384 inches area. All air from the cellar to base of the furnace had been excluded and a 4 by 12-inch tin air duct run from the base of the furnace to the seat wall, where some bricks had been removed and the opening covered with a 4 by 12-inch register face, actually admitting only 24 inches area of air to supply 384 inches area of piping. Can any one be surprised at the effect and the annoyance to the family?

Immediate relief was afforded by the removal of the toy air duct and the blind panels at the base of the furnace and partly opening one cellar window to permit a circulation of air in the cellar. This produced a change in the temperature of the rooms, but not in the hall, which was served with a floor register. To temporarily produce a different effect here we resorted to the old trick of placing upon this register a joint of warm air pipe, which carried the warm air above the strata of cold air on the floor and permitted the warm air to freely flow from this register into the hall.

When one considers the number and variety of mistakes in warm air furnace heating which have a strong, a very strong, tendency to prejudice the average householder against warm air furnace heating it would seem to emphasize the necessity for establishing in each State a system of issuing permits to mechanics after an examination as to their ability to install a warm air furnace in a scientific manner.

Many examinations of defective warm air furnace heating plants disclose the fact that too little attention is given to both air supply and draught. Without a supply of air at the base of a furnace warm air cannot be obtained in the rooms, and this fact is so simply plain that we are more than surprised that any mechanic capable of installing a warm air furnace does not readily understand this feature.

No warm air furnace has a draught of its own. This must be supplied by the chimney and the smoke pipe leading from the furnace, and unless these be properly constructed and proportioned it would be useless to look for good results from an otherwise correctly installed warm air furnace heating plant.
Highway Culverts

A DESCRIPTION OF THE COMMON TYPES OF ROAD CULVERTS AND THE METHODS OF THEIR CONSTRUCTION—PROPER REENFORCEMENT

By Paul Chesterton

The name "culvert" is one of rather broad application, its use ranging from the case of a small pipe or opening under a roadway to that of a small bridge spanning a running stream. The difference between a culvert and a bridge is not very clearly marked; a large culvert may be called a small bridge, and a small bridge is but little different from a large culvert. It is commonly considered that a bridge is intended as a crossing or roadway over a stream or gulch, while a culvert is used to allow the passage of water under an ordinary roadway.

Since the material from which the culvert is constructed is always subjected to dampness from the earth surrounding it, concrete has proved of great value for this class of work. The strength of concrete when mixed in proper proportions, and the smoothness of surface possible when concrete is used as an interior water passage, are also important factors to be considered. The old-time ditch with rough stone sides, and with a top covering formed of slabs of stone more or less closely laid, is now replaced by concrete which is mixed at the site and placed with but little trouble. The strength of the slab in the old stone culvert was limited by the strength of the stone. In concrete work, steel may be used, if desired, to provide strength where the stone is weak, thus allowing a greater overhead loading capacity for the culvert.

Culverts may be divided into three distinct classes:

1. Box culverts, which are rectangular in section.
2. Arch culverts, which have arched tops, and, in some cases, arched floors.
3. Pipe culverts, which are circular or elliptical in section.

The circular type is the more common form of pipe culvert.

Fig. 1 shows four types of box and arch culverts. Pipe culverts are often cast in sections at a place away from the site of installation, and then transported and laid in sections. It is claimed that circular culverts, even when cast in sections and hauled for some distance to the place where they are to be used, are considerably cheaper than ordinary cast-iron pipe of the same size which might be used for the purpose.

Figs. 2, 3 and 4 illustrate types of culverts as taken from practical designs. In connection with these figures, it may be well to explain the meaning of the names given to the various parts of the construction. In Fig. 3, the rounded passage through which the water flows is called the "barrel" of the culvert. The bottom part of this passage is called the "invert." In Fig. 3, this invert is formed of cobblestones. The arched part is called the "arch-ring," and each end of this ring rests upon "side walls" or "abutments." These abutments, in turn, may rest upon the foundations, if the soil is such that foundations are needed. At the ends of the barrel of the culvert, two end walls are shown rising up above the road level. The part of these end walls which is located between the arch-ring and the road level is called the "spandrel wall," while the part of the wall from the road level upwards is called the "parapet." This parapet wall is
often called the "coping." The parts of the end walls extending each side of the spandrel are referred to as the "tail-walls." Sometimes the spandrel wall and the tail-walls are referred to merely as the "retaining walls." The widened part at the base of the end walls may be spoken of as the "footing."

The length of a culvert is measured in a direction parallel to its axis; while in referring to a culvert in terms of the size of opening, the width of opening should always be given first, and then the height. For instance, a 4 by 3-foot culvert is one 4 feet wide across the opening, and 3 feet high from the "bed" or bottom surface, upon which the water flows, to the "cover" or top surface of the passageway through the culvert.

In Fig. 2, in addition to the parts already named, an "apron" and "wings" are shown. The "wings" are the sloping walls which are shown projecting outward from the side walls in the lower right-hand part of the figure. These wings act as a guide in directing the flow of water, and hold back the embankments, thus preventing a washing away of the earth at the sides of the culvert. The flat slab shown projecting downward into the ground at the outer ends of the wings is called the "apron." The object of this apron is to prevent the action of the water from undermining the concrete which is used as a bed or invert in this type of culvert. The best time to build culverts is during the summer months when the ground is free from frost, and when there is little or no water to be disposed of during the construction. If the presence of water is unavoidable, dams should be built which will turn the water temporarily in another direction, or a flume of boards built through the structure for temporary use, as shown in Fig. 4.

The size of the excavations needed for the placing of the culverts will depend upon the size of the walls, the thickness of the slab, the amount of footings or foundation needed, and the dimensions of the culvert in general. Figs. 2 and 3 will illustrate this point. The footings in ordinary soil may be placed directly in the trenches dug for them. These footings should be made wide where soils are soft; and in case of marsh or quicksand, it may be necessary to excavate to hard soil and fill in with gravel rammed well into place, or piles may be driven to form a support for the upper layers of concrete which form the footings under the side walls.

After trenches of the necessary width have been provided, lay whatever footings are necessary for the side walls in the case of box and arch culverts. The next step is to provide the forms necessary to use in...
placing the remaining parts of the structure, and fill the spaces between the forms with concrete. In small work, the concrete for the whole culvert should be placed at one operation if possible. In large work, this may not be possible; but the points for joining the concrete placed at different times should be located in such a manner that the strength of the culvert is not lessened.

In the case of an arched culvert, the footings and side walls may be laid at one time and extended upwards as far as the line where the curve of the arch begins. After this point is reached, the forms for the arch ring and wings, or spandrel and tail walls, may be set, and the concreting continued. Where a rectangular opening is used, the bottom or invert, if of concrete, may be laid, and then the forms for the side walls set immediately in place while the bottom concrete is still wet. Figs. 2 and 4 show the construction forms for box and arch culverts, and will be explained later. In Fig. 4 the outside forms are usually carried upwards about three-quarters of the distance from the beginning of the curve of the arch to the crown or top of the arch. This is to hold the wet concrete in the proper place, since it would flow down over the sides of the outside forms if not supported.

The quality of concrete for use in culverts varies from a mixture of 1 part Portland cement, 2 parts clean sand, and 4 parts broken stone about 1½ inches in size or smaller, to a 1:3:6 mixture, using a 2½-inch stone. The richer 1:2:4 mixture is used for top slabs where heavy loading occurs, and also in the side walls of large culverts. Abutment walls and wing walls may be built of a 1:2:5 mixture, while the weaker 1:3:6 mixture is used in larger foundations and footings. A mixture of 1 part Portland cement and 5 parts clean bank gravel is often used in the end or parapet walls. The concrete should be wet, and rammed well into the forms.

**Reinforcement for Culverts**

Although plain concrete will generally be sufficient for small road culverts, reinforcement consisting of steel rods, or of some form of wire fabric or expanded metal, may be used to advantage in large structures, or where heavy loads are to be carried when the culvert is located near the surface of the road. In the box culvert, the steel rods should be placed near the bottom of the top slab and near the inside surface at the side walls and invert. This steel aids in strengthening the concrete against bending due to loads on top of the culvert and to earth pressure on the sides. These rods or main reinforcing members of the fabric extend across the short dimension of the slabs, and are placed vertically in the side walls. A few small rods are placed lengthwise in all walls to prevent shrinkage cracks. These rods are not needed if fabric or expanded metal is used. If there is danger of settling of the bed of the culvert, steel should be placed lengthwise in the concrete invert, and located near the bottom of the invert slab. Rods bent into the shape of an L should also be placed along all edges near the outer surface, with one leg of the L in the top or bottom slab, and the other leg in the side walls, or a short piece of fabric. This is to prevent cracking at the outside edges. All inside corners should be well filleted, so that no sharp angles are present. This feature is clearly shown in Fig. 2.

When expanded metal is used, the steel is placed in the slabs and side walls about one-half inch in from the inside surface. The reinforcement in the side walls should be placed so that the diamond in the mesh is vertical. The top and bottom slabs should be reinforced in such a manner that the diamond goes from support to support. Reinforcement for the top slab should be long enough to extend across the slab and through the thickness of both side walls, as shown in Fig. 5. The Northwestern Expanded Metal Com-
pany, of Chicago, publish valuable data as to sizes of culverts, giving thickness of walls and slabs, together with the amount of expanded reinforcement needed in various cases.

The reinforcement of arch and circular or pipe culverts is placed near the inside surfaces at top and bottom, and near the outer surface on the sides. This reinforcement may consist of either rods or wire fabric.

The construction of wood forms for both box and arch culverts is clearly illustrated in Figs. 2 and 4. The use of heavy lumber is advised on account of the weight of concrete which must be rigidly supported while hardening. Supports are placed at intervals of two or three feet throughout the length of the barrel.

Wood forms should be constructed in such a manner that they may be easily removed, and used again if desired. The directions given in Figs. 2 and 4 make allowance for this, as shown. The forms for the arch-ring shown in Fig. 4 are made solid, but are supported by wedges upon the tops of the side-wall forms. The thickness of the wedges shown should be sufficient to allow the easy removal of the arch forms from the barrel when the wedges are knocked out. The strips of sheet metal shown protect the crack left between the side forms and the forms for the arch ring.

Several types of collapsible metal culvert forms are in the market. These may be used many times, and are rigid and easily placed in position. When a collapsible form is to be used, the ditch is dug, and coping or wing forms are placed in position. Then a bed of concrete is laid up to the point that the culvert is to occupy, and the collapsible form placed on this bed of concrete, the ends fitting into the proper places in the coping or wing forms. The concrete is then placed around the forms, and allowed to harden. After the concrete has set, the forms are removed by allowing them to collapse to a smaller diameter, which will permit of their ready removal from the concrete.

While some advocate the removal of forms after a period of two weeks, it is safer to allow them to remain in place for a month if possible, allowing no traffic over the culvert for the first week, and as little as possible during the first month. After the forms are removed, the earth-fill should be watched for a time to see that it covers the concrete to a depth of from 12 to 18 inches at all parts. No ruts should be allowed to form.

If it is necessary to keep the roadway open at all times, a culvert may be constructed in length of about nine feet. Thus, after the forms have been removed from one section of the length, they can be moved along, and the remainder of the culvert built.

Attention should be paid to the following points which may control largely the success of concrete culvert work:

Provide solid material under all walls. Use clean materials and plenty of a good grade of cement. Provide good, strong forms, and have them clean before placing. After placing, grease forms with crude oil to prevent the concrete from sticking. Use wet concrete well rammed to place. Do not lay concrete in freezing weather. Cover new concrete from the effect of the sun, and keep it moist. Do not attempt to remove your forms too soon; leave the concrete undisturbed until it has well set. Handle concrete intelligently, and it will last for centuries.

**Painting on Brickwork**

If you have a wall of brickwork, and the bricks are very soft, then broom down clean and apply a size of acid water, just enough muriatic acid to sour the water. Let this be rinsed off with clear water, let it dry, then apply all the raw oil the wall will take. This is for a first-class job, and the oil will prevent the chipping of the brick afterwards. The oil makes the soft bricks harder, and also waterproof. Hard bricks will not need so much oil. Where the wall has been filled with raw oil the first coat of paint should be of good quality, and according to what the finish is to be; if to be painted like wood, it should be thinned with oil and turpentine until the last coat, which should be done with all oil. But if a dead brick finish, then use all turpentine color, for the finish, though the priming may be all oil, and the next coat or two, half and half, as the dead effect is surer on a partly lustrous ground, or on a perfectly full luster.

**Artificial Aging of Wood**

It is sometimes desired, for artistic reasons, says La Nature, to give certain wooden articles a tint or aspect that makes them look older or more used. From a translation of this article in the Literary Digest we note that the coloration of the wood by impregnation, to imitate old wood, does not generally give satisfactory results. When the wood is subjected to the action of ammoniacal gas in the presence of air and superheated steam, the effects obtained come nearer to the natural effects of age. The best way to imitate old wood is to subject it to the slow action of moist air and ammonia.

For this purpose, the wood is placed in ditches in moist soil, free from bacteria, not clayey and not too sandy, containing a little humus, and treated with 1 to 2 per cent of lime and sal ammoniac. Cinders do very well for the constitution of this soil. Amateurs may profitably use this receipt to age certain articles artificially and give them a more artistic or more antique appearance.

**A Good Shot**

"Paw wants a bottle o' liniment and maw wants a bottle o' china cement right away."

"All right, sonny. What's wrong."

"Maw hit paw with the sugar-bowl."—Judge.
How to Install a Motor-Boat Engine

DIRECTIONS FOR PUTTING IN THE FOUNDATION TIMBERS OR ENGINE BED—CONNECTING UP THE VARIOUS PARTS OF A SMALL BOAT ENGINE.

By A. E. Palmer, M. E.

THE success with which a motor boat may be operated and the degree of satisfaction it gives its owner, depends so much upon the proper installation of the motor that this phase of the motor boat subject should receive the most careful attention that the builder is able to give.

There are so many types of installation, depending upon the type of motor and boat, that space will not permit of a lengthy discussion here, but the writer will select as his theme the installation of one type as being typical of the operations necessary to correctly placing a marine motor. The general method of procedure for all installations is the same, varying only in point of detail.

We will assume that the shaft log is bored and ready to receive the propeller shaft. The next step is to design the engine foundation.

In selecting wood for the foundation, some care must be exercised. Procure some good pieces of oak as free from flaws and knots as you can find. The engines up to 15-h. p., use two-inch stock, and for engines above that rating, three-inch lumber is better.

Place your boat upon suitable support and level it both lengthwise and sideways. In leveling lengthwise, place a straight edge along the keel, inside the boat and then place a spirit level on the straight edge. In leveling sideways, place straight edge across the coaming.

Having leveled the boat and blocked it so that it will maintain this position, stretch a strong string through the center of the shaft log hole and extend it into the boat some distance beyond the proposed engine foundation. Be sure that this passes exactly through the center of the hole in the shaft log and not to one side or the other. Say the shaft log hole is 138 inches in diameter, then with a rule, measure the distance from the sides of the hole to the string and adjust the string until the distance from any point on the circumference is exactly 11/16 of an inch. Secure the string in this position. This string represents the center line of the engine and propeller shafts when in position.

Having determined the size of engine bed needed, cut out two or three cross pieces to conform to the shape of the boat and upon which the bed timbers are to rest and to which they are secured by means of lag screws. The side timbers are the next pieces to shape, which may be done in the following manner: Measure the distance on the motor from the center line of the crank shaft to the lower face of the crank case flange. This dimension will be the distance from the string to the top face of the bed timbers at all points. Shape the side timbers and cross pieces something after the pattern shown and bolt the whole frame together by means of lag screws before placing in the boat to receive the engine. The cross member may be bolted directly to the keel by means of bolts put through from the under side of the boat. In putting these bolts in place, put a washer under the head and coat it with thick lead paint before drawing up tight on it, thus preventing leakage at this point.

After the foundation is in place, measure the distance from the string to the top face of the bed timbers again, in order to be sure that the face of the timber is parallel with the string. Secure the bed to the keel by drawing down on the bolts after you have measured to find whether or not the center line of engine bed is directly over the center of keel. Remove the string through the propeller shaft hole and place the engine on the bed timbers. Insert the propeller shaft and secure the outer stuffing box temporarily in place with small screws. Suspend a plumb bob from one head in line with the keel center and arrange to adjust this line so that it can be brought to within an eighth of an inch from the end of the propeller shaft. Chalk the end of the propeller shaft and find the center with a pair of dividers and place a prick punch mark at this point. Now bring the plumb bob line close to the end of the shaft and adjust the stuffing boxes until the plumb line falls directly over the prick
center of the engine shafts are directly over the center of the boat. Now mark on the timbers the position of the bolt holes in the flanges of the motor bed, then remove the motor from the foundation and bore the holes in the bed timbers to receive the holding down bolts. Replace the foundation; line it up again with the keel and with the spirit level placed across the top, then secure permanently to the keel. Put engine on the bed, place flange and coupling bolts in place loosely and then wait for the final lining up until the boat is in the water.

The fuel tank is usually placed in the bow of the boat and the fuel led to the motor through copper or block tin pipe. Copper tanks are best for holding gasoline, but rather expensive. A good heavy coated galvanized iron tank, riveted and well, soldered, gives very satisfactory results under all ordinary conditions. In making gasoline connections, all points should be smeared with ordinary brown kitchen soap, as this is more effective than white lead for this purpose. Two stop cocks should be placed in the fuel supply pipe, one at the tank and one near the carburetor, to prevent loss of fuel in case there should be a leak somewhere in the pipe line between the tank and the carburetor.

The water intake pipe should lead from the pump to a point in the boat far below the water line, close to the bottom, and there, should be a stop cock placed thereon to shut off the water supply when the engine is at rest for any length of time, to prevent the water from escaping into the boat should there be any leaks in the connections or around the pump plunger. It is well to make the connection between the pump and the intake with a wire bound rubber hose, as this eliminates the possibility of the vibration being transmitted to the intake connection which would tend to work it loose at the planking. This same principle applies to the water outlet which should be piped to a point above the water line.

There are virtually two kinds of exhaust installations; namely, the atmospheric and the under water exhaust. In the atmospheric exhaust system, the pipe is led from the engine directly to a point above the water line. Sometimes it is advisable to use a muffler with this type of installation, owing to the disagreeable noise.

It must be born in mind that the engine is not permanently set, up to this point and any connections that will tend to bind should not be made fast to the engine until it is lined up and bolted down permanently. This last operation will take place after the boat is launched. In the meantime, however, we may proceed with the other branches and get everything ready for the final "connecting up." All holes that are to be bored below the water line should be done now and connection secured to them permanently. Do not wait until the boat is in the water and then bore them, unless you are fond of bathing.

We will take it for granted that the boat is now launched and all that remains to be done is the final lining up of the engine with the propeller shaft. Bring the faces of the engine and propeller shaft close together and insert four strips of paper between them, at 90 degree increments. Notice if the tension on each strip of paper is the same. If not, adjust the engine bed by placing shims under it until the strips of paper are held with equal tension. Draw down on the bolts, keeping an eye on the coupling and the paper strips. Now draw up the coupling bolts, bringing the faces of the coupling together permanently.

It is a good scheme to pour melted babbitt around the engine bolts where they come through the frame, in order to guard against any sideway or lateral movement while in action.

The installation is now complete, and the motor is ready for its trial run.

Fire-Extinguishing Hand-Grenades

These are well known, and like most other means of extinguishing fires, they do good service if used soon enough. The composition with which they are filled varies greatly, and some of the recipes call for expensive salts which are of very little use. Ammonia and carbonic acid are two of the most efficient agents, but they are difficult to keep and to apply, carbonic acid, at least, requiring special arrangements and appliances. If carbonate of ammonia were a little more soluble than it is, it would be the ideal salt for this purpose. A solution of equal parts of alum and sulphate of ammonia, dissolved in water and diluted so that the liquid is about half saturated, has been highly recommended for filling these grenades. Any good sized bottle may be used to hold the liquid.
How to Make a Bed-Room Set

COMPLETE DETAILED INSTRUCTIONS WITH ITEMIZED STOCK BILL AND WORKING DRAWINGS SHOWING HOW TO MAKE A BED AND A CHIFFONIER

A bed of simple construction is shown in the accompanying drawing. The objection to most wooden beds is their excessive weight. This bed is so planned as to overcome that objection. In fact, some may prefer the heavier construction; although this one when made of mahogany, or birch, stained mahogany, makes a very attractive appearance.

STOCK BILL FOR CRAFTSMAN BED.

Posts, 2 pieces, 2½ by 2½ by 50½ inches, S-4-S.
Posts, 2 pieces, 2½ by 2½ by 42½ inches, S-4-S.
Rails, 4 pieces, 1½ by 1½ by 58 inches, S-4-S.
Spindles, 7 pieces, 1 by 1 by 31 inches, S-4-S.
Side rails, 4 pieces, 1 by 1½ by 75½ inches, S-4-S.
Side rails, 8 pieces, 1 by 2 by 5 inches, S-4-S.
Keys, 8 pieces, 3 by 3½ by 3½ inches, S-2-S.

Begin work by squaring the posts to length and putting on the chamfer at their top ends. Next, lay out and cut the mortises in them. Next, cut the head and foot rails to length, square the ends, lay out the mortises for the keys and then shoulder the tenons.

The spindles are to be tenoned into the rails, snugly fitted and well glued; for upon them, to a great extent, depends the strength of the head and foot steads. The side rails are to be built up by making two frames, one for each side, in which the short verticals—four on a side—are well tenoned into the long rails. For fastening these side frames into the posts one can purchase at the hardware store fixtures especially designed for this purpose.

On account of the small amount of material needed to make this piece of furniture one may well afford to get the genuine mahogany and finish the piece natural. Since the natural color of mahogany is rather insipid it will be advisable to apply a coat of some good mahogany stain first. Rub this lightly with some No. 00 sandpaper and then apply a coat of filler colored to match the stain. Remove the surplus filler when it has flattened, in the usual way, and allow it to harden over night. Sandpaper the filler lightly, then
apply a coat of shellac. Allow the shellac to harden then sand it lightly. On this shellac apply several coats of some good rubbing varnish. Rub the first coats with hair cloth or curled hair and the last with pulverized pumice stone and raw or crude linseed oil.

How to Make a Chiffonier

THE Chiffonier is much more difficult to make than the bed, but will be found within the ability of anyone familiar with tools.

**STOCK BILL FOR CHIFFONIER.**

- **Posts**, 4 pieces, 1½ by 1½ by 46 inches, S-4-S.
- **Front rails**, 6 pieces, 1 by 1½ by 29 inches, S-4-S.
- **Facing**, 1 piece, 1½ by 4½ by 29 inches, S-2-S.
- **Side rails**, 12 pieces, ½ by 3 by 14¾ inches, S-4-S.
- **Side panels**, 10 pieces, ½ by 5 by 14¾ inches, S-4-S.
- **Back rails**, 6 pieces, ½ by 3 by 28¾ inches, S-4-S.
- **Back panels**, 5 pieces, ½ by 5 by 28¾ inches, S-4-S.
- **Top**, 1 piece, ½ by 17½ by 33½ inches, S-2-S.
- **Mirror supports**, 2 pieces, ½ by 6 by 15 inches, S-2-S.
- **Mirror supports**, 1 piece, ½ by 2½ by 22½ inches, S-4-S.
- **Mirror frame**, 2 pieces, ¼ by 1½ by 14½ inches, S-4-S.
- **Mirror frame**, 1 piece, ¼ by 1¾ by 20½ inches, S-4-S.
- **Mirror frame**, 1 piece, ¼ by 3½ by 20½ inches, S-2-S.
- **Mirror backing**, 1 piece, ½ by 12½ by 18½ inches, S-2-S.
- **Drawer fronts**, 5 pieces, ¼ by 6½ by 28 inches, S-4-S.
- **Drawer ends**, 10 pieces, ½ by 6½ by 14 inches, S-4-S.
- **Drawer backs**, 5 pieces, ½ by 6 by 28 inches, S-2-S.
- **Drawer slides**, 10 pieces, ¾ by 1½ by 15 inches, S-4-S.
- **Cleats**, 2 pieces, ½ by 1½ by 10 inches, S-4-S.

The chiffonier is best made of white oak, quartersawed being preferable. Begin work by squaring the posts to length and plowing the two inner surfaces of each, the faces, so that the ends of the panels and rails may be inserted. The simplest construction, and one that will serve the purpose well, is to plow a rather deep groove in the posts the full length of the paneling and then make the tenons of the rails of a length and thickness to fit this groove, shouldering...
them flush with the surface of the post. Plow the rails and cut them to length. The length of the panels will be the same as that of the rails. No detail is given for the back paneling. It is to be made up the same as that of the sides, the pieces being the same width, only longer, of course. Scrape the parts and glue up the sides of the chiffonier. In putting on this glue be careful not to get it on the edges of the panel as the panel must be free to shrink or swell freely.

Cut the front rails to length and tenon them ready to be fastened to the posts. Place the back panel and the front rails and place the whole in the clamps. The cleats are to be fastened to the posts. On the front posts it will be necessary to trim off the back of the rails somewhat to permit of this. Of course a separate frame might be tenoned up for the support of each drawer if wanted. This latter construction would be stronger, giving added stiffness to the frame of the chiffonier.

While the glue is hardening on these the drawers may be made up. They are to be constructed in the usual manner by dovetailing the sides to the front and plowing the sides and front to receive the bottom and back.

The drawing shows clearly the manner of making the mirror frame and support. For the curved supports a templet of heavy paper or cardboard will be needed. The top of the mirror, too, and the facing of the front of the cabinet will need to be worked from a half-templet so as to get both halves alike. The mirror frame is to be rabbeted to receive a plain plate glass with the necessary backing. The mirror support is to be fastened to the chiffonier body with cleats and screws so that it may be taken off in moving. The mirror may be fastened to its support either by means of wooden dowels, or patent metal fasteners for that especial purpose may be purchased at the hardware store.

The front facing should be tenoned and placed in grooves cut in the posts, at the time the front rails are assembled.

The simple ornament on the mirror is the Fleur-de-Lis and is to be fastened in place with glue and brads.

**The Mortgage — A Valuable Asset**

By R. B. Buckham.

Doubtless the reader well remembers that seven years after the Pilgrims landed at Plymouth, a second band of new-comers followed them, and eventually settled at what is now Salem, Mass. From these two beginnings came the development of the Bay Colony, and the country at large. In this connection, it is of the utmost interest to note that the first instrument of record in the Registry of Deeds at Salem is a mortgage. It is a quaint instrument, brief and to the point, and is as follows:

"Thomas Dexter, of Lyn, yeoman, by his deed dated 22d. of Octob 1639 hath mortgaged his fearme in Lyn, conteyning about — — acres, with all his houses, meadows and broken grounde thereon, for 2 oxen and 2 bulls, upon condition of payment to Symon Broad-street of Ipswich of 90 lbs. the first day of August then next following, with a reservation upon the sale of said fearme to give the said Dexter the overplus above the debt and damages of the said 90 lbs."

From that day to this, as frequent an instrument as any to be recorded at this Registry is the mortgage.

A great many people have an indescribable dread of and aversion to the mortgage, and look upon it as a thing to be avoided, as far as possible. As a matter of fact, however, it is the source and means of untold blessing, an asset which the great majority of us could not well get along without, and yet live as well and comfortably as we do.

As long as it is rightly used, the mortgage is a most convenient and efficient business assistant. It is only when grossly abused and neglected that it becomes troublesome. Like fire, it is a good servant, but a very poor master.

The carpenter especially has frequent occasion to make use of its good offices. It is far from prudence and business foresight on his part to avow that he will have nothing whatever to do with it. It is no enemy of his, no treacherous foe, lurking in hiding for a chance to accomplish his undoing, but a helpmeet and friend, whose services are of the utmost value.

It is a well known fact that the city of Chicago was almost entirely rebuilt after the great fire by means of the mortgage. And it proved the best possible means of restoring the afflicted city. All of our great railroad systems, and colossal industrial enterprises have been built up in the same way. Even our municipal corporations acquire and pay for most of their public improvements by the same means.

It is in this way, too, that the carpenter can better his circumstances, build up his business, enlarge his opportunities. It is business man’s method of financing a business undertaking. It is, of course, satisfactory to hear one state that his home is clear of any mortgage, and that he owes no one a single dollar. But there is nothing more commendable than the course of the man who has secured a home for himself and family by means of the mortgage, who otherwise would have none. Think twice before abandoning the idea of a home, through distrust of the mortgage.

A mortgage is, in reality, nothing but a contract, a business arrangement, an agreement on the part of the promisor to pay a certain sum of money at a specified time, to insure the performance of which he pledges his home as an additional security.

The several states are constantly passing legislation to encourage and facilitate the use of the mortgage as a means of doing business. At this very time such a measure is being urged on the legislature of Vermont;
to exempt mortgages from taxation, some of the reasons being advanced for such action being as follows:

"Because it would give the private individual a chance to loan his money at home, instead of driving it out of the state.

"Because it would enable a man with a farm to sell to deal with a young man of limited capital.

"Because the young man of limited capital would have a better show of paying for his farm.

"Because it would help the laboring man who is trying to acquire a home.

"Because it would mean cheaper money, which would help build up all lines of business."

All of which must be admitted as certainly true.

There is an old Arabian axiom to the effect that "a blank page is a fool's page," which might well be interpreted to mean, in this connection, that the contractor in need of capital, who persists in showing a blank page as his list of obligations assumed, is not pursuing a wise and justifiable course.

How They Build Elevator Bins

Wooden Grain Bins in Huge Seattle Structure

A branch of carpentry work that is interesting because of its rarity, at least on such a large scale, is illustrated in the accompanying photograph. This is a wooden grain elevator of huge size recently erected at Seattle, Wash. It is divided up into units or bins, each bin being about 12 feet square.

The bin walls have to be exceedingly strong so as to withstand the lateral pressure of the grain when one bin is filled and the bin next to it is empty. In order to gain this necessary strength the wall construction illustrated is made use of. The walls are built up of 2-inch planks of a width depending upon the size of the bin, 2 by 10 being a common size. These planks are thoroughly spiked together; the corners are made with alternating over-lapped joints and are also reinforced with iron rods set in across the corners about every tenth plank, to give additional stability. Walls built up in this way are well liked for grain bins, since, in addition to being very strong, they present a flat, smooth surface on both sides.

This photograph shows the work on the elevator as just beginning. An interesting feature is the lumber conveyor which is a great labor saver in carrying the lumber to the different parts of the job. This conveyor is simply a series of "live rolls," chain driven. The laborers stationed along the conveyor at intervals pick off the planks needed as they are carried along.

Stipulation for Foundation Below Ground

A building contract required the contractor to put a foundation wall under the building four feet below the ground. The grade sloped, being higher in the front than in the rear of the building. The contractor placed the foundation in the rear upon the surface of the ground and, by filling, increased the level of the ground two feet above the bottom of the foundation. It was held that this was not a compliance with the contract, the owner being entitled to have the foundation four feet below the surface, in order to protect it from frost, etc. Villanuer v. Gross, N. Y. Supreme Court, Appellate Division, 122 New York Supplement 520.
The new $35,000 building to be occupied jointly by the Berwyn Club, the Berwyn Blue Lodge and the public, is illustrated herewith. It is to occupy the site of Oak Park Avenue, between 30th and 34th Streets. The corner stone of this building is to be laid July 4th.

Berwyn has felt the need of a building of this kind for some time. Both the Berwyn Club and the Masonic Fraternity were in need of better and more adequate quarters; and a public auditorium was badly needed. Realizing the possibilities of this situation, some of the leading men of Berwyn got together and organized what is known as The Auditorium Association, with Mr. C. W. Ostrander as President and Mr. Geo. H. Anderson as Treasurer. This association, with the help of G. W. Ashby, Architect, of Chicago, have worked out the problem of making provision for this three-fold need within the walls of a single building. A study of the floor plans will show how this is done. The Club quarters are in the forward wing, occupying both first and second floors. The Public Auditorium, having a large seating capacity, occupies the first floor of the rear part. The second floor of this part is given over to the Masonic Hall, and the rooms connecting with it. Each division has its own entrance, so as not to interfere with any of the others.

Mr. H. A. Sellen, President of the Berwyn Club,
expresses himself as being very well pleased with the new accommodations that the club is to have in this building. Mr. Wm. H. Gaylord, Worshipful Master and Mr. W. F. Struckmann, secretary of the Berwyn Blue Lodge, are equally well pleased with the Masonic Hall and rooms. It is certain also that the Auditorium, which is to be used for lectures, musicals, etc., will meet with general public approval, since it will meet a long felt want.

To Buy Ice With

Rich man (to beggar)—Not a cent! Remember that you will have your reward in heaven.

Beggar—Will I? Then lend me five dollars now and I will pay it back then. I'll drop it down the chute.—_Fliegende Blätter._

When Delay is Caused by Owner

A factory building contract called for completion by a certain date. On that date the building was completed except as to a loading platform. The construction of this platform had been postponed by request of the owners and afterwards erected promptly on request and as directed by their superintendent acting under their instructions. It was held that the building was "completed" at the required date within the meaning of the contract. _Iron Clad Mfg. Co. v. Thomas B. Stanfield & Son_, Maryland Court of Appeals, 76 Atl. 854.

Agreement to Pay for Extra Work

An owner let a contract for the carpenter work and one for the mason work to different contractors. During the progress of the work the contractor for the carpenter work found that the mason work was being done in such a defective manner that the cost of the carpenter work would be far greater than had been contemplated. He therefore refused to finish the work unless promised extra compensation. The owner signed an agreement to pay him $350 extra. On completion of the work he paid $25 and refused to pay the remainder, alleging that there was no consideration for the agreement to pay extra compensation. It was held, however, that the plaintiff was not bound to do the extra work rendered necessary by the defective mason work, and that this extra work was a benefit to the owner and a detriment to the plaintiff and hence a good consideration for the promise to pay thereof. _Marten v. Brown_, New Jersey Supreme Court, 76 Atl. 1009.

Boring into End Wood

Here is something about boring holes in end wood. This is a stunt that causes some trouble, especially if the fiber of the wood is coarse, as in North Carolina pine, chestnut, etc. The trouble starts with the worm of the bit sliding off each side of the hard fiber, or annular ring. This can often be remedied by hitting the end of the wood a sharp blow with a hammer, compressing or bruising it, then the worm will start, as though the wood was as dense as box wood. I find the best way to do end boring is to have a bit with a worn or point without threads put in a lathe or horizontal boring machine. Run it quite fast, but not too fast, as it will burn and smoke and take the temper out of the lips of the bit.

_WILLIAM C. JASBURY._
CONTINUING the study of the stair-building problem begun last month, the mechanic will now proceed to lay out the constructive details of the stairway, which includes many details that were not included in the construction of the example presented in the February issue.

The first operation will be the laying out of the stringers. The front stringers of the three flights containing straight steps only, will be laid out in the ordinary way, either by using the steel square as a tool or the pitch-board as a template, to mark upon the stringer board the groove lines for the number of steps each stringer will have to contain. The builder will consult his plan drawing to ascertain the exact number required for each stringer.

The method of laying out the wall stringers is shown in Figs. 17 and 17a. Fig. 17 represents the plan of either intersection of the flight as shown in Fig. 14 (May number) where the winders are indicated. The heavy lines of the flyer steps and of the winders indicate the nosing lines; and the dotted lines running parallel represent the risers.

From this diagram, measurements may be taken to cut out the winders and also to mark the grooves upon the wall stringer board.

Fig. 17a represents a portion of the two intersecting wall stringers laid out. It will be observed that they intersect at the corner, a. The upper edge of the two stringers at this point is made to measure the same above the nosing of the winder as the upper edge of the stringer does above the nosing of the common steps of the flights.

In laying out such stringers as these, containing winders, the stair-builder finds that he will have to joint a piece to the top edge of one and to the bottom of the other, so as to make them wide enough to contain the winders. The added pieces are shown in Fig. 17a at m and m respectively. The intersecting corners shown at x and y are sometimes left as shown, but in the best class of stairways, they are always ramp; that is—the abruptness of the angle is worked into an easement. Two different methods to work such examples were given in the February issue.

In regard to the front stringer, the plan view, Fig. 17, shows it housed into the newel about 1 inch deep. It is only the inside layer of the stringer that is housed. The outside layer is usually planted upon the inside when the stairway is being built. It may be a panel stringer, or it may be made up of parallel mouldings; but of whatever design, the usual method of construction is to nail it upon the face of this inside layer; the one that has been grooved to receive the treads and risers. It is the inside only that really needs being housed to the newel; in as much as it is the one
which supports the steps. The outside layer is merely used for decoration, needing no housing but rather a good fit between the newels when in position.

The reader will observe that I am dealing here with a "closed" front stringer—one grooved for treads and risers, not "cut and mitered," as was the subject of consideration in the February issue. The "closed" stringers are always made in two layers, while the "open" or "cut and mitered" are always made of one board, occasionally decorated with face brackets, which are neatly mitered to the projecting end of the risers beyond the face of stringers. As I will have occasion to again refer to the stringers when dealing with them in connection with the balusters, I will now proceed to explain how stair-builders layout and construct the round steps which are shown in Fig. 18, placed at the starting of the stairway.

Here is shown a plan drawing of the two round steps, both semi-circular but of different diameters. This figure must be drawn full size, because it will be the base of operation for risers, treads and the blocks which will be needed to bend the veneered risers. The curve of the two steps are drawn from the same center, as shown, it is fixed outside the face of newel and stringer, at a distance of from 1 to 2 inches, so that the steps upon entering the grooves prepared for them, in the newel and stringer, will enter with that much tangent to the curves. The dotted parallel lines in this figure, indicate the thickness of the risers and the heavy lines those of the nosing of the treads.

The only difficulty attending the construction of these steps pertains to the bending of the risers. The easiest method of operation is the one known as "kerfing," which calls for but the labor of making a number of saw cuts at equal distances upon the inside of the riser, to a certain depth, leaving a thin veneer on the outside. The saw cuts to produce a satisfactory job will, of course, have to be properly spaced.

An operation very much superior to the kerfing method is shown in Fig. 20, which represents an assumed full size plan drawing of the second riser shown in Fig. 18 entering the newel post. The riser is shown veneered in Fig. 20 and tightly bent around a solid block. The block is shown in diagram A made up of 2-inch layers glued together to the required thickness.

In diagram B is shown the riser ready for bending, having been prepared by removing the waste wood from its inside face, leaving but a thin veneer on the front face.

A method to find the exact length of the veneer is shown in diagram C. The shaded semi-circle indicates the curve to be veneered. By drawing lines through the corner of the curve, as shown, to meet in O and continue the lines on each side to the crown line, the distance a-b shown on the crown line will be the length required.

The riser is shown finished, having been bent around the block in Diagram D. The method of bending is to fasten the riser first to the beveled notch, shown at a, then bend the veneer slowly and carefully around the block up to where the wedges are shown. The wedges when driven tightly in the manner shown in Diagram E, will draw the veneer tight against the block; when it is fastened by being screwed to the solid part of the riser, as shown. Before the operation here described is commenced, the veneer and block receive a coat of glue, which when set, holds the two inseparably together. It will be observed that to prepare the veneer in the manner shown in Diagram B, entails considerable labor, owing to its being between
two solid portions of the riser. But it may be said that if the job is carefully done the labor it entails will be fully compensated in having produced a bent riser that in point of merit cannot be surpassed.

I present another method in Fig. 21, to bend the veneer for the same riser, but in this operation, the veneer is prepared by being ripped its whole length thus saving much time and labor in its preparation. To bend this veneer, two rough pieces are temporarily nailed one on each side of the block about 3/8 of an inch below the curved side, for the purpose of receiving nails driven through 1-inch slats that are used to press the veneer to the block. The block, veneer and slats, as shown in Fig. 21, plainly illustrate the process of bending by this method.

A third method is shown in Fig. 22, applied to the curve of the first riser, taken full size from the plan of the curved steps presented in Fig. 18. Fig. 22 represents the plan of the veneer riser and also the block that is to be used to hold fast the bent veneer. The block is built up of sections similar to the sketch shown in Fig. 22a, made out of 2-inch stuff. They are glued and nailed together to the form of the required block, in the manner shown in Fig. 23.

Fig. 24 illustrates the operation of bending the veneer around the block by the use of hand screws.

Fig. 25 is an elevation drawing of the two round steps, the first flight and few flyers of the second flight.

In practice this figure must be drawn full size, so that from it the length of the newels, the housing for treads and risers, in the newels, and also the templates for the easements and goose-necks of the rail may be obtained.

The reader will recall that these items were under consideration in the February issue, but here, the conditions were different than they are here. The first newel is here placed on the third step, while there, it was on the first step; and again—the second newel here contains one more step than was contained in any of the newels in the February issue. The consequence of the difference in conditions will inevitably cause a difference in the lengths of the respective newels and the size and form of the goose-necks.

It is shown in Fig. 25 how the length of the first newel may be found when placed upon the third step and the length of the second newel when it contains three steps; such being the conditions shown in plan, Fig. 14 (May number) of the stairway at present under consideration.

Referring to the first newel, as shown in Fig. 25, it will be observed that by measuring from the floor to the top of the third riser, we obtain 22 3/8 inches made up of the sum of three risers, 7 3/8 inches each; added to this sum is shown 5 inches measured therefrom to the bottom of the rail, as shown at n, which will make the total height from the floor to the under side of the rail equal to 27 3/8 inches.

When the rail is raised to its height above the steps, it will be 28 inches (2 feet 4 inches) higher than it is shown to be in Fig. 25. This therefore is to be added to the 27 3/8 inches already found, which will make the length of the newel now measured from the floor line to the bottom of the rail, when in position, equal to 55 3/8 inches or 4 feet 7 1/2 inches. By adding again the thickness of the rail and whatever desired for the cap above the rail, we will obtain the exact length of the first newel.

The length of second newel, as shown in Fig. 25, will be the sum of five risers longer, which is the difference in height from the floor line between the risers three and eight.

I have before explained how to lay out the easements and goose-necks for rails, but as the example here presented differs, and in some respects is somewhat exceptional, I will now describe how a stair-builder would go about a job like this. He will first draw the easements. The one upon the second flight will determine the height of the goose-neck upon the second newel, which will have to be in line with the easement of the second flight. Next the goose-neck is laid out as shown, the curve being described from the center O.

It will be observed that there is but a very short piece of straight rail between the goose-neck and the bottom easement; therefore one joint will suffice to connect the two, as shown. Sometimes it is decided to make away even with one joint and have the rail in one piece between the newels. In such case a template is prepared, as the one shown in Fig. 26. From this template, the material for the rail is cut out in one piece, which may be molded by machinery at a trifling cost. The knee is fastened to the neck as shown, by being glued and nailed from the top.

**A Bad Egg**

"He always was a bad egg, but nobody seemed to notice it while he was rich."

"Yes, he was all right until he was broke."
Measuring Interiors for Mill Work

HERE are undoubtedly many systems, for each man who measures up the mill work will have a method which differs in some degree from that of another man; but from my experience of the work, writes John Wavrek, Jr., in The Woodworker, I have come to the conclusion that the one which is described herein is the most satisfactory—to me at least.

In the first place, the man who takes measurements at buildings, it is needless to say, should be thoroughly familiar with every branch and detail of the planing mill; should be a practical mechanic who has had much experience, besides having ideas of his own. Often he will be called upon to make suggestions to people who are building or making alterations, and it would be greatly to his discredit if he were not able to supply them.

He often comes across people who intend to have certain work done in their houses, yet do not exactly know what they want; or, rather, do not know the details of the job. In such cases the mill man should be able to give ideas and suggestions. If he is able to do so, people will have confidence in him, while his inability to do this will be detrimental to the interest of the concern which employs him.

Careful Work for a Good Man

In some mills there is a very lax system in regard to taking data at houses for the interior finish, calling any man to do the work who may not be busy at the time there is a call to take such measurements. This is positively wrong practice, for in many instances the party who takes the measurements does not write out the cutting bills for the mill, but it is done by the foreman or some man in the office. If the data should not be very explicit, it will cause a lot of running back and forth in trying to find out the correct data, thereby squandering much valuable time, besides delaying the work; and all because the management employs the wrong method in this respect.

There are some instances which justify the bench man taking his own measurements, as, for instance, the stair man. There are some stairways which are much complicated, requiring very exact data, for a mistake in this kind of work is very costly to the mill. In such an instance it would certainly be the wiser procedure to have the stair-builder take the data himself. Sometimes there is a store front to be made which has some complicated features, and this, too, should be measured up by the man who is going to make it. However, these are exceptional cases which do not occur often. As a rule, there should be one man employed to take all the measurements.

There is another advantage in this, because of the fact that the one man gets to know the peculiarities and desires of the different contractors with whom he comes in contact, and will therefore know how to approach them and arrange to have their work gotten out according to their requirements. Another advantage to be gained by this system is that one man will be acquainted with progress of the various jobs which are in the course of construction, and can see to it that interior work for them is gotten out at the proper time, so that it can be sent on the job when needed.

How the Measuring is Done

For an example, we will assume that we are to measure up the interior of an ordinary house three stories in height. To be thoroughly familiar with the job which we are to work on it is essential that we read up the specifications thoroughly, also study the plan well. Of course, in most cases there are some changes made either in the plans or the specifications, which should be noted in the estimate or contract. This latter sheet should also be taken along to the job and note taken to see that there are no extras put into the job without being noted on the slips containing the measurements.

A very handy book to use to take data is one which has loose leaves that can be removed upon having completed the measurements, and placed on file. The sheets are in size about 5 by 7 inches, and section ruled. This ruling I find very convenient in making sketches, and especially in taking data for staircases. We will use a 4-foot rule as the most convenient for our purpose, besides a handy steel tape for the stair work.


**Top Floor**

First, then I go to the uppermost floor, which is the third in this instance, and start by taking the measurements of all the windows first. The handiest and quickest method is to take the sash sizes. Having this, and knowing the construction of the frames, we have a very good basis to work on. There would be one twin box frame, 2 feet 5 inches by 4 feet 6 inches, 1 3/4-inch jamb, 1-inch center; one box frame, 2 feet 9 inches by 5 feet 2 inches, 1 1/2-inch jamb; one skeleton window frame, 2 feet 7 inches by 5 feet 2 inches, 3 3/4-inch seat.

After having taken all the windows, proceed by taking the door sizes next. There may be an opening of 2 feet 10 inches by 6 feet 10 inches between the rough studs. This would mean a door of 2 feet 8 inches by 6 feet 8 inches. The stud, which may be 3 inches, would need a jamb of 4 3/4 inches. Whatever the rough opening is, make the door 2 inches less in size and the jamb 1 3/4 inches wider than the rough stud. However, in cases where plaster boards are used, this would be too wide, but in such case we would make the right allowance for the jamb by finding out the thickness of the wall finish. If an opening for a door should be irregular in width, as, for instance, 2 feet 9 inches, then it is a good plan to mark the studs with the correct size of the door which we intend to furnish, so that there will be no mistake made by the carpenter when placing the jambs.

When taking the size of closet doors be careful to make note of the fact, for in most cases closet doors are only 1 3/4 inch thick, while the others will probably be 1 3/8 inch. Also, very often the trim in a closet is different on the inside in cases where there is a cabinet head finish on the outside. Also measure the openings for switch-box doors, which are usually made inside the size of the box. After having taken the doors, proceed to measure up the baseboards or base, taking the closets separate, because in most cases they are different.

Next the base blocks, if any are needed, which is not always the case. Then corner beads, stating how long, for some corners will not allow of a regular 4-foot stock head being used. Sometimes it happens that a corner is not at right angles, which must therefore be stated and the correct angle noted.

In most cases there is a plaster railing inclosing the staircase on the top floor. If this wall is 4 inches thick, then furnish a cap of 5 3/4-inch wide, nosed on both edges, calculating a piece of moulding the same kind as the base cap on each side of and under this nosed cap. These mouldings should mitre into the base cap. Now measure the closets for shelving and pin rail.

**Second Floor**

Having taken all the data on this floor, take the steps and risers, nosing and strings for the stairs, which are usually the box kind; also wall rail. This would bring us to the second floor, with which we proceed in the same manner. It very often happens that this floor has different kinds of wood in the different rooms, the front room being oak or chestnut, the bedrooms cypress or pine, and the bathroom and toilet poplar. It is best to mark on the plans the various kinds of finish to be used in the different rooms, so that there is not so much chance to make a mistake; for a door which is to be made up of two different kinds of wood is expensive, as it has to be veneered and cannot very well be kept in stock.

On this floor there may also be a bay window, in which case take note of the width of space between the frames at the angles, for in many cases the regular trim is not wide enough, and a special trim must be made for these angles. If a seat is to be put in this bay window, correct measurement must be taken of all angles, length and depth, so that the seat will fit when sent to the job.

**First Floor**

The first floor is usually the hardest to measure up, for very often there is a colonnade which members into the staircase, and must therefore be measured very exact. Then there may be a paneled wainscot in the dining room, in which case the utmost care must be taken to get the figures just right, or there will be “something doing” when the paneling does not fit. A circular bay window is also one of the nightmares which often occurs on this floor. If this should have a paneled base or box seat, then your troubles are more than a few. However, be sure what you are about and go ahead.

The staircase, which is by no means the easiest part of the job, I usually reserve for the last. This necessitates the making of sketches in order to take down right so that the stair man may readily understand what is meant. Here it is very appropriate to impress the fact that whoever the man that takes the data, he should be able to make a tolerably good sketch, both instrumental and freehand, for often it is required of him to sketch the outlines of some ornamental work which has many curved lines and mouldings and which must be duplicated exactly.

It is therefore evident that you cannot pick out a man at random from the mill employes and send him out to get data. Also, there is very great responsibility connected with the work, which is not always appreciated by the mill owner. If you have the right man it is to your interest to pay him well; his path is not strewn with roses, for if anything goes wrong the man who takes the measurements is blamed first.

The data should be explicit in every respect, so that the man who writes out the cutting list for the mill may understand it thoroughly, without asking a lot of questions. It often happens that the measuring man will be out for several days in succession, and if the data is not explicit it will cause great delay in writing out the cutting list.
Plans for Story and a Half House of Seven Rooms

COMPLETE SET OF ARCHITECT'S PLANS WITH ALL DIMENSIONS AND DETAILS FROM WHICH THIS ATTRACTIVE MODERN RESIDENCE CAN BE BUILT

The accompanying perspective drawing shows a design that has been prepared to serve as a model of what a modern, convenient, low-cost house of medium size should be. The outside has been planned with an eye to artistic, attractive, and home-like appearance; and the interior has been arranged to include all the features that have been found desirable and which the present day home builder expects and demands for his new home.

The complete set of architect's drawings, from which this house can be built, are reproduced on the six pages following this. Since these plans were drawn and are here reproduced to scale, and since all the principal dimensions are given, it will be very easy for our readers to make practical use of these plans. Although these may not be used in their entirety, they will be found to contain many interesting and valuable features that can well be made use of in other work.

There are seven rooms in this house. On the first floor living room, dining-room and kitchen, and on the second floor four bedrooms. In addition to these, however, there are many small supplementary rooms which are so important in making a house convenient and livable. There is a vestibule at the front door

Model Seven Room Dwelling. Embodying all Modern Features

COMPLETE WORKING PLANS FOR THIS HOUSE ARE PRESENTED ON THE 6 PAGES FOLLOWING
FIRST FLOOR PLAN
House shown on page 61.
of ample size, from which one enters a large, square reception stair hall; a passage leads back to the kitchen and opening from this passage is the small, square toilet room. The butler's pantry is between the kitchen and dining-room, and there is also a back door entry which accommodates the refrigerator. A small closet on the stair landing gives a convenient place for coats and hats. All of the bedrooms have at least one clothes closet, the large front bedroom being provided with two. There are also two large closets off the upstairs hall. The bathroom on this floor is conveniently located. Attention is called to the fact that all the plumbing fixtures are grouped together and line up on all three floors, thus cutting down the expense for piping. The plans call for hot-water heating and electric lights.
BASEMENT AND FOUNDATION PLAN

House Shown on Page 61
Causes of Fires

The campaign against the enormous preventable fire waste of the country has naturally led to a study of the principal hazards and those which can most easily be avoided. Hazards are divided broadly into two classes, physical and moral, the physical hazards being inherent in the risk itself and in its surroundings, while the moral hazards arise from personal factors. Physical hazards may be subdivided into external and internal, the external hazards including lightning conflagration, sparks, bonfires, and exposure losses. To this cause are due 28 per cent of
REAR ELEVATION

FRONT ELEVATION

House shown on page 61
Details of Interior Finish

House shown on page 61.

all losses, both as to number and value. The internal hazards are much more numerous, and may be subdivided into five classes. These are: spontaneous combustion, the hazards due to the operation of machinery, the hazards incident to processes, those due to the various systems and kinds of apparatus used for heating and lighting, while the fifth division includes all those not already classified. The various processes of heating, which usually include the actual use of fire, are responsible for more losses than any other cause, and under this class it should be noted that defective flues are responsible for twice as many fires as any other physical or known moral hazard, and for a greater property loss than any other cause. Statistics show that 13 per cent of the total number of fires can be attributed to defective flues, with a property loss of over $12,000,000 annually. Electricity is responsible for the larger proportion of the losses due to illumination, although not for the largest number of such losses.
To Frame a Roof With Different Pitches

To the Editor: Riverhead, N. Y.

I wish to take advantage of some of your expert advice. I have a roof to frame, in which two gables intersect, some having different pitches but having the same height to the ridge. The rise of one is 4½ inches to one foot and the other is 7½ inches to the foot.

What I wish to do, is to get all of the cuts of the valley, the length of the valley and also all of the side cuts. Please show me how this may be done with the steel square, giving full explanations with each step in the working out of the proposition.

Henry C. Jeffries.

Answer: Here it is. The lines from 12 on the tongue to 4½ and 7½ represent the pitch of the common rafter for a one-foot run. Those figures give the seat and plumb cuts. Very good; everybody understands this so far. The next step is to find the corresponding run of the steeper pitch to coincide with that of the lesser pitch. Now, since 4½ is the rise of the lower pitch, the corresponding run of the steeper pitch must necessarily be less and is found by squaring over from 4½ to the steeper pitch and then plumb down to the tongue. It is found to intersect the tongue at 5; then 5 from 12 leaves 7, which represents the corresponding run of the short rafter to that of the long rafter.

The next step is to develop the plan. Set the needle point of the compass at 12 on the tongue and the pencil at 5 and swing to right angles with the tongue and draw the line AC; the plan is completed. AB represents the short run; BC the long run, and AC the run of the valley; ACD represents the plan for the other side; but it is not needed since it is the same as ABC.

The next step is to find the seat and plumb cuts of the valley. Set the compass at C, open out to A and swing to the tongue; it is found to intersect at 13¼. Then 13¼ and 4½ will give the cuts. To find the side cuts of the hip, take AF and the length of the hip, as from 13¼ to 4½ and the cut will be on the side of the square on which the length is taken for the CD side. For the opposite side substitute AG and proceed as before. For the side cut of the jacks, take AB (the short run) and the length of the common rafter for the long run, as 12 to 4½; this will give the cut for the long run side; the side of the square on which the length is taken giving the cut. Proceed in like manner for the other side but remember the length of the short rafter is only as from B to E' or as from 7 to 4½.

Another vital point that must be remembered is this. If there is a cornice on the building formed by the projection of the rafters, it should be of the same width for both parts, and the runs should be reckoned from the toe of the rafters where they intersect at the cornice line instead of the corner, or intersection of the plates. Consequently, the valley will not pass over the corner, as in even pitches, but will veer to the side on which the lesser pitch is used. This will also necessitate the plate on the steeper pitch side being raised higher than that for the lower pitch. The difference is the gain of one pitch over the other in the width of the projection of the cornice. Say the projection is one foot; referring to the diagram, it will be seen that the difference between the two pitches in this case, is 2½ inches, which should be added to the plate of the steeper pitch side. This being done, cut the rafters in the usual way, leaving the tails projecting enough to form the cornice, and they will intersect at the proper point after being cut by a straight line at equal distance out from the studding. A. W. Woods.

Which is the Right Way?

To the Editor: Springtown, Texas.

In order to settle a dispute as to how to hang a screen door, we want to know whether the screen should be on the inside or outside of the door, also whether a transom should be set with the putty on the inside or on the outside?

J. D. Robertson.

Answer: We believe the prevailing custom in that particular section of the country ought to be the judge in questions of this kind. "When you are in Rome, do as Romans do." See? Really what difference does it make? As to our individual taste, we would say put 'em both out—that is the screen and the putty. Perhaps if we had lived in a section
Side Cut of Jack for Uneven Pitches

To the Editor:
Madison, Wis.

I would be pleased to have you explain what you think to be the simplest way to get the side cut for jacks and for the hip and valley rafters when the roof has uneven pitches. I understand using the steel square for even pitches, but this part bothers me.

Answer: There is nothing new in this. In fact, it is the same old trouble that hundreds and thousands of others are troubled with. We have prescribed for it many times in the past six years through this medium, giving simple doses, strong doses and double doses; but the trouble is infectious and for that reason we have been called on to repeat the dose. But whether given mild or strong, it is all the same, although we have a hard time making our patients believe it. In fact, we are looked upon by some, as a sort of a quack. But then we have the consolation of knowing that all specialists are more or less looked upon as quacks; so we are not worrying—take our medicine or leave it alone. It is free; good stuff; and we give it on the square.

Here it is. In Fig. 1, ABCD represents the plan—a plain parallelogram with the long side representing the long run and the short side representing the short run. To this add the diagonal line, which represents the run of the hip or valley and the plan is complete. Nothing more is needed save the rise which may be anything desired, to find all of the lengths, cuts and bevels required in the roof.

We now pass on to Fig. 2. Here we have the parallelogram applied to the corner of the building. Look at it. Like illustration letters are used in like places. CE represents the rise, which as we said before can be anything. As the rafters must all have the same rise over the point C in the plan, then CE must equal the rise of all of the rafters, as shown by the arc that catches the point of all of them. In this they are represented as lying down; and from this the seat and plumb cuts are readily obtainable with the steel or bevel square.

Now, then for the side cut of jack. Take the long run and the length of the rafter for the short run on the square and the length of the hip and the cut will be on the side run on which the length of the rafter is taken; visa versa for the other side.

Now, for the side cut of the hip. Take AF (the tangent) and the length of the hip and the cut will be on the side of the square on which the length is taken. That is all there is to it, provided the toe of the rafter rests on the plate; but if there is a cornice formed by projecting the ends of rafters over the plate, then the reckoning point for the runs should be from the toe of the rafter instead of the outer edge of the plate. The projection should be the same on both sides and in that case, the plate on the side that has the steeper pitch should be raised; and as we have fully covered that point in another part of this number in answering Mr. Jeffries' question, we will not repeat it here.

The dotted lines centering at C represent the plan of the rafters intersecting the ridge piece and the dotted lines from this point, running parallel with the rise of the rafters show the amount of reduction that must be made in their lengths. This is easily obtained by measuring square back from the plumb cut for the full run of the rafters. This, of course, would require a full size diagram of the plan at that point.

A. W. Wood.

Vise Suggestions Wanted

To the Editor:
Craik, Sask.

Please let me know a satisfactory way of putting on an iron bench screw on a bench with a 2-inch plank top and with 1-inch side pieces. The sketch shows one way but when it is placed this way, a small block is required to be held in the vise as the action of the screw pulls too hard on the bench leg through which the screw passes. Would like to know some method to overcome this. E. Venning.

Answer: This is a very old style of vise. Mr. Venning can get at most any hardware store a new vise that will overcome the difficulties that he mentions. Perhaps some of the "Brothers" can suggest a way to overcome this difficulty with this type of wooden vise.

Editor.
**Two Questions Asked and Answered**

To the Editor: Roggen, Colo.

I would like to ask a question which, if published, I think would be a benefit to a great many others, as well as myself. How is the best and most satisfactory way of fitting a one sash window that is to swing in over the stool and make it wind and water-proof? Would also like to know how to get water off of a porch floor where the sides are built up with siding or shingled, as the case may be.

Answer: It is well nigh impossible to make a sash that swings in at the bottom, storm-proof against beating rains and dust storms. There are some patented devices now on the market for hanging single sash that are very good, but

![Drip from Porch Floor Runs down Inner Face of Siding](image)

even they are not always satisfactory. A reasonably tight job can be made by hanging the sash at the bottom and putting on a transom lift to operate same as a door transom.

As to the question of drainage for porch floor, we have used the form as shown in the sectional drawing. The inside siding is left up from the floor to allow the water to pass under and is allowed to drip on the inside of the outer siding to the ground. Ordinarily there is not much water that will get in on to a porch that is sided up, especially so with the prevailing wide porch cornice.

C. H. Welsh.

To the Editor: Louisville, Ky.

Victor C. Knudsen asks in the April number how to build a water wheel for lifting water to irrigate land. I favor a current wheel, of wood, mounted in the center of a flat boat, so that the paddles will be always submerged to the same depth, as the height of the water in stream varies. The wheel should be 12 or 14 feet in diameter and have sixteen paddles each 12 inches high (depth in water), and width (across stream) to be according to horse power required.

It should be inclined up-stream about 10 degrees from the radial line. The rim speed of the waterwheel will only be 40 per cent of the speed of the water in stream. Fasten paddles to the arms of wheel so that they will be fully immersed.

The first thing to do is to find the speed of the water, in feet per second, by tossing a branch of a tree in the water and timing its travel over a measured distance. To find horsepower of such a wheel:

1. Multiply the area of one paddle in square feet by the speed of the rim of wheel in feet per second (which will be 40 per cent of the speed of the stream) and divide such sum by 150.
2. Next subtract the rim speed of wheel in feet per second from speed of water in stream in feet per second, and double the result.
3. Then multiply both above results together to get horsepower.

If he knows how much water he wishes to raise per minute, and how high he has to lift it, he can get the horsepower by multiplying the number of gallons per minute by the height in feet and multiply that by 10 and divide by 33,000, and double the result, to allow for friction.

He can perhaps lift the water in steel elevator cups and sprocket and chain, all mounted on the boat and driven from axle of waterwheel.

William Ebert.

To the Editor: Creswell, N. C.

Will you tell me the proper way to level and square a foundation for a frame building with an ordinary spirit level and tape line?

Answer: For squaring the corner; take an ordinary tape line and, doubling the same with the end of the line at the 24-foot mark, a second party holding the line at Fig. 6, and a third party at Fig. 14, the line drawn taut will form a right angle at the 6-foot mark, as shown in the illustration. This applied to the given lines, as at A-B, will give the adjoining side line, as at B-C. For accuracy a thin nail should be driven in the corner stake and the line should pass the nail exactly at the 6 foot mark. Then drawing the line taut by holding a nail, or some other like piece at the 14-foot mark, will give the true angle, provided the line is correct.

A. W. Woods.

Squaring a Corner with Tape Line

![Squaring a Corner with Tape Line](image)
House Moving

To the Editor: University Place, Neb.

Enclosed you will find a picture of a house I moved last week on the trucks I described in the AMERICAN CARPENTER AND BUILDER of June, 1910. As I had some inquiries about them, I thought this photo might interest the readers. This house is 24 by 28 feet, two stories high, plastered, etc. It was moved nine blocks, paralleled the street car track two blocks and was under cables and wires. We were about

Moved on Trucks Illustrated in June, 1910, Number

35 hours in all, moving it. The house was loaded V-shape on three trucks pulled with blocks and tackle, as you will see by the picture.

A. H. THOMPSON.

Hardwood Border for Bay

To the Editor: Highland Park, Ill.

In answer to the question asked by Clarence R. Major, Easton, Pa., in the February number of the AMERICAN CARPENTER AND BUILDER, I am herewith sending a diagram showing the way I would fill in the space around the window.

W. M. WITTEN.

To True-Up Emery Wheel

To the Editor: Charlotte, Mich.

Is it possible and, if so, how may an emery wheel be made true again after it has become not true when it is running?

JAMES S. ROBINS.

Gable-End Hay Doors

To the Editor: Lynn, Ind.

Enclosed you will find view of barn showing gable-doors equipped with barn-door hangers and track. The bottom of doors are held in place by iron stays bolted at each end and in the middle, bent at ends the thickness of doors. A small piece of gas pipe the length of the thickness of doors

is placed on a bolt in center of each door.

These doors may be fitted with weights equal to weight of doors. These attached to rope and small pulley inside of barn will allow the doors to open and close as easily as other roller doors do.

This door is intended to be used to take hay in, where hay-track and carriers are used.

This is my own design: the picture is taken from the first set ever erected, as far as I know. I have been a reader of the AMERICAN CARPENTER AND BUILDER for some time, but have always regretted that I did not start my subscription when I first had the opportunity.

G. F. BIXLER.

Manila's Steel Church

To the Editor: Manila, P. I.

The San Sebastian, of Manila, better known locally as the steel church, is a drawing card for tourists. It is constructed of steel throughout, says the Literary Digest, excepting that the altars and confessionals are of fine Philippine hardwoods. The walls are but one-fourth of an inch in thickness and have no interior lining. The structure was made in sections in Europe and was shipped "knocked down," to the islands.

RALPH ELLISON.
Automatic Hen House Release Door

When fowls are confined for any length of time after sun-up in the morning, they become very restless; and it has been observed by many poultry breeders that when fowls are worried or restless, even for a short time during the day, it is a very hard task to get them to thrive as they should. And yet, when, with good intentions, many poultrymen have left the doors of their houses open all night, that the fowls might get out bright and nearly next day, a raid has been made on the roosts by weasels, foxes, or other prowlers of the night.

Poultry-raisers who are believers in the old adage, “The early bird gets the worm,” will undoubtedly be interested in the accompanying illustration of an automatic release door offered by Mr. H. V. Tormohlen in a recent number of Suburban Life.

An explanation of the plans is hardly necessary, as the sketch will give the details of construction. The trap is released by the first bird which walks on the slightly raised floor. A string is fastened to this floor, passing up over the projecting arm attachment and down to the wire hook which holds the door. To this cord is attached a weight to equalize the weight of the false floor, and make the least downward pressure on the floor lower it, and thus raise the releasing hook.

The trap-door is attached to the outside of the building, where the small drop-door is ordinarily located. The door should be covered with one-half-inch mesh wire netting. The door must be covered with wire, that the fowls may be attracted by the light, and thus be induced to come out upon the false floor and release themselves. When the wire door is up, the hook is pulled down over the edge, and should be tight enough to hold on by its own tension, as all resistance is relieved by the counter balance or weight, which is fastened just above the hook. The weight, of course, should be just heavy enough to balance the false floor, so that it will stand in any position to which it may be raised.

About four inches is sufficient incline to set the false floor. The end toward the building should be fastened to the floor with a hinge. The weight of the first hen will release the trap-door the instant she walks out upon the inclined board, permitting all the flock to pass out. The door will, of course, remain open.

Sharpening Fence Posts

The easiest way to sharpen fence posts is to set a post in the ground to the top of which is fastened a forked stick or piece of board in which has been sawed a crotch. Place a plank at the foot of the post and set the post to be sharpened on the plank and leaning in the crotch at the top of the post. This leaves both hands free to handle the ax. About twice as many posts can be sharpened with this assistance.

The Care of Oak Floors

The physical structure of all wood—and oak is no exception, although it is less susceptible to swelling and shrinking than any other variety—is such that water applied to it, no matter how well the surface is filled and covered, tends to swell the fiber which in time shrinks, leaving slight cracks between the strips of flooring. Hence water, either hot or cold, should never be applied to an unfinished or finished floor. The surface may safely be wiped with a cloth dampened in tepid water to remove the dirt and dust, but the dampness should be immediately taken up with a dry cloth.

The author, in the care of his own oak flooring, has for years successfully employed equal parts of sweet oil, turpentine and vinegar well mixed and rubbed on the floor with waste, or a cotton or woolen rag. The philosophy of this treatment is that there is acid enough in the vinegar to cut the dirt and grime that works into the finish from shoes; the sweet oil produces a luster, and the turpentine promptly dries the moisture. The occasional use of a floor brush alone or with a piece of Brussels carpet placed beneath it will assist in keeping the finish of an oak floor in good condition. The above named mixture need not be applied oftener than once a month to insure a floor finish that will approximate the sheen of a piano. Should the finish become worn in spots from hard usage, a little of this mixture will renew the polish quickly. Once a year it is well to use a good floor
How to Make Outside Venetian Shutters

A pair of outside venetian shutters are shown in the accompanying illustration, Fig. 1 being an elevation, Fig. 2 a horizontal section, and Figs. 3 to 6 details.

The shutters each consist of two stiles, top and bottom rails, and a number of laths, which are fixed at an angle of forty-five degrees. In making the shutters prepare the stiles, rails, and laths. The stiles and top rails are 2 inches by 1 1/2 inches, the bottom rails 2 inches square in section, and the laths are 3/8 inch thick. The stiles are set out to receive the laths, which are arranged as shown at Fig. 3, the distance between the bottom edge of one lath and the top edge of the next being 3/4 inch. The ends of the stiles and rails are also set out for dovetails, a suitable dovetail joint being shown at Fig. 4.

In cutting the dovetail joints allowance is made for mitering the beads, which are worked on the edges of the stiles and rails. The laths are housed into the stiles, and the center lath, and those midway between the center and the top and bottom, should also be tenoned into the stiles, as shown at Fig. 5. In finally fixing together, the dovetail joints may be secured with wood pins, and the laths are fixed with nails, the joints being well painted.

The meeting stiles are rebated together and beaded, as shown at Fig. 2, and the shutters are hinged to the outer linings of the window frame, a suitable hinge being shown at Fig. 6. A bolt should be fitted to the outer shutter by means of which the shutters are fastened when closed, and two shutter fasteners should also be provided in the wall to secure the shutters when open.

Protection from Lightning

Few realize that more people are killed every year from lightning than by railroad accidents and that the property destroyed every year through fire caused by lightning amounts to nearly six millions of dollars.

In view of these facts, the matter of adequate lightning protection takes on new importance. Every home builder should see to it that his new dwelling is protected, and every owner of property, whether the buildings are new or old, should see to it that his investment is protected against loss from lightning.

In this matter as in many others an ounce of prevention is worth a pound of cure. It is far better to make the small investment required to properly equip a building so that it will never be struck by lightning than to carry heavy fire insurance premiums on it with the hope of regaining some part of the loss in the event of the building being struck and burned.

The National Cable and Manufacturing Company, Niles, Mich., have given this matter careful, scientific study. They have evolved and perfected the "National pure copper cable lightning conductor system." According to the careful records kept by this company not one of the thousands of buildings protected by the National system has ever been destroyed, or even set fire by lightning.

They have just issued a new booklet of more than ordinary interest, entitled "The Laws of Lightning." This explains very satisfactorily the principles involved in reliable lightning protection. It answers the question, "What is lightning?" Readers of the American Carpenter and Builder will find this a very valuable book to have, since this is a subject that it is well to be informed on. Wide awake builders will also see in this an opportunity for doing a little nice business. The National Cable and Manufacturing Company, Niles, Mich., have an attractive agency proposition that will appeal to you. Investigate it.

Write for This

One of the most pleasing and instructive booklets of the year has been received from the Mastic Wall Board and Roofing Manufacturing Company, Cincinnati, Ohio. It illustrates and describes their asphalt mastic products—Bishopric wall board, Bishopric sheathing and Bishopric roofing.

It is a pleasure to look over and study a booklet of this kind, since it serves not only as a practical trade catalogue of an important line of building materials, but also is a text book showing clearly the approved methods of construction with these materials, suggesting new uses that carpenters and builders can make of them. A thorough knowledge of carpentry construction is demonstrated, and suggestions are made that would doubtless save money to many an experienced craftsman.

This booklet is very attractively illustrated, is of convenient size for handy reference, and is arranged in such an orderly manner that it is a pleasure to refer to it.

Part I. explains the composition of asphalt mastic and sets forth its merits as the most important material used in the construction of the asphalt mastic products. Part II. takes up in detail the construction, uses and merits of Bishopric wall board. Part III. takes up in detail the construction uses and merits of Bishopric sheathing. Part IV. takes up in detail the construction, uses and merits of Bishopric roofing, including also Pyramid shingles.

A very interesting part of the booklet is the section made up of excerpts from letters from practical carpenters and builders, telling of their experiences with these products.

The Mastic Wall Board and Roofing Manufacturing Company, Cincinnati, want you to have a copy of this booklet. Will you write for it to-day?
The Peerless Brick Machine

Carpenters and building contractors will be interested in the new 1911 model of the Peerless brick machine. While retaining the tried and tested features that have made the Peerless machine a favorite heretofore, some new features have been added that make this machine a very interesting proposition to all builders or contractors who want a large capacity machine. The Peerless brick machine makes ten bricks at each operation. Every brick is thoroughly tamped and it is stated that 12,000 perfect brick is not uncommon for a single day's work of ten hours with one machine.

The Peerless is remarkable for its ease of operation. By referring to the cut herewith you will notice the tamping device which is automatically lifted by two large coil springs, which do away with a large percentage of the work. A reference to the photograph will show the tamping device, which is so arranged that each brick is tamped with absolute accuracy. The Peerless machine is substantially made of iron and steel and is strong, compact and durable. Its working parts are extremely simple, so that with ordinary care the machine will last a lifetime.

One of the strongest features of the Peerless brick machine is its price. One does not have to have a small fortune to invest in this machine and another small fortune in getting a place to operate it. Their catalogue tells you all about it. It is an interesting catalogue too, and well worth having. A postcard addressed to the Peerless Brick Machine Company, 19 N. 6th street, Minneapolis, Minn., will bring this to you. Write for it.

Built-Up Veneered Panels

Readers of the American Carpenter and Builder should be interested in the line of built-up veneer panels made by the American Veneer Company. The company import a great deal of its veneer direct, over 35 different varieties being in use. This splendid business is the sole result of the tireless energy, experience and business ability of William A. Bushfield, the president, treasurer and general manager. Mr. Bushfield started at the foot of the ladder; first learned the trade and then established a small business for himself in Jersey City about 1900. By close application to details and producing the best class of material, his product was soon in demand, necessitating his building the large factory at Kenilworth in 1902.

The American Veneer Company will be glad to answer inquiries regarding its product and quote prices on any panel specifications furnished.

New Edwards Mfg. Co. Catalog

The 1911 catalog of the Edwards Manufacturing Company, Cincinnati, Ohio, has been received. It is a large size, 186-page, finely illustrated book, said to cover the most complete line of metal ceilings and side walls ever issued in one general catalog.

A feature of this catalog, of particular interest, is the collection of photographs of actual installations of Edwards' art metal ceilings and side walls in buildings of various kinds. These show in a striking way the beauty and appropriateness of this kind of finishing for interiors.

The manufacturers call particular attention to that section of the catalog devoted to their new line of Italian Renaissance designs. These patterns will certainly appeal strongly to architects because of their richness and simplicity.

Every reader of the American Carpenter and Builder will do well to write at once to the Edwards Manufacturing Company, 401-417 Egleston Ave., Cincinnati, Ohio, and ask them to send one of these catalogs. You will find it exceedingly instructive and valuable for reference purposes. They are now making a splendid proposition for one representative in each community to handle their complete line. It will pay you to investigate it at once.

Screen Door Anti-Slam

The Shelby Spring Hinge Co. are putting on the market the Screen Door Anti-Slam, herewith illustrated, which is designed to keep screen doors from banging; which has always been a source of annoyance. The Anti-Slam is made from steel and is rubber capped; it is very easily applied to any screen door. Each Anti-Slam is wrapped in separate package with screws, and one-quarter gross are packed in a carton. The company furnish with each box a neat easel to hold one dozen. Address the company at Shelby, Ohio.
Albany Saw Works

A firm that has manufactured saws for more than 55 years should know something about saws. The Albany Saw Works Company, 70 Waterlo street, Albany, N. Y., was established in 1855 by Ernest F. Decker. Years of constant application and watchfulness, experimenting at great cost and improvements in machinery have brought about a high standard. Naturally, this firm bases its claims for superiority for its goods on the years spent in making improvements. Every saw bearing the Albany Saw Works brand is fully warranted and guaranteed.

The illustration herewith shows one of the Decker hand saws. This is a fast, smooth cutting saw, particularly adapted for fine cabinet work, sawing mitres, and in all instances where rapid, smooth cutting is required. The Albany Saw Works Company also wish to call attention to its line of concave saws; these saws are dished and tempered by an entirely new, patented process. The manufacturers claim to furnish these saws at a lower price than other makers because of this new mode of manufacture.

The Albany Saw Works Company makes saws of every description and will be glad to furnish price lists and descriptions on application. This firm also manufactures planer and machine knives and can quote prices on any quantity or style required.

Special Contractor's Hoist

The Bates & Edmonds Motor Company, of Lansing, Mich., are offering a material hoist and elevator which we believe is worthy of the careful consideration of every contractor and builder. This hoist is intended primarily for use with a double platform elevator, one platform ascending as the other descends. With this arrangement the load is always partially balanced, consequently less power is required to elevate a given amount of material. On this hoist, in addition to the sheave which carries the elevator cable, the makers have provided a drum for direct hoisting. This drum can be run independent of the sheave carrying the elevator cable, as it can be thrown into gear by a very simple and effective device. This makes the hoist doubly valuable for contractors' work, because the drum for direct hoisting can be used without interfering with or disturbing the elevator cable. The hoist is built in a very strong and substantial manner and is fully guaranteed in every way. It is provided with a powerful foot brake. The clutches with which the hoist is reversed are positive and easily adjusted.

The double platform elevators furnished by this company are intended especially for contractor's work. The overhead horse carrying the upper sheaves is made of angle steel and southern pine timber. While it is very strong and substantial, at the same time it is light and can be easily moved as the building progresses. The wire guides are made from the best steel cable and provided with a mechanism for drawing them taut. The wire hoisting rope is 5/8-inch diameter, with six strands and hemp center. The elevator platforms are 4 by 6 feet and strongly braced at all points. In fact the whole apparatus is built in the most substantial manner and fully warranted for the work intended.

The engines used in connection with these hoists are directly connected, of the hopper cooling type. The gasoline is carried in the base, consequently they are self-contained, no outside connections whatever being necessary. These engines are the B. & E. Standard Type A machines, of which there are something like 12,000 in successful operation.

Any contractor or builder interested in this apparatus will be amply repaid for writing the Bates & Edmonds Motor Company, Lansing, Mich., and asking for Bulletin No. 5, which gives full particulars of the entire outfit.

Bicknell's Combination Woodworker

Bicknell's Jointer, Saw and Combination Machine is designed for general use in wood working shops. This handy machine is made with different combinations which enables the operator to do jointing, sawing, rounding, grooving, dado work, boring, etc. All of this can be done on one arbor.

The arbor, jointer head, pulley and inside collar are made in one piece from special spindle steel; this runs in high speed babbitt bearings.

Woodworking Machine of great Adaptability

Slotted heads, special cutters and saws are used on the extended arbor, and changes are easily and quickly made.

The most important features of this combination machine are simplicity, durability and the variety of work that can be done on one arbor.

This machine is manufactured by the Bicknell Mfg. & Supply Co. of Janesville, Wis., who will be pleased to mail catalogue to interested parties.

Coltrin-Boos Block Machine

Carpenters and builders realize pretty generally today the money making possibilities, to them in their business, of a good concrete block machine. Blocks are needed on almost every job for the foundation and basement courses; and it is just as easy for the builder to have a block machine and make these blocks himself as it is to pay out good money to some one else for them.

It is well known that there are good profits in making concrete blocks for sale; and building contractors who have tried the proposition tell us that by making blocks for their own work the cost of the block machine and block making equipment is easily made up from the savings, that is profit, on a single job.

The Coltrin-Boos Mfg. Co., Jackson, Mich., want every reader of the American Carpenter and Builder to write to them and investigate their block machines before buying elsewhere. They say that the Coltrin-Boos is the machine you will eventually decide on because it is the simplest, fastest and best and may be had at a reasonable price. The illustration herewith shows one of the sizes of their concrete block machine outfit.

The Coltrin-Boos Mfg. Co. make 16 different sizes of the concrete block machines, besides brick machines, tile moulds, concrete mixers, etc. They make an extremely liberal offer
of sending their machinery out on a five-day free trial, so that a thorough test can be made by the purchaser before closing the deal. Write at once for descriptive catalogues and booklets concerning these machines. They contain valuable information, and you will find them very interesting.

A Roof that Needs No Painting

In making a roofing the problem of the manufacturer is chiefly a matter of getting a durable wearing surface. In the past roofing manufacturers have depended upon a heavy coat of paint for such protection. If kept properly renewed, a painted roofing will give satisfaction.

The objection to this type of roofing, however, was that the painting constituted a nuisance and expense. The average owner was fairly sure to neglect it, and when the paint wore off—and of course no paint could wear very long under the severe conditions of roof service—the water and frost began to do serious damage.

Of late years the roofing industry has been considerably changed by the appearance of Amatite, a mineral surfaced roofing which needs no paint. It is obvious that a surface which consists of small particles of mineral properly cemented upon the top surface of the roofing will not need any paint. The effect of weather upon the mineral surface is practically negligible.

Amatite costs no more than the painted roofings, and the saving of work and expense has made it exceedingly popular.

A sample of it is obtainable on request from the Barrett Manufacturing Company at New York, Chicago, Philadelphia, Boston, Cincinnati, Cleveland, Pittsburgh, Minneapolis, St. Louis, Kansas City or New Orleans.

Honeycomb Mitre Boxes

Something as far as we know absolutely new in the line of mitre boxes is being manufactured by the Rockford Mitre Box Co., Rockford, Illinois. In manufacturing this mitre box this company have succeeded in combining great strength and durability with extreme lightness. Every little and big requirement of the carpenter has been carefully looked after by the manufacturers of this tool. The back of the Honeycomb mitre box is detachable, this company claiming that this is the only way in which a mechanically perfect mitre box can be made, and the extra tooling space which is required for so doing, has been overcome by special devices so as not to increase the cost. The lever is peculiar in its construction, inasmuch as it locks—with a positive lock—at any degree or fraction of a degree. This lock works on the principle of an eccentric, there being no springs used.
Despite the growing scarcity of Oak, which has been seized upon by lumber dealers and manufacturers as a pretext for raising prices on Oak Doors, Interior Finish and Flooring, we are actually selling the very finest qualities and grades at less than dealers charge for Pine. Years ago the Gordon-Van Tine Company arranged for the output of large tracts of the best Oak timber in America. Our customers profit by our foresight. We are actually selling Oak to carpenters and contractors at less than the same material would have cost you ten years ago. The cut in prices not only affects Oak Doors, but extends through the whole line of Oak Finish and Interior Trim. A further reason for our low prices on Oak is the big scale on which our goods are manufactured, and our small selling expense.

Oak Doors—All Styles

The most artistic line of Oak Doors in the country. Veneered Oak Doors set with French Polish- ed Plate Glass; Craftsman Veneered Red Oak Doors, glazed in choice designs; Plain Veneered Oak Panel Doors; Oak Sliding Doors and many special designs, at less than half dealers' prices.

Inside Mouldings in "Mission" Styles

We carry in stock for immediate shipment, Oak Mouldings, Interior Finish, Beamed Ceiling, etc., to harmonize with any architectural scheme. Our prices save you big money.

Oak Flooring at Pine Prices

We are selling the finest grade of Oak Flooring at such low prices that you can floor a home in Oak at about the usual cost of Pine.

Our Millwork Catalog Your Savings Bank

We sell by mail direct to thousands of Carpenters and Contractors. Our Grand Free Millwork Catalog describes, illustrates and quotes net prices on over 2,000 Bargains in Building Material. We guarantee quality, safe delivery and satisfaction. We save our customers over a million dollars a year.

Protect Your Profits!

Write for the complete Catalog of 5,000 Bargains and protect your profits by buying Millwork and Lumber at wholesale prices.

Our responsibility is vouched for by three big banks with combined capital of $2,350,000.00.

Gordon-Van Tine Co. 582 Federal Street Davenport, Iowa
The length and clamp gauges are subject to thousands of variations, always assuring a perfect clamp on the material. The index is conveniently placed for accurate adjustment. The lever can be adjusted off square if necessary for filing or other exceptional requirements. There is an intermediate gib which takes up the wear, which assures you that the gib is always square with the bed-plate. It can be easily moved from place to place and will stand securely without fastening. Moreover the machine is absolutely dust proof.

The Honeycomb mitre box is made in a malleable steel frame, which makes it equal in strength with tool steel. The above mentioned improvements are but a few of the details that have been given most careful attention in the construction of the machine. Where this box is not handled by dealers, the Rockford Mitre Box Co., Rockford, Illinois, will be pleased to quote special price to carpenters and contractors. It is made in eight different sizes. Write today for descriptive literature.

**Gale Wall Safe**

The accompanying illustration shows the Gale Wall Safe, sold exclusively by the Willis Mfg Co., Galesburg, Ill. These wall safes meet a long felt want in the home, either in city or country. They provide a safe place for your valuables of every description. They preserve the privacy of your affairs and give absolute peace of mind and consciousness of security against fire, water, burglars and dishonest persons. As a protection for the home, the Gale Wall Safe stands without an equal and alone as the greatest check upon burglars and thieves. They can be easily put into the wall of occupied buildings. It requires the cutting of a hole in the wall a little larger than the safe, inserting the safe and cementing it in position. This can be done in two or three hours. Only the dial is exposed, which a small picture will conceal. You have your own combination, which may be changed any time so desired. Available at all times for deposit of money, jewelry, etc.

No modern house is complete without one of these safes.

**Nicholls Take-Down Square**

The Nicholls Manufacturing Company, Ottumwa, Iowa, are putting on the market a new take-down square; one that separates without the aid of a screw-driver, as there is no screw or cams used; it locks automatically.

The tongue completely separates from the body of the square, making it very convenient to carry, as it takes up very small space, going into a space 2 by 24 inches. The main feature of this new take-down square is that it will always stay true. It is so constructed that the tongue is held down into beveled bearings by a spring, and these

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**Union Metal Columns**

Union Metal Columns follow the classic designs of ancient Greece and Rome.

In the substitution of steel for wood not an atom of charm or beauty is lost—but a new element of value is added.

Union Metal Columns are indestructible—used in Porch, or Pergola, they will outlast the structure in which they are incorporated. Specified by the most eminent architects and designers of America, these columns have earned an enviable reputation even among those who deplore the slightest departure from ancient forms.

The catalogue which we will be glad to send you upon request illustrates the artistic use to which Union Metal Columns have been applied in beautiful homes and buildings throughout the country. We have a special proposition for Builders and Carpenters. Write to-day.

*The Union Metal Manufacturing Co.*

| 401 Maple Avenue |
| CANTON, OHIO |

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**Reduce Accidents**

You may be held for damages in case of serious accidents. Men's lives are at risk on your scaffolds. For your own protection you should use the safest and best scaffold you can buy—even if it does cost a little more than the inferior kind, in the beginning.

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| Detroit, Mich. |
Put It At Work
In Your Shop

The "Multimotor" Shop Engine increases your profits and keeps down the size of your pay-roll.
Does the work of three men at an expense of less than a cent an hour.

Stop pedal-pushing and crank-turning!

Let the Fuller & Johnson "Multimotor" Shop Engine turn the wheels in your shop. This wonderful engine is small in size but a giant in power. Runs all hand-power or foot-power machines—jig saws, lathes, emery wheel, grindstone, drills, etc. Just the thing for carpenters, contractors and owners of small workshops.

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Absolutely Safe

Simplest, neatest, strongest, most reliable little engine ever built. Comes to you complete—nothing to add but gasoline.

Easily moved anywhere. For indoor use has outdoor fuel tank, insuring perfect safety.

Important working parts protected by dust-proof case. Needs no attention while running. Works steadily all day on a few cents' worth of grocery-store gasoline. It is air-cooled, fool-proof, cannot freeze or overheat.

The "Multimotor" in design, material and construction equals the best automobile engines. Every engine is thoroughly tested before leaving the factory, and is guaranteed!

Fuller & Johnson Farm Pump Engine

Practically the same as "Multimotor," with pumping gears added. Can be hooked up to any pump in 15 minutes. Needs no belts, arms, jacks or special platform. Pumps 400 to 1,500 gallons every hour. Perfectly adapted to farm and suburban use.

Engine Book Sent Free!

Book, giving full information about "Multimotor" and Farm Pump Engine, sent FREE on request. Let us tell you more about these amazing little power-producers. Let us send you the name of the nearest dealer, who will show you the engine and explain what it can do. (264)

If interested in larger engines, ask for Catalog of Fuller & Johnson's Famous Double-Efficiency Engines.

FULLER & JOHNSON MFG. CO. Madison, Wis., U.S.A.
Do Your Mill Work on the Job with the
"AMERICAN"
PORTABLE SAW BENCH

How often you have wished that your job was near the mill, so you could do a large part of your work by machine, instead of by hand.

An "American" Portable Saw Bench on your work will put mill facilities right at hand, and the time and labor this will save you means money in your pocket.

In all probability, an "American" Bench will pay for itself on the first job; and its savings on subsequent jobs will swell your profits.

For the "American" Saw Bench is not a "one-job" tool. It is built to the "American" standard, which means that it will prove a permanently profitable investment, year after year.

An "American" Saw Bench is the greatest money-maker a contractor can own.

Ask us to send you a descriptive circular.

AMERICAN SAW MILL MACHINERY CO.
82 Main Street
HACKETTSTOWN, NEW JERSEY

1655 Hudson Terminal
NEW YORK CITY, NEW YORK

bearings are made so as to take up the constant wear which comes in taking the square apart and putting it together. The more this square is taken apart and put together the firmer the joint. A rust-proof canvas case is furnished with each square.

They guarantee this square to be true and remain so under ordinary use. This square is manufactured in Nos. 3 and 100 Standard, also No. 100 Rafter Framing, in oxidized coppered black (white or yellow figures), galvanized, old copper and nickel-plated.

The No. 100 Rafter Framing has the famous Nicholls Rafter Framing Rule, giving cuts and lengths for common, hip, valley and jack rafters for seventeen different pitches of roof.

The cut below shows part of the Rafter Framing Rule on the No. 100 Framing.

The outside inch figures indicate the rise of your roof to the foot. Under these figures on the first two lines you will find the lengths of common, hip and valley rafters for one foot run only. Now that you have the length of the rafter for one foot of run; multiply this length by half the width of the building and this will give you the exact length of rafter in inches. Divide by twelve in order to get it into feet. For example. If your roof rises 16 inches to the foot, under 16 on the first line are the figures 20.00; this is the length of common rafter for one foot run; if the building is 14 feet wide, half the width of building would be the run of common rafter; in this case it would be 7 multiplied by 20.00, giving you 140.00 inches, or 11 feet 8 inches.

Third and fourth lines give you the exact length of first jack rafter and their difference in length spaced sixteen inches and two feet centers. Fifth, sixth and seventh lines give you the side cuts of jacks, hip or valley rafters, also cuts of sheathing in valley or hip.

These cuts are obtained by placing square on stock at the figures on left of line, for body of square and right of line, for tongue. For example: On the sixth line under 17 are the figures 7 and 10; by placing square on stock to be cut at these figures, 7 on body and 10 on tongue, and marking on the 10 side, this gives side cut of hip or valley rafter against ridge board or deck.

The Nicholls Mfg. Co., Ottumwa, Ia., are giving away free their book showing cut of square, also figures, and explaining how to use these figures to obtain the length of common, hip, valley and jack rafters for seventeen different pitches of roof; also what figures to use on tongue and body of square to obtain their cuts. Every carpenter should have one of these books. Write for one at once.
UNDERFEED IN ZERO-LAND

June Temperature Within
and Arctic Cold Without

**Canadian Saved $75 on Winter’s Coal Bill and More in Comfort**

One night in January last, with Canadian winds blowing 45 miles an hour and the thermometer registering 26 degrees below zero, the temperature within the concrete covered home of Dr. J. Roddick Byers, St. Agathe des Monts, P. Q., was as delightful as a June day in Southern California. Altho exposed to the full force of the wind, these degrees Fahr. were shown—Living room 72; Dining room 76; Office and waiting room 73; Bath room 80; Halls 70 and Bed rooms comfortable. Peck-Williamson UNDERFEED heat did it. Money saved, smoke consumed, health conserved, attention minimized—these are points of supremacy in the UNDERFEED which insure clean heat at least cost.

It is testimony like this which has given the UNDERFEED the “inside track” with architects and builders as heating systems which ADD to the Renting or Selling value of any building. We would like to go further and prove to all building contractors that it will pay them to specify Peck-Williamson UNDERFEED heaters.

The Peck-Williamson Underfeed
HEATING WARM AIR STEAM-HOT WATER
SYSTEMS FURNACES-BOILERS

Save \( \frac{1}{3} \) to \( \frac{2}{3} \) of Coal Bills

Dr. Byers, who is Secretary-Treasurer of The Laurentian Society for the Treatment and Control of Tuberculosis, voluntarily writes: "I have estimated my Underfeed saving in fuel at about $75 in actual cash and a good deal more in comfort."

We want every architect and builder to know that Heating Plans of our Engineering Corps are FREE. Write us about this NOW.

**A PAYING PROPOSITION TO DEALERS**

Howard Shordon, Heating and Ventilating Engineer, at Ft. Wayne, Ind., writes us:

"If furnace dealers in general only knew how easy it is to sell your Underfeed line, everybody among them would be trying to secure the agency. All that is required to secure Underfeed business is to sell two or three furnaces the first year and install them properly. After that, you will get all the business you can take care of without hustling around soliciting and cutting prices down so that there is little profit when you do make a sale."

All inquiries that come to us as a result of our great national continuous advertising campaign are Sent Direct to Dealers in the territory from which they are sent.

Write for the Underfeed Booklets—Furnace and Boiler—and you’ll quickly learn why the Underfeed dealer has the bulge in selling argument over all competition.

Get into touch with us TODAY and learn how you can share in the BIG 1911 harvest.

THE PECK-WILLIAMSON CO., 436 West Fifth Street, Cincinnati, Ohio
A New Wrinkle in Saws

Every carpenter and builder should be interested in the new C. E. Jennings' combination sets of saws, with the Garland adjustable handle, illustrated herewith. These saws are made and sold under the well-known Arrow Head trade mark by C. E. Jennings & Co., 42 Murray Street, New York.

The feature of these sets is the adjustable handle, which will hold any of the blades. The lever turns the screw that locks the blade in place and the handle is guaranteed to remain in position. The sets are sold in different combinations and the handle is made to hold either a panel saw for cross cutting, a rip saw blade, a double edge pruning saw blade, a metal cutting blade, a compass saw blade, or a keyhole saw blade. The entire set should be of great value to any carpenter or mechanic, as it includes practically all the saws required for ordinary work; and when not in use, can be packed with the handle, in a flat box occupying very little space.

The manufacturers have been very successful in selling sets of these saws for home use, for motor boat and automobile men, farmers, etc. If they cannot be obtained at your dealers', write C. E. Jennings & Co., 42 Murray street, New York, for direct quotations.

Dwight Special Thin Hardwood Flooring

The growing scarcity of hardwood and its increasing cost render the use of a serviceable thin floor a necessity. Dwight Special thin hardwood flooring, the well-known product of the Dwight Lumber Company, Detroit, Mich., meets this want fully. It can be laid over an old floor with very little expense, and for new work it is practically as serviceable as thicker flooring. This flooring is obtainable in ¾ by 2-inch quartered oak, plain oak, white maple and red birch. It is manufactured in clear grade only.

Ordinary thin flooring has such a small tongue and the

Build Yourself a Perfect Boat at One-Half Cost

It is as easy as A. B. C. for the man skilled in using tools to build any one of these handsome motor boats. Pioneer Knock-Down Frames are so true, so accurate and simple to assemble that thousands of novices have followed our simple plans, put the frames together and launched beautiful boats at one-half the usual cost.

Pioneer Frames

are made of A No. 1 seasoned white oak. Every rib is accurately bent and fitted in its exact position. Every frame is tested in our factory, taken down and shipped. You just put the pieces back where marked. Here's a real lark for every carpenter and builder. Here's where you join the great company of Pioneer enthusiasts on every lake and stream.

Let us send you at once the attractive Pioneer Boat Book which gives the details, shows you we supply everything, frame, planking, fittings, engine, etc., and that we save you money at every turn. Remember we guarantee satisfaction, Write today.

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"Natural Woods and How to Finish Them"

FREE TO ALL CARPENTERS

YOU ought to own this comprehensive book—for two reasons:

It will aid you in giving sound advice to your customers.

It will teach you how to do your own finishing in and around your home.

Send for a copy today.

Berry Brothers' Architectural Varnishes

MEET ALL REQUIREMENTS FOR HIGHEST GRADE FINISHING IN BUILDINGS

TRADE LIQUID GRANITE MARK

For finishing floors in the most durable manner possible. Its quality has made it the best-known and most widely used of all varnishes. There is no substitute.

FINISH

For the finest rubbed (dull) or polished finish on interior woodwork. It has for years been the standard to which all other varnish makers have worked.

ELASTIC INTERIOR FINISH

For interior woodwork exposed to severe wear and finished in full gloss, such as window sills and sash, bathroom and kitchen woodwork, and stands the action of soap and water to an unusual degree.

ELASTIC OUTSIDE FINISH

For front doors and all other surfaces exposed to the weather. Dries dust free in a short time and possesses great durability under the most trying weather conditions.

SEND FOR OUR FREE BOOKLET: "NATURAL WOODS AND HOW TO FINISH THEM."

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Established 1858.

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Factories: Detroit, Mich., and Walkerville, Ont

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Dealers: Everywhere.
If You Want to Save Money

One of the large items of expense in building and equipping a modern home is the plumbing and heating fixtures that are required. Builders like to buy where they can get the most for their money and if they are able to make an appreciable saving in these important items of heating and plumbing, they are usually very glad to do so. Mr. M. J. Gibbons, Dayton, Ohio, is handling the highest grade of plumbing, heating and lighting materials at very reasonable prices. He states that he is prepared to equip any building with the most complete mechanical equipment, including bathroom outfit, kitchen sinks, range boilers, hot water and steam heating plants, electric light systems and hand and power pneumatic water systems, including gasoline engines, etc. In fact, he has everything that pertains to modern convenience in plumbing, heating or lighting. Readers of the American Carpenter and Builder who have had dealings with Mr. Gibbons speak of him in the very highest terms. He guarantees satisfaction in every respect.

Concrete as an Aid in Beautifying the Home

The instinct of mankind has always been to beautify the home and within the past few years this instinct has found an outlet in an entirely different source. That is, the manufacture of artificial stone in the form of ball moulds, lawn vases, lawn seats, and many other things of similar nature. The mixing of sand, cement and water forms a plastic material which lends itself readily to the moulding of dozens of articles which can be used for ornamental purposes. We illustrate herewith some of the articles made with concrete moulds, showing the artistic lines and attractiveness when used for this purpose. The first is a fancy design extensively used for porches, piers, gate posts and many other places. The second is a complete top section of a concrete gate post. It is made with three different moulds which fit together so nicely that the completed mould has the appearance of one solid piece of cut stone. Such an ornamental piece costs but very little when made out of concrete, but of cut stone would cost from $10 to $15 or $20.

Every property owner, contractor, mason, carpenter or builder should secure a copy of the Northwestern Steel and Iron Works' 1911 concrete machinery catalog, which is one of the largest and most beautiful publications of the kind ever issued. Showing complete line of concrete machinery catalog, which is one of the largest and most beautiful publications of the kind ever issued. Showing complete line of concrete machinery for making these and many other moulds of every description. It will be an agreeable surprise to find how economical these goods are in price. The manufacture of concrete specialities will prove a splendid side line or a fine business that will return
Guaranteed Excellence

When we put our factory brand on any one of these tools for Carpenters, it means that we are willing to accept full responsibility for the quality.

The MARK of the MAKER

on a P. S. & W. Samson plane, stands for the ball-bearing chuck, the steel-clad head, the alligator jaw, and the most careful selection of materials and testing of every part.

When you see it on a P. S. & W. Chisel, it means that chisel is in every respect the standard of the most complete and perfectly finished line of chisels on the market.


Look for The MARK of the MAKER on every item in our four large lines of Guaranteed Hand-Tools for Carpenters, Machinists, Electricians, and Tinmiths.

Write today for your free copy of the "Mechanics Handy List", shown above. It contains 33 pages of valuable shop-information and a catalog of over 200 tools.

The Peck, Stow & Wilcox Co.
MANUFACTURERS of the Largest Line of Mechanic's Hand Tools Offered by Any Maker
Established 1819  Five Large Factories
Address Correspondence to
22 Murray Street, New York City
WHY NOT GET A
SI-MONDS HAND SAW
FOR YOUR WORK NOW?

You have read so much and heard so much about the Simonds Hand Saw that now it is time for you to try it.

Remember that the Dealer who sells you a Simonds Saw is empowered to guarantee it fully in every respect and your money will be refunded if the Saw is not entirely satisfactory.

Remember that there is a variety of styles from which to choose; different lengths, points, straight back or sway back.

Remember the Simonds Hand Saw is made of Simonds Steel and each Saw is packed in a separate case—a distinctive feature.

Remember that the workmen who make Simonds Saws are the most skilled men at this trade.

If it will help you we will tell you the name of the Dealer near you who sells Simonds Hand Saws, or, if there is none near you, we will quote you a price on a saw delivered direct from the factory. Just fill in the coupon below, clip it out and mail it to us.

The Quickest Way to Get a Simonds Hand Saw

SIMONDS MFG. CO.,
Fitchburg, Mass.

As per your advertisement in the American Carpenter and Builder, send name of nearby Dealer selling Simonds Saws. I desire a Saw, Length.

Point

Signed

Street

City

State

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
Nicholls New Take-Down Square

Guaranteed Accurate and to Remain So

The main feature of OUR new TAKE-DOWN Square is that it will always stay true, it is so constructed that the tongue is held down into beveled bearings by a spring, and these bearings are made so as to take up the constant wear which comes in taking square apart and putting it together, thereby producing constant accuracy.

SOME OF ITS GOOD POINTS:

1. Convenient to carry — 2. Each time Square is taken apart and put together the wear produces a firmer joint, thereby insuring constant accuracy — 3. No screws used; locks automatically — 4. The only Take-Down Square which leaves no part of the Tongue attached to body when separated — 5. Occupies smaller space than any other Take-Down Square manufactured — 6. '2"x24" — 7. Instantly taken apart and put together — 8. Rust-proof canvas case with each Square.

 Manufactured in Nos. 3 and 100 Standard; also No. 100 Rafter Framing containing the famous Nicholls' Rafter Framing Rule. This rule gives length of Common, Hip, Valley and Jack Rafter for seventeen different pitches of roof; also their cuts.

If your dealer will not supply you we will ship you one of these, express prepaid, at the following prices:

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<th>Polished</th>
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</tr>
<tr>
<td>No. 100 Standard</td>
<td>2.75</td>
<td>3.00</td>
<td>3.25</td>
</tr>
<tr>
<td>No. 100 R Framing</td>
<td>3.00</td>
<td>3.25</td>
<td>3.50</td>
</tr>
</tbody>
</table>

Every carpenter should know how to get the lengths of rafters, also their cuts.

OUR LITTLE BOOK WILL TELL YOU. SEND IN COUPON.

NICHOLLS MANUFACTURING CO.
OTTUMWA, IOWA
THE Hobbs Concrete Block Machine is scoring a remarkable success. The most intelligent and progressive block manufacturers everywhere are buying the Hobbs. 98% of the machines sold replace less modern machines. The Hobbs is not an experiment, but is a scientifically improved block machine that "stands alone."

For your best interests send for the Hobbs catalog. It is a costly book with many illustrations, but we will gladly send it to you free.

It explains all about the Composition Face Plates and the marvelous range of the Hobbs by means of which you can produce Real Broken Ashlar.

THE HOBBS CONCRETE MACHINERY CO.
800 Ford Bldg. DETROIT, MICH.

can be done by installing just one machine.
You may argue: "What's the good of one machine when I have a dozen different kinds of work to perform? Is it possible to use one machine as a band-saw, as a joiner, as a planer, as a mortiser and tenoner, as a sander, etc. etc.? I cannot afford to buy separate machines; furthermore, I have not sufficient floor space to install them or men to operate them."

Our answer to this argument would be to refer them to the No. 14 Famous Universal Woodworker, made by the Sidney Tool Co., of Sidney, Ohio, which does sixteen different kinds of work, a few simple adjustments being all that are needed to change from one kind of work to another. That carpenters and builders have been quick to realize the possibilities offered by this machine, is proven by the fact that six hundred have been sold during the past two years. That it is satisfactory is demonstrated by their all being in use today; we understand that not one has ever been returned or reported unsatisfactory.

The principle of constructing one machine to take the place of several is not new. Yet this concern seem to have carried it out to a higher degree than any other. Each of the various kinds of work can be done, so it is claimed, as well, as quick and as clean on the Famous woodworker as on a machine built to do just one thing.

The No. 14 comprises the following sixteen machines: 27-in. hand saw; 12-in. joiner; saw table (with raising and lowering arbor); single spindle shaper; boring attachment (arranged on special boring spindle); pony planer; tongue and pole rounder; hollow chisel; mortiser; single end tenoner; drum sander; disc sander; knife grinder; emery grinder, band-resaw; spoke tenoner; rim borer and wheel equalizer; adjustable felloe rounder.

Consider the advantages of this method. Consider that you are doing your own millwork in your own shop, free from the delays and high charges of planing mills, putting their profits in your own pocket, and cutting down production costs that much. And remember there are no machines lying idle, practically no extra floor space required, no high-priced labor to pay, as anyone can operate the Famous. The Sidney Tool Co. will gladly send their catalogue, prices and terms upon request.

Union Metal Columns Used
Builders who are progressive and on the lookout for new things of merit in the building world, will be interested in the accompanying illustration of the new main building of Clinton College, Clinton, Ky. This is a typical installation of Union Metal Columns for large and important work. The
**The Keenest Edge in Shortest Time, on Any Tool, With No Danger of Drawing Temper.**

**FREE TRIAL ELEVEN TOOLS IN ONE**

1. Coarse Grinder
2. Fine Grinder
3. Chisel Attachment
4. Drill Attachment
5. Polishing Shaft
6. Buffing Wheel
7. Polishing Wheel
8. Carborundum Hone
9. Pocket Hone
10. Scythe Stone
11. Foot Power Attachment

We want every shop, factory, and tool-user to prove by 6 months' Free Trial, on your own tools, how this grinder saves time and money, makes work easier, saves and makes money. We will send this Mechanics Special on 6 months' Free Trial, and then, if you wish, send it back at our expense.

**Luther Diamond Tool Grinder**

*Genuine Carborundum Wheels will not Draw Temper*

The genuine Carborundum Wheels on this grinder cut hardest steel, as emery does soft copper, and does not draw temper—no water cooling necessary. You can do work in two minutes on this grinder that would take a half hour on the grindstone. With this grinder it is quick and easy work to keep tools bright and keen-edged, which means faster, easier general work.

**BUILT LIKE A HIGH GRADE LATHE**

Special tool holders make it possible for any one to do difficult grinding, such as twist drills, chisels, etc. 2500 revolutions per minute—steel and malleable construction, enclosed gears, dust proof, bronze bearings, machine cut spur gears run in oil bath.

**WHAT USERS SAY**

**Thirty Times Faster than Grindstone**

We have received your special tool grinder with foot-power attachment and sharpening outfit. We have tried your grinder and our machinist is very much pleased with it and tells us that he ground a chisel on this tool grinder in two minutes, which would have taken an hour of his time on any other grinder.

*Elwood Haynes, Pres., of Haynes Automobile Co.* says: "I have found the Mechanics Special a most excellent device."

Thousands of users say the same.

**RETURN THIS COUPON FOR SIX MONTHS' FREE TRIAL OFFER**

Return this coupon for 6 months' Free Trial Offer—a whole half year of free test. Let us give you full description of the Mechanics Special—full particulars of our liberal offer, and also the wonderful story of the discovery of Carborundum, as it appeared in McClure's Magazine. Returning the coupon puts you under no obligations, it is well worth your while to find out all about the grinder guaranteed for 5 years—that will outlast any number of emery wheels—save tools and make work easier. Return the coupon today.

**Luther Grinder Mfg. Co.**

16 Madison St., Milwaukee, Wis.

**FREE COUPON**

Luther Grinder Mfg. Co.
16 Madison St., Milwaukee, Wis.

Please send me free and pay your Carborundum booklet and six months' Free Trial Offer on Mechanics Special Luther Diamond Tool Grinder. This obligates me in no way whatsoever.
The 1912 Fore Door
Runabout $750
Fully Equipped F. O. B. Detroit

All Prices Include Complete Equipment

We believe that in this new 1912 fore-door Hupmobile, fully equipped for $750, you get infinitely more than you have ever even been offered before. To get down to bedrock—pick out any car of lower price: and add to that price the money value of the 1912 equipment of the Hupmobile.

When you've made it plain to yourself that even in point of price this new car is the most extraordinary thing that has ever happened in motordom; get back to the only question that counts—the question of quality—and study this page to see what your Hupmobile dealer offers you.

Into each and every Hupmobile model for 1912 have been incorporated entirely new elements of value. The legitimate savings of an immensely increased production—these are passed on to you in the form of a structural, mechanical and incidental equipment, never before offered in a car at anything like this price.

Study the list of 1912 improvements. Consider what you get; and what you pay. Remember the flawless reputation of the Hupmobile—its immense popularity not only with men of moderate means, but men of wealth and experience in every community.

1912 Improvements
An auxiliary inverted top-leaf spring placed between the frame and rear spring, to prevent listing of body.

Four pinions instead of two on the differential.

Rear axle shaft tapered into and keyed onto the wheel—cannot work loose.

Ball bearings on either side of differential replaced by specially designed Hyatt roller bearings.

Ten-inch double internal expansion brakes instead of eight-inch.

Adjustable ball housing for universal joint.

All spring hangers fitted with oilers.

Timken roller bearings on front wheels.

Supporting seat for front spring. All springs made of Vanadium.

New pressed steel radiator lined with brass, with 33 1-3 per cent more efficiency in cooling.

Double springs on the foot brake pedals.

New square dash and hood ledges of natural walnut.

Nine-inch mud-guards instead of six-inch; and mud shields completely enclosing space between wheels and fenders.

Large timing gears of bronze instead of fibre.

Valve adjusters on all valves maintain timing longer under all conditions; make timing quickly adjustable and prevent engine power from decreasing.

Improved Breeze carburetor—will not leak, and is accurately and easily adjusted.

Cam-action oiler on the engine regulated with the throttle and gives a positive feed. You get more oil as you need it and as the engine develops power. This feature, peculiar to high priced cars of foreign make.

Four-doors included as regular equipment with no extra charge; also top, windshield, and gas lamps and generator.

HUPP MOTOR CAR COMPANY
1255 JEFFERSON AVENUE, DETROIT, MICH.

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER

manufacturers inform us that these columns are enjoying an immense popularity, constantly increasing, not only for large columns such as these, but also for ordinary porch use, for pergolas, etc.

Union Metal Columns are made in all sizes, up to 40 inches in diameter and a maximum length of 35 feet. These columns are equipped with cast iron bases and composition capitals. For columns up to and including 14 inches in diameter, 24 gauge galvanized steel is used, one-ply in thickness. For the larger columns, 16 inches up to 26 inches in diameter, two-ply of 24 gauge galvanized steel is used. For columns larger than 26 inches, two-ply of 22 gauge gives the required strength.

Special galvanized sheet steel is used for this purpose, from which the galvanizing will not peel, and which takes paint well.

It is stated that an examination made a short time ago of some Union Metal Columns which had been installed six years ago failed to reveal any indication of rusting or other deterioration in any part of the columns. Builders and contractors consider this an excellent record, and they state that built up or stave wood columns installed at the same time have opened up at the joints, making it necessary to renew a number of them.

The popularity of Union Metal Columns is well demonstrated by the fact that their factory is no longer large enough to meet the demand. The company are now moving into a new office and factory building which will triple their output. They state that this change has been made necessary by the increasing demand for Union Metal Columns.

A new catalogue illustrating and describing Union Metal Columns and showing photographs of many actual installations has been prepared by the Union Metal Mfg. Co., Canton, Ohio, and can be had by writing to them.
“PUT A STOP TO DEPRECIATION—BUILD WITH CYPRESS AT FIRST!”

The Wood That Lasts Shall Be First With Wise CONTRACTORS

By honest and intelligent advice on woods we are not only saving losses to people who are going to build anyhow—but we are also CAUSING MORE PEOPLE TO BUILD

This is going to be of more and more benefit to you month by month. It is up to you to intelligently take advantage of this by learning for yourself that CYPRESS is not only the ONE BEST OUT-DOOR WOOD for the owner—but also the ONE BEST WOOD FOR YOU. Cypress “makes good.” That helps your reputation. Cypress is easy to work—that’s good for your tools.

We are giving away complete working plans and specifications for THIS BUNGALOW. Many thousands of people ALL OVER THE U. S. are writing for them. THEY WILL HAVE TO GET YOU TO DO THE WORK.

THEY WILL INSIST ON CYPRESS

It will be MONEY IN YOUR POCKET TO HELP THEM GET JUST WHAT THEY WANT.

(Plan by Henry L. Wilson, Architect, Chicago)

CYPRESS is the “comer” in your territory. Listen For It.

Why not FIND OUT what CYPRESS can do for YOU NOW? WRITE US—ASK YOUR OWN QUESTIONS—about your own needs, big or little. You can rely on detailed and reliable CYPRESS information if you address our “BUILDERS’ HELPS DEPT.” We will recommend CYPRESS ONLY FOR USES WHERE IT IS THE BEST WOOD TO USE.

Southern Cypress Manufacturers’ Association
1216 Hibernia Bank Building, New Orleans, La.

We are producing CYPRESS—and talking it—but not retailing it. BUY IT NEAR HOME. ASK your lumber man if he sells CYPRESS: if he does not, ask him WHY. Then WRITE US. We will tell you where you CAN get CYPRESS.

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
Supply Your Lumber Needs from This

Why buy your lumber in dribs at high retail prices when you can buy from us in carload lots for the same prices or less than your retail dealer pays? A barn or building of ordinary size requires at least a carload of lumber.

We are independent lumber manufacturers. Our prices represent the actual cost of manufacture plus one small reasonable profit. We employ no middlemen

You Are Paying Too Much for Mill Work and Building Material

Just glance over the following prices on a few items selected at random from our new Building Material and Mill Work Catalog:

- $1.50 Doors
- 2.00 Windows
- 1.00 Mouldings, per 100 feet
- 75.00 Stairs

Why we can quote you these extremely low prices

The big mill work factory from which we ship your order carries a stock on hand at all times upward of half a million dollars. Manufacturing our material in such huge quantities enables us to control the raw material, and our big sales make it possible for us to operate with the smallest margin of profit. You reap the benefit.

Right in your own state are hundreds of people regularly doing business with us, and we will be glad to send you copies of unquinted letters which they have written us telling of the good quality of our material, the big saving which we enable them to make, and the prompt and careful manner in which we ship the material.

Clip the coupon today, fill it in and mail it to us, or mention this magazine to your local firm and you will receive by return mail, postage prepaid, our free Building Material and Mill Work Catalog, which may be the means of saving you more than $1,000.00 during the present year.

Your Money, Including Any Freight Charges You Have Paid,
Enormous Stock at Wholesale Prices

We save you the profit you have been paying the retailer and the cost of handling the lumber through two or three middlemen, which you have also been paying. Read the facts; they are of vital importance to you.

$1,050.00

FOR ONLY $1,050.00 we will furnish all of the material to build this large six-room frame house, (brick, cement and plaster excepted). For the house we specify clear narrow bevel cypress siding, "A" cedar shingles, fir edge train plywood floors, clear oak and maple flooring and pure white tile flooring in the bathroom, Craftsman design oak doors, stairway and trim for the first floor, clear bosh doors and trim for second floor, a beautiful rustic fireplace with two colored glass windows on each side in the living room, and a massive oak buffet of the latest Craftsman design, with seats on each side covering the entire end of the dining room.

$2,000.00 WILL NOT BUY YOU A BETTER AND MORE HIGH CLASS BILL OF MATERIALS IN YOUR LOCAL SOURCE OF SUPPLY. The difference between $1,050.00 and $2,000.00 represents your saving when you place an order with us for a complete house bill of the size and design illustrated above.

OUR BOOK OF MODERN HOMES illustrates, describes and prices nearly 100 houses for which we furnish all of the material at amounts ranging from $153.00 to $1,521.00. For each one of these houses we give complete building plans, type-written specifications and an itemized bill of materials (our bid), placing at your command the best architectural service.

TO PROVE THAT OUR HOUSES ARE OF THE VERY BEST QUALITY and can be built at an immense saving we print in our book of Modern Homes twenty-two photos of houses built according to our plans and with our material, together with letters from the builders and purchasers, testifying to their satisfaction. You can't afford to be without this book of Modern Homes. Use the coupon today and ask us to send you a copy.
The Business of this Place is to Raise Salaries

From every section, and from all sorts and conditions of men, messages come to tell of earnings increased and futures brightened through study of I. C. S. Courses.

And no matter where you live, how little spare time you have, or how brief your schooling, the I. C. S. can raise your salary. The 400 or more advancement letters received every month represent only a fraction of the total number of advancements.

I. C. S. Courses have made draftsmen, foremen, and superintendents of shop hands; building contractors, architects, structural and concrete engineers of carpenters and masons; advertising men, window trimmers, show-card writers, chemists, illustrators, and designers of clerks; electrical, mechanical, and steam engineers of laborers; mine inspectors, foremen, and mining engineers of mine workers; bridge engineers, surveyors and mappers, civil engineers, gas engineers, automobile runners, and civil service employees of young men willing to use their spare time to mold a career.

Mark and mail the Coupon and learn how the I. C. S. can raise your salary.

The A B C Protractor Square

Practically, the difference between an ordinary workman and a foreman is in the latter's ability to lay out the work. In carpentry, as in stone masonry, a knowledge of geometry and mathematics is usually necessary in order to accomplish some of the commonest forms in construction. While it is always convenient to have an understanding of the sciences, the ingenuity of modern designers has obviated the need of detailed technical training and enabled the mechanic who knows what he wants to do to perform the same operations mecha-

Stucco Houses, Their Protection and Decoration

The use of stucco in the construction of private residences has given architects and builders an opportunity to produce handsome and substantial houses having a rich, aristocratic and conservative appearance, at less expense than houses of a similar character formerly entailed.

Stucco has shown itself to be a thoroughly practical material for modern building construction, nevertheless it is a material that requires special precautions to insure its stability; and its surface, unless properly treated, is prone
Ocean Grove, N. J., Feb. 8, 1911.

The Knickerbocker Company, Jackson, Michigan.

Gentlemen: I am mailing you photo of one of the buildings of The Buchanan & Smock Lumber Co. plant which shows where we were just starting to concrete the upper floor, the footings, piers, lower floor, columns, girders, beams, etc., having gained sufficient strength to permit the work to proceed. Unfortunately the COLTRIN MIXER could not be shown in this photo because the work is upstairs, still, when I tell you this building is 280 ft. long and 70 ft. wide you will see it is no small affair. There are four more buildings which are now complete excepting the roof on the north building which is 180 ft. long by 30 ft. wide. This roof will be concreted in two days and then the No. 12 COLTRIN will have just cause to point with pride to its work. Not a single time in 48 days and three hours work has the engine refused to start or the machine failed to do its work.

The piece of concrete Mr. Smock gave you at the New York show was a spawl from one of the pier footings of the building shown in the photo and thirty days old when broken. Proportion one part Atlas Portland Cement to six parts of bank run gravel. The piece shows the pebbles or stones were positively fractured, thus indicating the perfect uniformity of the mixture.

Tell any and all of my concrete colleagues who may talk mixer with you next week at the Chicago Show that he who hesitates to choose the COLTRIN is lost so far as dollars are concerned, for our two COLTRINS have proven themselves reliable, faithful and money makers.

My brother will mail you photo of the sea wall that we are constructing at Allanhurst, N. J. Of course we use only the COLTRIN on the work.

Wishing you the success your good machine deserves, I beg to remain,

Very truly yours,

D. C. LEAW.

Write for 1911 Catalog

THE COLTRIN CONCRETE MIXER
STEAM—GASOLINE—ELECTRIC—HAND POWER
THE KNICKERBOCKER CO. Dept. A. JACKSON, MICHIGAN

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
We are creating such a demand for them that they are rapidly supplanting wood shingles everywhere.

The use of wood shingles is already prohibited in many sections, because of their lack of fireproof qualities.

The modern roofing is Cortright Metal Shingles, because they have every good quality a first-class roof should have.

The contractor who handles Cortright Shingles in his section is getting the business.

Are you equipped to meet this growing demand?

If not, write for our special proposition to contractors, or just simply fill out and mail us the attached coupon.

CORTRIGHT METAL ROOFING COMPANY
PHILADELPHIA and CHICAGO
Big Profits In Concrete Specialties

If Dollars Look Good to You—Read This Carefully

Do you realize that there is a lot of money in some sand bank waiting for you to take it out? Do you know that every wagon load of sand can be made to produce a net profit of $25? It is a fact and right at your very door is a golden opportunity to coin money in a most rapid and gratifying manner. Very few people realize that the manufacture of concrete specialties brings enormous profits and many ambitious men, by devoting all or part of their time are making generous and enormous profits every year in this way. Just as an example of what can be done in this line, we give below one man’s experience and profit’s for one week.

The manufacture of ornamental concrete articles is not difficult and can be accomplished by any man of ordinary intelligence. We furnish complete and detailed instructions with every mould. These moulds can be readily sold for use in city parks, lawns, cemeteries and every property owner is a prospective customer for a solid, indestructible Hitching Post. Do you know of another line that will net you such handsome returns in so short a time as the manufacture of these articles?

**Figure the Profit Yourself**

These moulds never sell for less than $5.00 each, which is much less than the cheapest iron hitching post or vase you can buy and are much superior as they are indestructible. They generally bring from $15.00 to $25.00 a pair.

<table>
<thead>
<tr>
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<tr>
<td>12 Lawn Vases</td>
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<tr>
<td>33 Hitching Posts</td>
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</tr>
<tr>
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**THEY COST AS FOLLOWS**

<table>
<thead>
<tr>
<th>Item</th>
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</thead>
<tbody>
<tr>
<td>41 sacks cement (10½ bbls.)</td>
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</tr>
<tr>
<td>5 yards sand</td>
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<tr>
<td>57 hours labor</td>
<td>11.40</td>
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<tr>
<td>33 staples and rings for posts</td>
<td>3.30</td>
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<tr>
<td><strong>Total</strong></td>
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</table>

A good week’s profit: **$184.80**

**Send for large beautiful Catalog 29**

*It shows everything in the Concrete Machinery Line*

Every carpenter, builder, contractor, mason and property owner should have a copy of our 1911 concrete machinery catalog. It shows the largest line of concrete machinery in the world and everything imaginable is listed and described. It will pay you to send for a copy now. You will find the prices lower than has ever been made on a similar line of goods anywhere, and many articles you ought to have in your business. *Do it now.*

**Northwestern Steel & Iron Works**

942 Spring Street Eau Claire, Wis.
Franklin Tunnel Quarry

Readers of the AMERICAN CARPENTER AND BUILDER will be interested in this illustration, which is a reproduction of a photograph of the interior of one of the tunnels of the Genuine Franklin Tunnel Quarry of the Slatington Slate Company, Slatington, Pa. This celebrated Franklin Tunnel Quarry was opened in 1846. It is the oldest and the largest quarry operated in the Slatington district.

If you will examine this photograph carefully you will note the compactness and solidity of this bed. Also note that in this tunnel there is only one big bed. Since the Genuine Franklin Tunnel roofing slate, as well as the Genuine Franklin Tunnel natural slate blackboards are made from this one bed and are never mixed with the product of any other bed, the wearing quality is always absolutely uniform throughout, both in strength and color. It is evident that the possession of such a quarry as this, made up of just one large bed, gives the Slatington Slate Company a decided advantage over many other quarries with slate deposits in numerous small beds. No one can appreciate this better than the readers of the AMERICAN CARPENTER AND BUILDER who are practical users of slate, both for roofing and for the numerous special purposes to which slate slabs are so well adapted. For black-boards, toilet-room finishing, sink-tops, laundry-tubs, stair treads and risers, electric switchboard faces, etc., the clear black slate slabs from this Genuine Franklin Tunnel Quarry, are proving very popular.

The Slatington Slate Company, Slatington, Pa., have just issued their new catalogue and price list for 1911. They want to place this booklet in the hands of everyone interested in the building line. It is gotten up in exceedingly attractive style and is full of valuable information for carpenters and builders. Write for a copy.

New Metal Roofing Journal

A newcomer in the ranks of the roofing papers is "Edwards Metal Sheet," issued monthly in the interest of the Edwards Mfg. Co., Cincinnati, O. It is very attractively gotten up, nicely illustrated, and is brimming over with interesting, useful and entertaining reading matter pertaining to the metal roofing business. We are informed that the...
Messrs. Smith & Seale, of Gloster, Miss., said they could not run their shop without the FAMOUS WOODWORKER.

Here's Their Letter:

THE SIDNEY TOOL CO., Sidney, Ohio.

Gentlemen—We have been using one of your No. 14 Universal Woodworking Machines, furnished with all attachments, for the past year and we believe it to be the most perfect woodworking machine on the market. Every attachment on this machine works perfect and does perfect work. We consider it the most up-to-date and complete machine ever made and we could not run a general repair shop without it.

We have not bought a buggy body, seat or wood part or gear, nor wagon axle, felloe round, bolster reach or anything of the kind since we have had this machine. We buy our timber rough and cut out all such parts that we need, and we will be pleased to recommend this machine to any man running a general repair shop and will be pleased to answer any questions that any brother repair man should like to ask in reference to this machine.

Will endorse anything the Sidney Tool Co. has said in advertising this useful machine.

SMITH & SEALE.

The No. 14 FAMOUS does the work of sixteen ordinary woodworking machines.

Your business pays the biggest profits when you eliminate millwork bills. You can do this by installing a No. 14 FAMOUS Universal Woodworker—sixteen woodworking machines in one.

All the woodworking machinery you need is embodied in this one machine. It's not necessary to invest your capital in a number of machines when one is sufficient—when one does just as much as several and costs less to buy and less to maintain.

Over six hundred FAMOUS Universal Woodworkers are in use; and we are getting letters like the above every day. Not one has ever been returned; no user has ever found reason for dissatisfaction. Can any other universal woodworker show such a record? No Sir!

THE SIDNEY TOOL CO., Sidney, Ohio

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
Sheath Your Houses With Linofelt

Build houses that keep the outside OUT and the inside IN, that keep OUT the cold of winter and the heat of summer, that keep IN the warmth in winter and the cool in summer. Put up houses and buildings that keep out sound, the rooms of which are quiet and restful. Getting these features will add less than one per cent to the cost of your house, will add more than 40% to its comfort and living value and will effect a constant saving of 40% in all fuel bills. Architects, contractors and carpenters are the ones able to appreciate most the superiority of Linofelt because they know how unsatisfactory is ordinary building paper.

These Plans Show the Method

They show you clearly the practical and simple method of insulating walls and floors with Linofelt.

Anyone who knows Linofelt immediately becomes enthusiastic about it—because it has so many delightful features. It is an insulating quilt. No other is as light as Linofelt cubical contents considered. It comes from the same source as linen. It is made from flax in the largest flax market in the world—Winona. It is odorless, chemically clean, as sanitary as a surgical dressing.

We have had made comparative tests of Linofelt and other sheathing mediums for sound deadening qualities. We will send them on request. The same sound heard 200 feet through ordinary building paper is heard only 2 feet away through Linofelt. Tests prove Linofelt more than 38 times as effective as building paper for all uses.

Let us send you an attractive book for Architects, Contractors and Carpenters showing Linofelt in all forms, telling how it is made, showing and explaining plans and methods of using Linofelt, illustrated with excellent photographs of residences and buildings built with Linofelt, located in different climates. Let us send you a free sample of Linofelt so that you can see it with your own eyes and feel it with your own hands and have a close realization of its extreme effectiveness, have a firm knowledge that it will do MORE than we claim it will do. Get the book, the service, the sample by writing to us today.

Union Fibre Co.

Manufacturers

24 Union Avenue, Winona, Minn.
The Philip Carey Co., Distributors

Cincinnati, Ohio

Branches and Warehouses in all the large cities in United States, Canada and Mexico

“Defoe” Knock-Down Boat Frames

The DeFoe Boat & Motor Works, of Bay City, Mich., were originally manufacturers of pleasure launches—turning them out complete ready for the water from their factory. About five years ago they conceived the idea of putting them out in a partly finished condition, to be finished by the purchaser at destination. The DeFoe people erect the frame and finish it complete to the point where planking is to be put on. Everything is put together with bolts and screws, afterward taken apart and crated in compact packages for shipment. In this way freight is reduced to about one-tenth of what it would be on the finished boat, and their claim is that any man, or, necessarily a mechanic, can finish the work from the special instructions and full sized paper patterns which are furnished with the frame. This being so, a carpenter would be doubly sure of the best results.

Their claim is that a boat can be had in this manner at a saving of at least three-fourths.

The accompanying illustrations show plainly the success attained by two young men of Milltown, Wash.
Utility Wall Board is Used on Walls and Ceilings of These Artistic Rooms

The first illustration shows how easily Utility Wall Board is applied, the other illustrations show how artistically it can be decorated. Doesn't it look good to you? Wouldn't you like to have us send you a sample of it—and tell you how economical it is—How easily it is applied—How artistically it can be decorated. Our beautifully illustrated and descriptive booklet tells the whole story—and shows pictures of artistic interiors—it is free for the asking, together with a sample of Utility Wall Board.

UTILITY WALL BOARD is unlike any other Wall Board you have ever seen—It is made of exceedingly tough, durable fibre, thoroughly waterproofed—No moisture can penetrate—It is applied directly to the studding, taking the place of both lath and plaster—Any carpenter can put it on—You can do it yourself with simply a saw and a hammer—It will last as long as the house stands—You'll be amazed at the convenience of it—the economy of it—the beauty of it.

Don't fail to send for the sample and booklet at once.

Utility Wall Board is Sold Through Dealers in Building Materials Everywhere

THE HEPPES CO.
4503 FILMORE ST. CHICAGO, ILL.

MONTROSS METAL SHINGLES
Made of full weight tin plate, embossed, then galvanized or painted. Outlive wood shingles or composition roofings. More durable, more serviceable. Lasts the life time of building. Have given satisfaction for 22 years. Do not leak, crack, rattle or blow off. Lighter than slate or tile. Easily laid, no soldering. Inexpensive.

Carpenters and builders, increase your business and satisfy your customers by recommending them. Allows a good profit on your work. Local Agents wanted. Send for special offer. Illustrated catalogue, testimonial price list, etc. Write now.

MONTROSS METAL SHINGLE CO., 102 Erie St., Camden, N.J.

Magnificent Steel Launch $96
Complete With Engine, Ready to Run

18-20-22 and 27 ft. boats at proportionate prices. All launches tested and fitted with Detroit two-cycle reversible engines with speed controlling levers—simplest starter made—starts without cracking—has only three moving parts—everyone can run it. THE SAFE LAUNCH—absolutely non-flammable—needs no boathouse. All boats fitted with air-tight compartments—cannot sink, leak or rust. We are sole owners of the patents for the manufacture of rolled steel, lacquered, steel boats. Orders filled the day they are received. Boats shipped to every part of the world FREE CATALOG. STEEL ROWBOATS $20. (33)

MICHIGAN STEEL BOAT CO., 1239 Jefferson Ave., Detroit, Mich., U.S. A.

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
Striking Effects in Concrete Blocks

Several innovations of a remarkable character are claimed for the improved concrete block machine that is being introduced by the Hobbs Concrete Machine Company, of Detroit, Mich. Developments in machines for making concrete blocks have been made rapidly during the past five years, and machines that were once thought the acme of perfection are already regarded as out of date.

The Hobbs machine is described as having as few parts as any similar machine in the market, and yet possessing a possible range of over 2,000 sizes of concrete blocks in any style of face. It is claimed that most of the changes can be made with the bare hands, and that in no instance is more than five minutes required for any change.

What is described as probably the most valuable improvements involved in the Hobbs concrete block machine are the face plates, made of iron-stone composition. An extremely hard and durable composition is used in making these plates, which are protected on the edges by iron frames. The plates are casts taken directly from a selected pattern stone. The concrete block with a fine facing is tamped face down on this cast, and the result is said to be a revelation in concrete block manufacture, the grain and sharp outlines of the pattern stone being reproduced in all their natural beauty. The natural face of the block thus produced is said to be entirely different from the result obtained from using the cast iron plates employed on other machines to produce rock-faced blocks.

Readers of the American Carpenter and Builder will do well to write at once and look into this proposition for themselves.

Porter Weatherproof Screens

It is the boast of the Porter Screen Company, Burlington, Vt., that their door and window screens are not only substantially made but are architecturally right. They make a specialty of furnishing made-to-order window, door and porch screens; and their method of construction, which is the full mortise and tenon with interlocking corner joint, is approved by architects and is considered the strongest and most durable obtainable. Since their factories are located near abundant lumber supplies, and where experienced labor is had at reasonable cost, they are able to offer exceptional values. Since their factories are fully equipped with modern woodworking machinery, having a great capacity, they are able to turn out the largest or smallest order in the minimum time.

If you have any special screening to do, or if you want to secure the best in both construction and material in screens, it would be well for you to get in touch with these people. They have a new book, and a very interesting one it is, on "screens," which will be mailed free on request, to all those interested. Address the Porter Screen Manufacturing Company, Burlington, Vt.

Sackett Plaster Board

Combines lathing, fireproofing, soundproofing, heat and coldproofing in one simple, inexpensive operation. In the construction of plastered walls and ceilings Sackett plaster board is a WONDERFUL IMPROVEMENT — the Ideal Lathing Material. It is modern — progressive — efficient. Avoids buckling, plaster cracks, stains, future repair bills and other defects common to ordinary lath construction.

SAVE TIME — SAVES PLASTER and makes walls and ceilings as they should be — safe, sanitary, comfortable and durable.

Sackett Plaster Board is handled by up-to-date dealers. Our mills have a capacity of over one million square feet per day, and being located at widely separated points enable us to supply this material promptly and economically at any point in this country and Canada.

When writing advertisers please mention the American Carpenter and Builder.
Push the Doors That Pay the Profit
You can build your bank account and increase your local prestige if you stock up with, and recommend

Chehalis Fir Doors
The Stock Door of the Future
Eventually you will have to use Fir Doors because compared to Fir other woods are getting scarce. No other wood can compare with Fir in its adaptability to the various finishes often required.

It not only takes the splendid finishes of oak, mahogany and walnut, but it matches yellow pine trim better even than does white pine.

Chehalis Fir Doors are the only doors the panels of which are picked for similarity of grain. Built with vertical stiles and rails and slash grain panels. Possess other features that put them in a class by themselves.

Let us tell you more about them. Send for catalog (F). It's free. Better still, let us send you samples of Fir done in hardwood finishes. Enclose 10 cents to pay postage.

Chehalis Fir Door Co.
Chehalis, Washington

Granite TRADE MARK ROOFING

A six inch lap is better than a three inch lap. It gives better protection against leaks and permits nailing down on the under side only, so that no nail heads appear on the surface. Otherwise this is the same Granite Roofing that we have sold for 26 years for use on great factories. It is immune from damage by coal smoke or cinders, and it has a sea grit surface which makes painting entirely needless. Behind it is a reputation that has Passed the Quarter Century Mark.

EASTERN GRANITE ROOFING CO.
Chicago 19 Battery Place, New York Pittsburg

Ornamental Theatres
Plaster Relief Decorations
Theatres Designed Everywhere
Write for illustrated Theatre Catalog. Send us Sizes of Theatre for Special Designs.

Decorators Supply Co.
225 Archer Ave., CHICAGO, ILL.

The Luxury of a Lake Trip
Where will you spend your summer vacation? Why not enjoy the charms of our Inland Seas, the most pleasant and economical outing in America.

Daily service is operated between Detroit and Cleveland, Detroit and Buffalo, four trips weekly between Toledo, Detroit, Mackinac Island and Port Huron; three trips weekly between Toledo, Cleveland and Put-in-Bay.

A Cleveland to Mackinac special steamer will be operated two trips weekly from June 16th to September 10th, stopping only at Detroit, every other trip.

Special Day Trips Between Detroit and Cleveland. During July and August. Railroad Tickets Available on Steamer.

Send 2 cent stamp for illustrated Pamphlet and Great Lakes Map.


Detroit & Cleveland Navigation Co.
New Richards-Wilcox Catalog

A catalog of more than usual interest has been received from the Richards-Wilcox Manufacturing Company, Aurora, Ill. It illustrates and describes the door hangers and other hardware specialties made at the Wilcox plant.

As many of our readers know, the Richards Manufacturing Company, and the Wilcox Manufacturing Company, both from Aurora, joined forces some time ago, consolidating under the name of the Richards-Wilcox Manufacturing Company. By reason of the consolidation of these two large concerns, the trade is now offered the exceptional advantages of the wide range of selections from their line, which is now one of the most complete on the market.

The present catalog shows the Wilcox line and supplements the Richards catalog number 11, which was recently issued. Every reader of the AMERICAN CARPENTER AND BUILDER should write at once for copies.

An Improved Clothes Dryer

Readers of the AMERICAN CARPENTER AND BUILDER will be interested in an improved clothes dryer that has been perfected by the Chicago Dryer Co., 383 So. Wabash Ave., Chicago. The accompanying illustration will show what this dryer is and how it is used. It is strongly constructed, with a steel post, which goes down into a metal lined socket in the lawn. The post is removable so that the dryer can be taken down and put away when not in use, if desired.

Those who have used the “Chicago-Sun” clothes dryer, which is the name of this dryer, say that it is exceptionally convenient, since each arm operates independently of the rest. It holds 165 feet of clothes line. When opened the arms lock in position and stretch the lines taut. They are also locked automatically when closed, making the device convenient to handle.

Certainly when a neat, durable clothes dryer like the “Chicago-Sun” can be obtained at such a low price as this is sold for, there is no longer any good reason for going to the trouble and inconvenience of building one of the old-style wooden clothes reels. Those having new homes built this season will want their drying yard equipped with this convenience and many others will want it to take the place of the old antiquated contraption that has been serving the purpose of a clothes dryer.

Readers of the AMERICAN CARPENTER AND BUILDER will do well to write at once to the Chicago Dryer Company for their interesting booklet describing the “Chicago-Sun” clothes dryer and their laundry dryers. They have a special proposition that will interest you.

IF YOU HAVE WORK TO DO

that entails the fastening of fixtures to walls where ordinary screws will not hold, use the SEBCO EXPANSION BOLTS for heavy work and the SEBCO SCREW ANCHORS for lighter work.

You should let us send you some free working samples and our catalog 5R. We illustrate and describe many uses for our Expansion Shields and other products that will interest you and show you a way to do better work at no additional cost for labor or material.

Tell us the work you are doing; we will offer suggestions and send you free working samples. Send a Postal Now.

STAR EXPANSION BOLT CO.

147 CEDAR ST. Cat. Dept., 5-R NEW YORK
VENETIAN BLINDS

Improve any House

Not only in appearance, but in increased advantages, they will add value to the building. They match any wood or finish and require no window and pocket. Burlington Venetian and sliding blinds, screens and screen doors "keep out the sun but let in the air.

Write for our special price list and catalogue for carpenters and builders.

BURLINGTON VENETIAN BLIND COMPANY
341 Lake Street, Burlington, Vermont

MELLOTONE

For Interiors—Soft as the Rainbow Tints

Has the wearing qualities of best oil paint with beauty of water colors. Cheaper than most wall paper—more durable than Kalsomine. Washable, sanitary, fadeless, crackless. Gives best results. Saves the builder money. Write for full particulars.

The Lowe Brothers Co.

Makers of "High Standard" Paint—"Little Blue Flag" Varnishes

450-452 E. Third Street, DAYTON, OHIO

The Galloway Gasoline Engine

SIMPLEST ENGINE BUILT

Only four things to do:

1. Turn on the switch. 2. Turn on the oil. 3. Turn on the gasoline. 4. Give the fly wheel a start and the Galloway will go right along all day without further attention. It is ideal power for a small shop, and it's got the capacity to take care of your growing needs.

The Galloway has been classed as a standard, high-grade engine for fifteen years. Over 4,000 in use in Iowa alone. Thousands in every other State and Territory.

If you try the Galloway engine; you will find that it is not overspeeded. Remember, the bore and stroke count, and you don't have to drive your engine faster than you ought to drive it to get the rated horse power. Rated by actual brake tests.

On the larger sizes, if it is not entirely convenient for you to pay all cash, we will take your note for the balance at the regular rate of interest for six months.

The price given is for the five-horse power only, but we make these engines in seven sizes.

Ask for free information on stationary and portable gasoline engines from two to twenty-eight horse power. We make the best, and we price them at a reasonable figure. Write today.

The William Galloway Co.,
1145 Galloway
WATERLOO, IOWA

WE MAKE ANYTHING IN WOOD

Therefore, Mr. Builder, don't it stand to reason, that being equipped as is our factory to turn out with special machinery any and every wood work requirement that we can give you superior work and better material

AT A FAR BETTER FIGURE

NO JOB IS TOO SMALL

KANSAS CITY SASH & DOOR CO.,
KANSAS CITY, MO.
Your Interest in "Jewel" Advertising

The furnace advertising campaign of the Detroit Stove Works, which has been carried on for the past few months in the leading magazines and periodicals of the country, has attracted the attention of all practical warm air furnace men. The style of copy is new in the warm air furnace field, and it's broad comprehensive outlook will find wide sympathy among those interested in the cause of warm air heating.

As the largest manufacturers of cooking and heating appliances in the world, the Detroit Stove Works felt that it was up to them to take the lead in a fight against the untruthful claims put forth by manufacturers of other appliances.

Replies from magazine advertisements have been numerous and indicate the keenest interest on the part of the public in general. These inquiries are, of course, valuable to every seller of Jewel furnaces. The factory turns all inquiries to the dealer in the territory covered, and because the nature of the advertisements is not such as to attract curiosity seekers, the inquiries are proving very valuable assets to every seller of Jewel furnaces. Astonishing as it may seem in view of the efforts put forth by other lines of heating appliances—the sale of the warm air furnace is increasing by leaps and bounds, and especially is the sale of quality apparatus growing; people are beginning to realize as they have never perhaps realized before, that the great features in this warm air apparatus are—durability, efficiency and responsibility.

To be durable a furnace must, of necessity, be properly designed and made of high quality materials. Efficiency naturally follows correct design and proper manufacturing. Responsibility of the manufacturer is the other important factor. And in this respect purchasers of Jewel Furnaces are very fortunate in having back of their selection one of the strongest and best known concerns in the business—a company whose product has been on the market continuously—giving satisfaction for over half a century.

Jewel Furnaces are not only guaranteed from the standpoint of service and efficiency, but the policy of the company in handling the business has always been extremely liberal and broad-minded, and this is one of the features that has helped to increase the already large army of Jewel boosters.

Dealers selling the Jewel Furnaces find the 50-year-old reputation of Jewel stoves a good asset. This, in connection with the high quality goods and the vigorous advertising campaign, makes the Jewel proposition an exceedingly attractive one to every hustling merchant.

Complete outline of the Jewel proposition is well worth having, and if you are interested it would pay you to write the Detroit Stove Works, Detroit, Michigan, mentioning the American Carpenter and Builder with a request for information.

The Carroll Column Clamp

This is an ingenious time, labor and material saver for form building for concrete work. The illustration shows what the clamp is and how it is used. It is claimed that Carroll clamps pay for themselves on a single job. They never wear out.

For full information address the Carroll Column Clamp Co., Kansas City, Mo.
ASBESTOS
"CENTURY"
SHINGLES

"The Roof that Outlives the Building"

Look into the service record of Asbestos "Century" Shingles for yourself. You'll find that you can depend absolutely on their integrity.

They give the client a roof that needs no repairing or painting—no expense bills that arouse his ill will and make him question the value of every other feature of the building.

Asbestos "Century" Shingles are the first practical lightweight roofing of reinforced concrete—made of hydraulic cement reinforced with interlacing asbestos fibres.

The Keasbey & Mattison Company, Factors, Ambler, Pennsylvania

Sanitary—Inexpensive—Beautiful

Just Send Us Plan of Space to be Tiled, and We Will Quote Lowest Price F. O. B. Your Station

CERAMIC—MOSSIC—ENCAUSTIC

IN WHITE AND IN DIFFERENT COLORS

WE SUBMIT DESIGNS when desired, and do work in any part of the country. Let us figure with you on one job, large or small. One trial will convince you.

MANTELS—GRATES—FIRE-PLACE GOODS

WISCONSIN MANTEL & TILE CO.

420 Milwaukee St., Milwaukee, Wis.

Corrugated Iron Roofing

Galvanized and Painted

The Jersey City Galvanizing Co.

MAIN OFFICE

107 John Street :: NEW YORK

To Prove to You the high, standardized construction and composition of Carey's Roofing, we want to send to you Booklet and Sample FREE and give you practical information regarding Carey's Roofing based on 25 years' actual time-proved tests. Carey's Roofing is equally adapted to flat or steep surfaces, wood-shiplathing, tile or concrete. Whether your contract is large or small, we want to show you the advantage of using a standardized roofing material.

THE PHILIP CAREY MFG. CO.

58 Wayne Avenue 50 Branches Cincinnati, O.

"FAMOUS FOR DURABILITY"
James Swan Co. Tools

The James Swan Company, Seymour, Connecticut, have just issued a new loose-leaf catalog which shows up to advantage the many lines of carpenters' tools which they manufacture.

The present location of their factory has been devoted to the making of bits and augers for over one hundred years. Their line consists of augers, auger bits and chisels of all kinds, drawing knives, screw drivers, nail sets, boring machines, gillets, gouges, expansive bits, ice picks, plug cutters and hollow augers, all of which are fully warranted. Two of their leading lines are illustrated herewith.

Concrete Machinery Specialists

The first essential of successful concrete machinery is the equipment that makes it.

Raber and Lang, Kendallville, Indiana, owe their ever increasing business largely to this fact, inasmuch as they have equipped themselves thoroughly with everything that was needed to turn out an absolutely perfect product. They are concrete machinery specialists.

Adopting the name "Crescent," when they first started in the machinery business, they have built so well that today the word "Crescent," appearing on any concrete machine, is a pledge of satisfaction. Their line consists of The Crescent continuous mixer, with automatic side loader; Crescent pipe and tile molds; Crescent power drain tile machinery; Crescent brick machine; Crescent elevators and conveyors, revolving sand screens for every purpose, power tampers for large tile, trucks and cars for block, brick and tile makers, culvert forms in any size, wet process fence posts molds, tapering or round porch column molds any diameter at top or bottom, and any special molds which will be made to order.

Two of the James Swan Co. Tools

Among this large line they have two especially attractive propositions that will appeal to the readers of this paper, namely, the Crescent mixer and the Crescent brick machine. It is not the purpose of this article to go into detail relative to either of these machines, but the writer knows that they are good machines, machines that will pay you to investigate thoroughly. Their literature is attractive and is of great interest. A letter or card addressed to Raber and Lang Co., Kendallville, Indiana, will bring this to you.

"X L" Metal Shingles

The latest addition to the immense lines of sheet metal products of the Canton Art Metal Company, Canton, Ohio, is the "XL" metal shingle. This is a heavily embossed shingle of beautiful design, and is provided with their improved side lock construction, which is doubtless already well known to many of the readers of the AMERICAN CARPENTER AND BUILDER. It makes allowance for the necessary expansion and contraction and at the same time makes an absolutely tight fitting side lock. These shingles are made in 10 by 14 inch size and are furnished in both galvanized steel and painted tin.

Your Success is our Necessity

We Want to Show You Why

CAN you afford to figure a job of Metal Ceiling unless you are sure the cost of erecting will not exceed your estimate? Your success is our necessity because you will not buy our ceilings unless there is profit in them for you and satisfaction for your customers. Most of your success depends upon the fit.

We Have Solved the Problem

Our Double Bead Lap produces a thoroughly dust-proof and invisible joint. It is simplicity itself. Easy to fit, therefore cheapest to erect. This means profit and satisfied customers to you.

Another Secret

The great variety and high character of our Art Metal Ceilings and Sidewall Designs insure the customer's preference when shown our catalogue. Send us plans with all measurements and we will prepare drawings of appropriate ceilings, without charge, and name you low price on all material. P.O. B. your station.

The Tiffin Art Metal Co., Tiffin, Ohio

2nd & Broad Ave.

Sash, Door and Blind Makers' Supplies and Special Machines

WINDOW PULLEYS (Cast and Sheet Steel). All sizes and finishes. Write for Catalogue.

ENTERPRISE PULLEY MORTISER. Equipped with Four Bits. Cuts Full Stile in same time required for single mortise

ENTERPRISE POCKET CUTTER. Makes a Pocket both wind and water tight.

PIONEER MOULDING SANDER. Finishes Mouldings and Interior Trim equally as well as handwork, and at one-tenth the cost.

Sash Cord and Chain, Glazier's Points (Standard and Machine), Blind Staples, Wood Screws, Wire Nails and Dowels.

AUSTIN & EDDY

805 Tacoma Bldg., Chicago, Ill.
AIRGAS—LATEST INVENTION

ACME OF SIMPLICITY AND ECONOMY (1,000 Candle Power for One Hour for One Cent)

The Standard Vacuum Gas Machine has revolutionized Gas Production by means of a Vacuum Cold Process. Airgas can be used for Lighting, Heating, Cooking and Industrial Purposes. Airgas is made without the application of any heat and consists of 97 per cent of air that you breathe and 3 per cent of Gas. Machines are made in different sizes, for small homes, big residences, large buildings, or can be used to supply gas for entire towns up to 20,000 people. Gas made automatically throughout. No cleaning. No work filling machine. It runs itself. Water Geothermal, Geothermal, or Water, also called Pellet, or Motor-pipes of any grade. Standard Vacuum Airgas can be made for 15 cents per 1,000 cubic feet. 32 times cheaper than electricity, 25 times cheaper than acetylene, 12 times cheaper than common kerosene oil lamps and 16 times cheaper than Coal or City Gas. Machine makes gas only when needed, otherwise stands idle. It is always ready. Gas produced instantly. No waiting. All conveniences of city gas, with none of its dangers and its disadvantages.

The illustration above shows an entire Standard Vacuum Gas Plant for a Private Residence.

Agents Wanted: We want a representative in each town or community. Agents will be fully protected. No experience of any kind required. Plants can be delivered ready for any location and for any country or climate. Systems will last a lifetime. Always satisfactory. No trouble. No worry. Contractors & Builders visiting the coming Cement Show in Chicago are cordially invited to call on us where we have a Machine on demonstration.


Huther Bros. Patent Groover or Dado Head "Will save it's cost in three days' time."

Griswold Adjustable Roofing Brackets

TIME, LABOR AND MATERIAL SAVERS.

For supporting staging for shingling, repairing and painting roofs. Only positively safe staging support without nailing. Instantly placed in position or removed. Adjustable to any angle. Made of steel, light and hold to small space for packing. They are particularly convenient in working around Dormer windows, skylights and pizza roofs.

No carpenter, builder or painter should be without a supply of Griswold Roofing Brackets. Send for circular and agents' proposition.

W. S. GRISWOLD
37 John St., Springfield, Mass.

METAL CEILING AND SIDEWALL

LARGE VARIETY OF CLASSIFIED DESIGNS


WE MAKE QUICK SHIPMENTS.

Suggestions Plans Estimates Free.

ALL STYLES OF METAL ROOFING.

The Kanneberg Roofing & Ceiling Co.

1002 Robin Street, Canton, Ohio

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
Weber Wax Polisher and Sander

There is a great demand for a small wax polisher and sander, if it is handy and effective. Knowing this, Mr. John F. Weber, who has made almost a life study of contractors' needs, has perfected a polisher on an entirely new principle.

It is composed of three castings, three screws and a handle. The weight is separate and, when a thumb screw is loosened, the sandpaper block can be set at any angle. This gives as many different scraping surfaces as there are angles, and nearly doubles the life of the sandpaper. When the sandpaper does become worn out, a new sheet can be set in place in an instant.

When used as a wax polisher, a tough bristle brush of best quality fits into the place of the sandpaper block. The polisher is then ready for use. Special care has been taken to provide a weight just heavy enough to impart a fine finish without being hard to transport.

Both the sandpaper block and the brush fit into a clamping arrangement in such a way as to bring them flat and even on the floor. This care has resulted in producing a true "lineless" finish all over the floor.

Besides using this polisher themselves, contractors find a ready sale for them. After finishing up a house, it is a simple matter to sell one to the owner, because its utter simplicity and handiness—with its superior work—speaks for itself.

Contractors are asked to write to Weber Mfg. Co., 670 71st Ave., West Allis, Wis., for complete particulars and prices on this polisher and on a number of other modern money-saving devices, including the famous Weber Double Acting Floor Scraper.

Hints on Boat Building*

By an Amateur

Like most carpenters, there are seasons of the year when I have considerable idle time, and in looking around trying to find some way of profitably occupying this time, I ran across the proposition of building one's own boat.

I have always wanted a boat but the cost of the completed article has been beyond my means. When one of my friends suggested that I could at a comparatively small expense build myself a boat that would be entirely satisfactory, I was a little skeptical, as I had always thought that while I am thoroughly familiar with ordinary carpenter's tools, that the building of a boat required the technical skill of an experienced boat builder.

However, I decided to make the venture, and so purchased a knock-down frame from a boat factory for a 20-foot launch, who sold the goods at a remarkably low price. On receipt of the frame I started to set it up and after considerable difficulty, occupying several days time, I succeeded in accomplishing this part of the work after a fashion. When the frame was set up, one of our local boat builders dropped in to look it over, and I must say that I was somewhat discouraged by his criticisms.

First he said "There is not a single floor timber in the whole boat. What do you suppose is going to hold her together? There is nothing to hold the ribs to the keel but a couple of wire nails. You can never make her tight with—"For further information on Boat Building, address the Pioneer Boat and Pattern Co., Wharf 25, Bay City, Mich. Ask for "Pioneer Boat Book."

OAK FLOORING

BUILDERS AND CONTRACTORS should always use OAK FLOORING. Your clients then will be satisfied. Any truthful landlord will tell you that OAK FLOORING increases the renting and selling values.

OAK FLOORING—the modern, sanitary, hygienic floor; cheaper than carpets. With an OAK FLOOR, your home is half furnished.

OAK FLOORING 1/4" thickness can be laid over old floors at a very low cost, without disturbing the woodwork of a room.

OAK FLOORING gives an air of refinement and elegance to a home. Is rich and cheerful in color.

OAK FLOORING is made in four grades, and is adapted to the humblest of homes or a palace.

Use OAK FLOORING for artistic, economical and durable qualities. Write us for further information.

THE OAK FLOORING BUREAU, 826 Hammond Bldg., Detroit, Mich.

TWO BIG WINNERS

At the Cement Shows the "Crescent" line of concrete machines again carried off all honors. We show in this ad two machines that all builders should own.

The "Crescent" Continuous Concrete Mixer will make you money, absolutely. It is so simple, yet very durable, accurate and efficient. You will never go back to the shovel if you get a glimpse of this machine.

The "Crescent" Vertical Tamping Brick Machine is in a class of its own. It is perfection itself. Over a dozen distinct features. WRITE FOR OUR FREE LITERATURE.

We manufacture Pipe and Tile Molds, Elevators, Conveyors, Fence Post Molds, Etc., Etc.

RABER & LANG MFG. CO., Kendallville, Ind. :: 810 Mill Street

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
We Want a Builder
In Every Town

We Have An Attractive Proposition For One Carpenter
Or Builder In Every Community To Take Orders For
Our Widely Advertised

Edwards' Metal Spanish Tile
ARE EASILY SOLD BY OUR AGENTS
Home Owners Everywhere Are Reading Our Advertisements In The Leading Magazines

Edwards' Interlocking Metal Spanish Tile
ARCHITECTS EVERYWHERE SPECIFY THIS ATTRACTIVE ROOFING

Edwards' Metal Tile are stamped out of the highest quality Worcester Grade Terne Plate, size 10 x 14 inches, furnished either painted or heavily galvanized. They are provided with our patented interlocking device, which conceals all nails, makes it possible to get a perfectly moisture proof roof without soldering and without danger of having the tile crack open in extremely cold or hot weather. Edwards Metal Spanish Tile looks exactly like the best Terra Cotta Tile. They have the decided advantage of being much lighter, easier to apply, longer lived and cost much less.

The Edwards Manufacturing Company
401-417 Eggleston Avenue "THE SHEET METAL FOLKS"
Cincinnati, Ohio
THE WORLD'S LARGEST MANUFACTURERS OF METAL ROOFING, METAL SHINGLES AND METAL CEILINGS

"We Save the Children"

By using our Ventilating School Room Heater
For CHURCHES, SCHOOLS and RESIDENCES
Any Size
Send Plans for Estimates

CHAS. SMITH CO.
102 Lake Street, Chicago

CONSOLES
Columns and Grilles

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

Send for 36-page Catalog — No. 16 —
It contains many fine designs of modern Grilles, Columns and Consoles.

Northwestern Grille Works
Incorporated
CHRISTENSEN BROS., Managers. 1820-26 Milwaukee Ave., Chicago

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
that kind of construction, and the clamps and stringers are
not large enough for a row boat."

However, as I started I determined to finish the boat up,
which I did in about two months time, working nights and
all other spare time I could get. I spent a great deal
of time calking the seams, as I wanted to show my friend,
the boat builder, that this boat was going to be water tight.

After installing a J H. P. engine the boat was launched
and did not leak a drop until I started the engine up. After
running about a mile I soon found out that the boat was
only tight went standing still, and I had to admit to myself
that the boat builder was right, and that the plan of construc-
tion was not right, or the boat would not have begun leaking
as soon as the boat started.

However, I used her all that season and had more real
pleasure than I ever had before, although I think that I
lowered the water in the river that summer by steady use
of the pump. I sold her in the fall to a party who did a
lot of work on her in the way of reinforcing the frame, and
giving the boat additional strength throughout and he got
along with her fairly well.

After my season's experience I had the boating fever worse
than ever, and decided to build a larger boat during the
coming winter, but this time I decided that instead of taking
merely the question of price into consideration I would
investigate the reputation of the Company from whom I
bought the material, and be sure that I was getting what
I should get in the way of quality and workmanship in the
frames of the boat; the technical part of the work which
should be made by the experienced boat builder.

I decided on a 25-foot extension cabin cruiser, which I
had often seen and admired very much on account of her
trim appearance and fine accomodations and seaworthy quali-
ties. On getting acquainted with the owner of the boat he
informed me that he purchased the frames and material in
the knock-down the same as I had and finished her himself,
but had none of the difficulties that presented themselves to
me when I built my first small boat, as the material he had
received had been satisfactory in every way.

He gave me the name of the company from whom he
purchased and I immediately got busy and ordered material
for a duplicate of my friend's boat, from the company he had
bought of, and when the goods arrived and I got them
unえた I found them an entirely different proposition from
the one that I had first tried. The frames came finished
complete, with every possible part ready to re-assemble; with
all the parts that might possibly be assembled incorrectly;
permanently fastened, ready for the water. Every pair of ribs
was fastened securely together with a good solid floor tim-
ber; the clamps and bilge stringers were heavy; each rib was
bent to its exact shape and stayed, and a keelson was also
furnished, and with the frame came complete instructions
for re-assembling it, telling how to bolt the bilge stringers
and clamps to each rib and how to bolt the keelson through
the floor timbers to the keel, together with complete instruc-
tions for finishing the boat. The material was of the very
best throughout and of the proper size to make a thoroughly
seaworthy boat.

I was able to re-assemble this frame, although it was a
very much larger boat than my first one, in less than three
hours after uncrating it, and the boat was ready to plank.
I worked at the boat through the winter, putting in only my
spare time, and long before the season opened she was ready
to launch. I have used her ever since and she is not for
sale, but I have a pump that I would donate to any of my
less fortunate boating friends.

From my second experience I found, as I had been told
in the first place, that to build your own boat, no matter what

---

Carborundum Carpenters' Round Combination Bench Stone

_You Can Use All of the Surface and Put a Clean Smooth Edge on Your Chisels, Plane Bits or Similar Tools_

Note the shape—round so as to give full play for rotary sharpen-
ing motion—There is no unused surface—The wear is uniform—
Its use means a better edge in less time—Can be used dry or with
Carborundum Temperoil, the oil that tempers the cut, smooths
the edge, does not gum and has no acid.

Carborundum Round Combination Bench Stone

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 107</td>
<td>$1.00</td>
</tr>
<tr>
<td>With Quartered Oak Box Holder</td>
<td>1.50</td>
</tr>
<tr>
<td>Carborundum Pocket Stone in Case</td>
<td>.35</td>
</tr>
<tr>
<td>Carborundum Temperoil; 1⁄4 ounce bottle</td>
<td>10</td>
</tr>
</tbody>
</table>

_All from your hardware dealer or by mail direct_

_The Carborundum Company_

Niagara Falls, N. Y.
ADDITIONAL PROFITS from Lightning Conductors

You can make extra money and please every customer by handling the right lightning protector. The safest, fastest selling and most profitable system is the NATIONAL Flat Copper Cable. Round if preferred. Advertised extensively for your benefit. We help you sell by sending letters and literature to prospective buyers furnishing names of inquirers, etc.

A perfect system, giving perfect protection, with a perfect advertising and selling plan, and right in line with your other work. Easy to secure the order when building or repairing house or barn, and you make a complete job with additional profits.

We can place you in a position to overcome all competition in your territory. Let us send our booklet, "The Laws of Lightning," and full particulars.

National Cable & Mfg. Co.
Department C
NILES, MICH.
the size, is a very simple and easy proposition if you get the proper material and proper foundation work from a reliable company. The rest is child's play, and while any amateur who can handle tools at all can make a successful boat, the average carpenter, being familiar with tools, can do it without the slightest difficulty of any kind.

Eclipse Concrete Mixers

This is the age of concrete; all other building materials are giving place to it.

The question that confronts contractors and builders no longer is, shall it be concrete; but what method, or machine, will produce concrete of best quality and at greatest economy?

For this purpose the Eclipse concrete mixer is offered by its manufacturers, the Standard Scale and Supply Company, of Chicago. It differs from all other standard batch mixers in the important feature of being built low and charged directly from barrows, requiring only slightly inclined run-ways, instead of being placed high above the ground, necessitating the use of some form of mechanical charging device.

Eclipse mixers come in all sizes to meet the requirements of both large and small work. An interesting catalog is issued by the Standard Scale and Supply Company, describing these mixers and their other contractors' equipment. It will be mailed free to our readers on request.

The Results of Indifference

In some factories where tools are made there is a spirit of indifference to results. From the head of the house down, the idea is to produce as much as possible and to sell it by one means or another; preferably by fixing the price a little under what really good tools should cost, and fixing the quality to match the price.
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SUPPLY THAT ELIMINATES THE STORAGE OF
WATER. THE ONLY SYSTEM THAT DELIVERS
WATER DIRECT AND FRESH FROM THE WELL.
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In the first place, the steel selected for these inferior tools must be bought at a price, and so must the wood for the handles. The work of shaping, hammering and adjusting is done quickly because time spent in careful work costs money. The tools are passed from one department to another in a rush, finished rapidly, stamped with a meaningless statement like "warranted all steel," or some other vague description, and shipped to dealers in all directions.

It was for the purpose of protecting the dealer, the mechanic or farmer, and themselves, from any chance of dissatisfaction that more than forty years ago the Simmons Hardware Company decided to stamp their line of tools with a trade mark that carried a genuine guarantee, that meant satisfaction, or money back, to both dealer and user. The idea met with a great response from all sorts of craftsmen, and today they recognize the Keen Kutter trade mark as the identifying mark of the finest tools and cutlery obtainable.

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One Gallon is sufficient for 500 square feet.

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- No. 123 Dark Oak
- No. 125 Mission Oak
- No. 124 Early English or Manila Oak
- No. 110 Bog Oak
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- No. 129 Dark Mahogany
- No. 130 Weathered Oak
- No. 131 Brown Weathered Oak
- No. 172 Flemish Oak
- No. 178 Brown Flemish Oak
- No. 110 Bog Oak

Gallons $3.00—Half Gallons $1.50

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BECAUSE THEY ARE MADE OF VERY HEAVY GAUGE METAL AND PERFECTLY CONSTRUCTED.

If the upper plate 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.

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Notice to Advertisers

Forms for the July number of the American Carpenter & Builder will close promptly on June 20. New Copy, changes and orders for omissions of advertisements must reach our business office, 178 West Jackson Boulevard, Chicago, not later than the above date to insure attention.
ANY WEATHER is "Good Building Weather" when you use Bishopric Wall Board as a substitute for lath and plaster. It is cheaper and better and does away with all delays in building. It is nailed to studding dry, ready for immediate application of paper, paint, burlap, or any other kind of decoration.

FOR WALLS AND CEILINGS

This substitute for lath and plaster is made of kiln-dried, dressed lath, imbedded in hot Asphalt Mastic surfaced with sized cardboard and cut at the factory into 4x4 feet sheets, which are easily and quickly nailed to studs, ready for immediate application of wall paper, paint, burlap, or other decoration. The laths imbedded in Bishopric Wall Board give it wall strength, a guarantee against warping.

It is applied dry, is guaranteed not to swell, shrink, warp, crack, flake or blister; is clean, sanitary and odorless; is proof against moisture, cold, heat, and vermin; saves fuel in winter and keeps out summer heat; also deadens sound.

Bishopric Wall Board is made of railroad dressed lath, imbedded in hot Asphalt Mastic surfaced with sized cardboard and cut at the factory into 4x4 feet sheets, which are easily and quickly nailed to studding dry, ready for immediate application of paper, paint, burlap, or any other kind of decoration.

PRICE OF WALL BOARD AND SHIPMENT—Crate of 16 sheets, covering 256 sq. ft. of surface, $6.40 per crate, or $2.50 per 100 sq. ft., F. O. B. New Orleans, Cincinnati, or Alma, Mich. We ship from nearest point.

BISHOPRIC SHEATHING

In applying ordinary lumber, heavier scaffolding, more tools and greater scaffold floor space are required. In applying Bishopric Sheathing, one man drives a few nails in each sheet; a common laborer or boy can finish the nailing.

Bishopric Sheathing is made of same materials as Wall Board, but finish is not necessarily so fine, therefore costs less. It is of uniform thickness, insuring a perfectly even surface when applied.

Bishopric Sheathing is nailed to studs, with lath and asphalt side exposed. Over laths weather boards are nailed or cement applied.

Bishopric Sheathing makes a more solid and substantial wall than lumber. There are no gaping joints; no widening cracks due to shrinking; no knot holes.

The Asphalt Mastic in Bishopric Sheathing is a non-conductor, moisture cannot penetrate it. It is proof against vermin. The pests cannot bore through the tough, gummy Asphalt Mastic. In applying weather-boards over laths, dead air space is left between the laths; formal.- splendid insulation. Does away with the expense of building paper and cost of its application.

One wagon load of Bishopric Sheathing covers an area from six to ten times as great as one load of lumber—a tremendous saving in hauling. Five thousand feet can be hauled in an ordinary wagon.

An Ideal Bishopric Home

Ideal Bishopric Sheathing also is used with excellent results under flooring and as a substitute for roofing boards. Used under floors, it serves as a sound deadener and keeps out dampness; used under the shingles, it keeps out cold and summer heat.

ITS MANY USES—Bishopric Sheathing also is used with excellent results under flooring and as a substitute for roofing boards. Used under floors, it serves as a sound deadener and keeps out dampness; used under the shingles, it keeps out cold and summer heat.

BISHOPRIC ROOFING

The materials used in Bishopric Roofing are self-protecting. Other roofings require protection in the way of paint or coatings to prevent drying out, cracking or rotting. Bishopric Roofing requires no help. The asphalt mastic is non-conductor, moisture cannot penetrate it and cannot soften, dry out, crack or blister. The roofing has a thickness of 1/8 inch; it is fireproof by composition. The Mastic is applied hot to the roof and is proof against moisture.
KEEN Kutter knives are true in temper and of finest quality from point to heel of every blade. Ordinary knives balk, flinch and fail because the blades are soft in spots and the microscopic teeth that form the edge get bent and useless.

**KEEN KUTTER**

knives are uniformly hard. The workman who tempers Keen Kutter steel takes the same pride in his work that you do in yours, and that spirit prevails in every detail of manufacture. Keen Kutter blades hold their edge, and keep their spring, the handles stay on—and the whole knife makes good. If it doesn’t, your dealer refunds the price. The guarantee is as real as the knife.

"The Recollection of Quality Remains Long After the Price is Forgotten."

Trademark Registered.

—E. C. SIMMONS.

If not at your dealer’s, write us.

**SIMMONS HARDWARE COMPANY, Inc.**

St. Louis and New York, U. S. A.
WE INITIATE -- NEVER IMITATE

Time-Savers

50%

of the time required to hang a door can be saved by using "National" Ornamental Butts. Some contractors say they can save more. Figure up the time spent in a year in hanging doors and you will see how much it is to your advantage to use them.

Another exclusive feature—
The new false tip is threaded and screws into the butt. The slot is for a screwdriver, making it easy to remove the pin. Also shows which is the bottom of the butt.

STYLE No. 400
here illustrated can be furnished in any finish and in all sizes from 1½-inch to 4½-inches inclusive.

Ask for Booklet, "Ornamental Ideas," and give us your dealer's name.

Directions—Attach butt part "A" to jamb first, then set and wedge door into position and attach Ornamental Leaf to surface of the door. Simple, isn't it?

National Manufacturing Co. Sterling, Ill.