ANThRAFILL FILTERS
FOR TRULY CLEAR, CLEAN AND SPARKLING WATER
COMPLETELY EFFECTIVE
IN ANY CLIMATE

JUNIOR ANTHRAFILL
POOL FILTER
COMPLETE WITH 1/4 H.P.
1725 RPM MOTOR
• 2400 GPH Pump Capacity
• Motor with Grounded Cord and Plug
• 10 Gallon Tank with Bolt-on Cover
• Epoxy Phenolic Lining
• Brass Pump and Strainer
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WITH OVERLOAD PROTECTION
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BRASS STRAINER
List $7.95 RSA86
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• Heavy Duty

For any size pool that uses a filter. Easily attaches to intake hose of filter for automatic skimming action. Cleans floating and surface debris. Unit is molded from high impact poly-styrene and poly-proplene, has one piece floating weir with amazing "living hinge", removable leaf strainer, adjustable anodized aluminum support brackets, fits any above ground pool, wall up to 2" rim size, standard pool hose connection.

For any size pool that uses a filter. Easily attaches to intake hose of filter for automatic skimming action. Cleans floating and surface debris. Unit is molded from high impact poly-styrene and poly-proplene, has one piece floating weir with amazing "living hinge", removable leaf strainer, adjustable anodized aluminum support brackets, fits any above ground pool, wall up to 2" rim size, standard pool hose connection.

B. D. W. PARKWAY INDUSTRIES BOX 123 S. Plainfield, N.J. Dept. W.B.
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"Christmas Money" Coupon Card
(FACING THIS PAGE)

GOOD FOR

$275 Worth of Greeting Cards for Christmas and All Occasions

AND YOU ALSO GET

2

New Christmas Samples, on approval, and full details on how to earn, in your spare time, $50 to $250 between now and Christmas

JUST IMAGINE! The valuable Coupon Card attached to this page is good for the Giant $2.75, 98-piece Assortment of Christmas and All Occasion Greeting Cards — for only 25¢ to help cover packing and mailing costs (which will be billed to you later). In addition, this Card will also bring details on how you can earn $50 to $250 in your spare time between now and Christmas!

Why do we make this Special Introductory Offer? Because we want you to see how easy and pleasant it is to earn "Christmas Money" with our wonderful "Extra Money" Plan. No experience needed!

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To help you get started, with your giant assortment of cards we will also send you several other popular assortments on approval. If friends don't snap up these bargains, send them back at our expense and pay nothing!

Mail The Coupon Card at Left NOW — WITHOUT Money!

Mail valuable postpaid "Christmas Money" Coupon Card at left now. The big $2.75 Giant assortment of cards will be yours to KEEP whether or not you do anything further about the "Extra Money" Plan! If Coupon Card has already been detached, write direct, enclosing 25¢, to GREETING CARD ASSOCIATES, Studio W167, 1113 Washington Ave., St. Louis 1, Mo.

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Imperial Greeting Card Co.
Los Angeles 12, Calif.

Midwest Card Co.
St. Louis 1, Mo.

New England Art Publishers
N. Ashington, Mass.

Western States Card Co.
Denver 11, Colo.

Mail the Coupon Card at left now to GREETING CARD ASSOCIATES!

One of These Nation-Wide Associates Will Give You Prompt Service In Your Area:

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Chicago 13, Ill.
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Detroit 4, Mich.

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Los Angeles 12, Calif.

Midwest Card Co.
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New England Art Publishers
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Yes! You Get A $2.75 98-Piece Assortment for only 25¢ (SEND NO MONEY NOW!)

Imagine! ... you get 98 useful items in this big assortment, It's a joy to have on hand, always ready for every greeting card need. Included in this Giant Christmas and All Occasion Assortment are generous quantities of cards for:

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CRAFTSMAN WOOD SERVICE CO., Dept. L-7 2729 S. Mary Street, Chicago 8, Illinois

Rush Giant New Craftsman Wood Catalog. I enclose 25c to cover mailing cost.

Name ..........................................
Address .....................................
City ........................ Zone ... State
Letters to the Editor

Dear Mr. Topper:

In the May-June issue you say that when you buy a swimming pool you should get a complete maintenance kit, but you show just a filter by itself on page 43. What other equipment is available with the filter?

R. S. L., Canton, Ohio.

Dear Mr. R. S. L.:

Problems of lack of space permitted showing only the filter. Our unit, however, was supplied with a complete maintenance kit. It consists of the filter and a floating weir that skims foreign matter from the surface of the pool. The weir automatically adjusts to variations in water level. There also is a vacuum cleaner with floating hose, and a chlorine dispenser with a supply of chlorine granules. A hand skimmer is provided to clean leaves and debris from the surface. For more information on filter Models 110 and 114, write directly to: Home Pool Equipment, Inc., 1815 N. Potrero Ave., El Monte, Calif.

A similar setup can be purchased from Parkway Industries whose interesting and attractive ad is on the inside cover of the magazine.

Dear Mr. Hedden:

I have been retired from the railroad for three years and am happy to join the ranks of amateur grandfather clock builders. When I turned to the Letters to the Editor column in the March-April issue I was surprised to see a photo of the type clock I made. In the last two winters I've made a total of three, from a colonial pattern from Mason and Sullivan. I planed rough native walnut to 13/16 in. with my 12-in. Parks planer, used figured wood for most of the clock, with straight-grained stock for the waist. All the main joints are splined so I eliminated glue blocks. All the molding was made with an 8-in. Craftsman saw. None of the molding is glued, but is held by wood screws driven from inside the case. The hood can be removed by taking out a few screws, leaving the works in the clear. The works are German-made and have Westminster, St. Michael and Whittington chimes. The case has two coats of filler-sealer and two coats of Pen-Chrome clear satin varnish. Over this is applied a coat of imported, lavender-scented cabinetmakers' wax. The clock was appraised by a local furniture man as being worth over $1,000. My wife and I are proud of the clocks and hope our three grandsons will be when the time comes that they are passed on to them.

B. B. Topper, Ashtabula, Ohio.

Dear Mr. Topper:

Grandfather clocks have been one of our most popular subjects, and you have done a magnificent job on yours. It seems to us that the clocks challenge the creative craftsmanship in a builder; we have never seen a clock badly done. We are sure your grandsons will be most appreciative when they receive the clocks. These time keepers are timeless in their appeal to all of us.

Jay W. Hedden

Dear Mr. Hedden:

In the May-June issue you say that when you buy a swimming pool you should get a complete maintenance kit, but you show just a filter by itself on page 43. What other equipment is available with the filter?
Mr. Caldwell spends his leisure time constructing scale models of old railroad cars. His other hobbies include woodworking, metalworking, photography, photo-developing and the study of plant life.

"All of this would not have been possible," says Bert Caldwell, "without my MAGNI-FOCUSER. I call it "My Real Eyes." Mr. Caldwell goes on to say, "I was out of hobby work for several years because I just couldn't see fine detail any more. Then someone recommended MAGNI-FOCUSER and I was back in business. MAGNI-FOCUSER is a binocular magnifier that gives 3-D magnified vision. I wear it over my eyeglasses. This leaves both my hands free for all the intricate work I do. MAGNI-FOCUSER acts as an eyeshade, too, by shutting out all overhead and side glare. To resume normal vision, I merely raise my head slightly." MAGNI-FOCUSER comes in 3 models—134" magnification at 14", 234 at 10", 234 at 8". Order from EDROY PRODUCTS CO., Dept. A, 480 Lexington Ave., New York 17, N. Y. Costs only $12.50. Absolute money-back guarantee if you're not delighted.

Dry cells, and the batteries assembled from single dry cells, are regarded as semi-perishable. From the time a dry cell is manufactured, whether in use or not, it deteriorates. That is, it gradually loses the power-producing capability it had originally. Usually, when we speak of a "fresh" cell, we are talking about one that is within its recognized shelf life. Shelf life is the length of time from manufacture until the cell has 85 or 90 per cent of its original capacity. Most cells of the larger size—from "C" size on up—and batteries composed of those cells, are considered to have a shelf life of one year. Cells from the "AA" size down are generally regarded as having a shelf life of six months. The larger the cell size, the greater the shelf life, and conversely, the smaller the cell, the shorter its shelf life.

There are two factors that operate to cause this gradual deterioration of the cell; manufacturers attempt to control both these factors in various ways. The most important limiting factor in moisture in the electrolyte. Once this moisture evaporates, the cell is dead. In addition to the top pour of asphalt, common in all cells, manufacturers attempt to control the evaporation from the cell by other means. Ray-O-Vac, for instance, uses a completely sealed-in-steel construction. This limits the amount of "breathing" the cell does. Breathing is a result of atmospheric changes. It is this "breathing"—a transfer of air and moisture in and out of the cell when temperature and pressure change—that causes moisture loss.

The cell, incidentally, cannot be sealed completely, as some gases must be permitted to escape. Without some sort of venting the cell would swell when it discharged. Our sealed-in-steel cell is vented through the asphalt-impregnated kraft, (or polyethylene-laminated), paper around the top.

The other factor operating to cause deterioration of the cell is a slight chemical reaction taking place within the cell even when it is not on a closed circuit. This chemical reaction is variously called "parasitic action" or "local action" and, in general, is the result of a cell-within-the-cell, so to speak. The possibility of parasitic action could probably be avoided only by using absolutely pure raw materials, which is economically an impossibility. The manufacturer attempts to control parasitic action by maintaining as high a level of purity of raw materials as is economically possible, along with the use of corrosion inhibitors in the batteries. The latter operates to retard parasitic action and thereby extend the shelf life of the cell.

Storing batteries in a cool, dry, even-temperaturated location will assure longer shelf life of a dry cell. Proper protection of exposed metal parts, keeping batteries in cool bags, and storing the cells in coolers or even freezers is acceptable. With the exception of some very small sizes, the LeClanche cell suffers no damage from freezing, and this low temperature extends the shelf life of the cell. A Frenchman named LeClanche described the forerunner of the modern dry cell in 1868 and most of the dry cells manufactured and used today are basically the same as he described.) Moisture loss is reduced materially, and parasitic action is avoided almost entirely at temperatures of zero degrees F. and lower.

Leakage probably is the most common complaint about dry cells. Most dry cells, and batteries of dry cells, by the nature of their production, are of good durability and quality. Within a given brand there is little variation in capacity. Because of variations in raw material, capacities may vary from time to time. The manufacturer of course, attempts to control the raw materials, and to assure stable quality. The most difficult raw material to control is the manganese dioxide that
serves as the depolarizing agent. This material is mined in various places around the globe, and even from a given mine quality will vary. The use of artificial manganese dioxide assures a more stable quality of raw material, but artificial manganese is more expensive than natural ore, and generally is used only in premium-unit cells. It also is used in smaller cells that are used in assembling batteries. It normally is mixed with natural ore, with the particular formulation determined by the anticipated use of the battery. Artificial manganese has some advantages where high drains are anticipated on batteries, but has little effect where the expected drains will be low or intermittent. The shelf characteristics of artificial manganese dioxide are not as good as the natural material. (The major exception to reasonably stable quality among dry cells is in regard to imported units. Tests show that imported batteries reflect much greater variation among themselves than is found in domestically-made units.)

A dry cell leaks for one of two reasons, or a combination of the two. During normal discharge the anode, (the zinc can), portion of the cell is consumed. Because the can also is the container for the various ingredients in the cell, consumption of the can permits the electrolyte to escape. What actually happens is that the zinc can becomes perforated, the electrolyte eating tiny holes through the zinc. The electrolyte then seeps through the holes. At this point the dry cell is very near exhaustion, if it has any current-delivering capability at all. However, if the cell is left on a closed circuit, the chemical reaction continues to consume the zinc. The holes usually occur in the wall of the can, rather than the bottom, as it is made thicker by design.

The escaping electrolyte either is absorbed by the porous wrapper around the zinc can, or is contained by the exterior package of the cell. At this point, if the cell has been exposed only to intermittent drains,
Shoppers' Waterproof Hedge Trimmer fits any 1/2 or 11/2-in. electric drill motor. Extra-long 14-in. blade of hardened tool steel cuts, trims and shapes hedges and shrubbery faster and neater than hand shears. Handle lock at 10 angles for convenience. Unit is lightweight and compact, ideal for women gardeners. 1-year guarantee. $12.95 list, special price $8.88 ppd. Shop-King Inc. Dept. WB-5P, 425 W. 203 St., N. Y. 34, N. Y.

Adjustable Dado Head
With 8 blades adjusts by rotating the inner hub to produce a 1/4" to 15/16" width cut. Proven on table and radial-arm saws, you eliminate jerking, binding, or twisting on plywood and soft or hard woods. Units come in 6 or 9 in. models. 6" Dado is priced at $19.95 and with the ease of setting and quality of cut takes the guesswork out of the job. For the name of your nearest dealer, write to Comet Industries Corp., 2048 Imperial St., Los Angeles, Calif.

See More Read Clearly
More Finely Print

Slip-On Magnifiers
Having trouble seeing fine print and close detail work? Slip these magnifiers on your glasses and see clearer instantly! Powerful 2.50 diopter lenses. Fits all glasses. Low $2.98 postpaid price saves you at least 25% over usual price. State age. Money-back guarantee. You must be completely delighted or you may return postpaid within 30 days for full refund. Nel-King Products, Inc., Dept. WB-73S, 811 Wyandotte, Kansas City 5, Mo.

Septic Tank Trouble?
Northel Reactivator works to keep septic tank and cesspool clean. A bacterial concentrate breaks up solids and grease—works to prevent overflow, back-up, odors. Regular use can save costly pumping or digging. Simply mix dry powder in water, flush down toilet. Non-poisonous, non-caustic. Guaranteed to reactivate septic tank, cesspool. Six months' supply (22 cas.) only $2.95 postpaid. Northel Distributors, WM-7, P.O. Box 1103, Minneapolis 40, Minn.

Build This Baritone Ukulele
This baritone ukulele is tuned and played like the first four strings of the guitar. A rich, mellow tone, from an instrument only slightly larger than the standard ukulele. An exciting project for the do-it-yourselfer. Sounds more like a guitar than a ukulele. Full size plans include detailed instructions, construction tips, sources for special woods and materials. Plans are just $2.00 from: Ukulele, Workbench, Dept. 1070, 543 Westport Rd., Kansas City 11, Mo.

Original Designs
Variety and interest are the keys to America's most popular needlework magazine, The Workbasket. Every month you'll have original tatting, knitting, and crocheting designs right at your fingertips. You'll also find information on embroidery and needlepoint plus gardening tips and mouth-watering recipes. Four times a year receive hot iron transfers FREE. Send only $1.00 for 12 issues to the Workbasket, Dept. 1088, 543 Westport Rd., Kansas City 11, Mo.
**Showcase**

**Early American Coffee Grinder**

Blended your own coffee in this authentic, natural birch, Colonial Coffee Grinder. Easy to assemble kit contains everything needed to build a heavy duty, working Grinder - complete with pull-out drawer. Seasoned birch cut and grooved to fit perfectly. Decorate to match home decor. Size 6 x 6 x 6½. Retail price $14.95. Shoppers Showcase price $8.95. Send check or money order to Walcraft Products Inc, Dept. WB, 2501 Nebraska Ave., Toledo 6, Ohio.

**WET CONCRETE** ready to use is “Crack Crete,” available in bulk, in cartridges for standard caulking guns and in “Flo-Guns.” The latter is like a cartridge, but is self-dispensing. Turning the end cap starts the concrete flowing, a turn to the left shuts it off. The material is self-curing, but stays liquid in container. Can be used for dozens of jobs around the home. For nearest dealer: Crack Crete, Masco Products, Inc., 1511 West 39th St., Chicago 9.

**MINIATURE CHARGER** supplies a full ampere; can be mounted permanently on firewall of a car or in engine compartment of a boat, will charge dead battery to capacity that will start engine in one hour. Unit is just slightly larger than a pack of cigarettes, and can be submerged in water with no hazard of shock. At radio and electronic dealers for $6.95, or write to Electrotone Laboratories, Inc., 1713 N. Ashland Ave., Chicago 22.

**PUSH·PULL** cap on plastic glue bottle eliminates former cap that often was lost. New cap is pulled up to dispense glue, is pushed down to seal container. Cap is loss-proof, as it cannot be removed from the glue container. Plastic pin at the top of the inside shaft prevents dried glue from clogging cap; another problem often present with older-style cap. New cap is on 1½, 4 and 8-oz. sizes of Elmer’s Glue-All, will be on 16-oz. container later.

**THIS PAINT ROLLER** with a “squeeze-bottle” handle eliminates the need for frequent dipping into the paint tray. The handle holds about 13 oz., enough to cover 65 sq. ft. of surface. Constant supply of paint to the roller is assured by gripping the handle. Included with the roller is a cover for a 1-qt. paint can that makes pouring easy. Koto-Matic is $2.98 from Koto-Matic, 383 Winslow Ave., Buffalo 11, N. Y., refills 89 cents each.

**Water Broom Saves Time & Work**

Clean-sweep concrete and asphalt areas... patios, driveways, walks, garages, parking lots, porches, shrubs, etc. Three powerful jets of water deliver concentrated spray to move debris, cut hosing time, conserve water. Glides on swivel casters. Chrome-finish, pistol-grip shut-off forms handle. Money back guaranteed. $6.95 for one, two for $6.45 each, three for $5.95 ea., all prices postpaid. Rovercraft Industries, 222 West 38th St., Kansas City 12, Mo.

**Flower Show Tags**

New show tags for 1963 are ideal for all types of flower shows. These attractive tags designed especially for Flower and Garden Magazine, include division, class and variety, with concealed name of entrant and space for judges’ decision. Order now for spring shows. Send just $1.50 handling charge for each 500 tags to Flower and Garden Show Tags, Dept. 1028, 543 Westport Road, Kansas City 11, Mo. Allow two weeks for delivery.

**Suspens-O-Truss**

Now—Two-way rupture relief. You can enjoy the relief and comfort of a new truss design for reducible inguinal hernia combined with the added ease and security of a cool, comfortable suspensory. Flat foam rubber pad shaped to fit snugly under abdominal bulge. Elastic body belt. Send hip measurement. Only $6.98 postpaid. Satisfaction guaranteed or money back if returned p.p.d. in 90 days. Kinlen Co., Dept. WB-737, 809 Wyandotte, Kansas City 5, Mo.

**Evergreen Ground Cover . . . $2.98**

It’s Not Too Late to Plant 50 Hardy Creeping Myrtle (Vinca Minor) Plants ($2.98) to cover 100 sq. ft. of ugly bare spots. Thrives in dense shade where grass will not grow. "Periwinkle blue" flowers. We ship matured plant divisions from naturalized plantings, fully guaranteed. 100 plants only $5.75. Instructions included. If C.O.D. Postage extra. Cash orders add 40¢ and we ship p.p.d. Rush order today, Michigan Bulb Co., VM-1608, Grand Rapids 2, Mich.

**WORKBENCH** July-August 1963, 9
**Stepladder-Chair**

Except for double front legs, unit looks much like ordinary kitchen chair when stepladder is dropped down.

When top “slat” of back is pivoted upward it becomes top step of stepladder, or fairly high platform.
L. H. DUDLEY

Combining the functions of a utility chair and short stepladder, this item is handy to have in the workshop, basement or any room in the home where it is necessary to reach high shelves or cabinets.

Construction is simple, most any softwood can be used unless the unit is to be kept in a room where a hardwood chair would be more appropriate. The back legs of the chair are made by using a pattern enlarged from the squared drawing. If you have a set of wooden chairs that you would like to match, copy the back legs from those chairs. Because the chair is also a step-ladder, glue and screw all joints solidly. Also, while wood screws are shown as pivots for the back slats of the chair they would be stronger if 3/4-in. dowels. Glue the dowels into the slats and let them rotate in holes in the back legs. Short lengths of 3/8-in. metal tubing could be inserted to provide "bearings" for the dowels.

For a general utility use, ordinary fir plywood could be used for the complete chair. Note that the upper slat is 1/2 in. down from the tops of the back legs, and the center of the pivots will be 3/8 to 1/2 in. below the top edge of the slat. △ △

With ladder portion pivoted upward, first step is formed by swinging up the lower "slat" of the chair back.
Although this unusual, free-standing patio roof appears to curve in two directions, all wooden members actually are straight. Your youngsters studying geometry in high school or college may be able to explain to you that the roof represents a mathematical equation.

Start construction by setting the four corner posts in concrete. While the drawing shows 2 ft. in concrete, in cold climates we would recommend 30 to 36 in. deep. If the posts do not project exactly as indicated, be sure they are slightly too long, so they can be sawed to the right length. When the concrete has set, install the 2 x 6 framing. It will be necessary to half-lap the framing at the corners. The 2 x 6 facia goes on next, then the 1 x 2 battens, followed by the 1 x 4 redwood tongue-and-groove decking. The ends of the strips of decking can be trimmed flush with the facia by using a portable electric saw. After the strips have been cut, install the roll roofing, then the 1 x 3 trim strips. △ △
Non-technical, but a complete guide to metal craft work, this book shows and describes the various tools required and how to use them. Included is a section on metal spinning and painting. The last part of the book is devoted to various metal projects that can be made, using the information in the rest of the book.

Physical properties, test results and chemical resistance of Resin-Fiber Surfaced Plywoods are explained in this new booklet. It contains specifications and 47 illustrations which show how these products are being used for everything from directional road signs to decorative domes for patios.

In this attractive booklet are suggestions on how to plan patios, how to light them, how to select materials to make them more interesting and how to add touches that make them more attractive. Also included are ideas on maintaining patios and their furnishings. The ideas are imaginative, yet practical suggestions by the authors to be useful to amateur and professional patio builder.

Catalog has 32 pages, many in full natural color, featuring medicine cabinets, lavatory mirrors and accessories. Catalog reflects trend toward cabinets with larger capacity, with greater awareness of the danger from low-level storage of potential poisons that could be reached by youngsters.

This book assumes that the reader has no experience in graphic arts, thus the techniques described, and the equipment required are kept within the capabilities of the average hobbyist. Chapters describe linoleum-block printing, wood engraving, etching, silk screen printing, lithography, bookbinding and letterpress printing. If you want information on any of these crafts this book provides full details and even a history.
Early-American Water Bench

BY BRUCE BURK

If you are furnishing your home in Colonial decor, this water bench will make an attractive addition to the furnishings. There is more grace and beauty in this item than in much Early-American furniture. Part of the charm of the water bench is due to the contrast of small, slender drawers in the top compared to the fairly large doors in the bottom. The airiness is due in part to the open space between the top of the lower cabinet and the shelf and drawers above.

The bench can be used as a sideboard in the living room where it will provide ample space for linens and silver. The trough and upper shelf make an ideal place to display prized bric-a-brac. If you are a hi-fi enthusiast, the lower cabinet may be used to house a complete stereo installation. The tuner and amplifier can be located in the shelves on one side of the cabinet. The record player and tape recorder can be mounted in the other side on pull-out shelves.

First step in construction is to join, dowel and edge-glue 1-in. stock for the two sides, the shelves and back. Cut these parts to size and sand. Next, dado the side and back and the two upper shelves. Cut to size the five front members that surround the doors and assemble with glue and dowels. Attach to cabinet as-

More graceful and attractive than most colonial furniture, this water bench is ideal as a buffet.
assembly with screws and glue. Next, cut out and miter the three base members. Use hardwood splines, as indicated. Add corner blocks; attach base to cabinet with screws and glue. Miter the base molding and install with small finishing nails and glue. Cut the door panels to size from 1-in. stock and add the raised-panel detail by running through the saw with the blade tilted at 9 degrees. Dado the frame members as shown. (Note: The dado in the vertical members is blind; that is, it does not extend the full length of the member.)

Next, drill the frame members for dowels, and make the door assembly. Hang the doors and install button-type locks and knobs. The drawer fronts are made in a manner similar to the door panels. Rabbet the drawer front for the side members. Cut sides and back from ¾-in. stock and dado for ¼-in. plywood bottom, as shown. Assemble drawers with nails and glue.

The cabinet is now ready for finishing. If an antique effect is desired, add distress marks, (nicks and marks to simulate usage and age). Now, sand all surfaces smooth with 600 paper. Apply natural paste filler with a cloth to all surfaces requiring a finish. Remove excess filler by wiping with a clean cloth across the grain. Allow to dry overnight. Note: Filler is used on softwoods such as pine and cedar to fill open grain and marks, and to prevent the softwood from absorbing too much stain. It is not necessary to fill cherry, maple or birch, if these woods are used. After the filler is dry, sand with 700 paper and stain to desired color. Allow the stain to dry overnight. Spray or brush on two or three coats of sanding sealer. When dry, rub with 300 steel wool, then wax.

Materials List
Ponderosa Pine, No. 2 common or better, finished on 4 sides.
Hand select well-seasoned, flat boards with small, tight knots.
10 pcs. 1 x 12, 8 ft. long.
3 pcs. ¼ x 12, 4 ft. long.
Fir plywood, ¼ in.
1 pc., 12” x 48”.

Hardware
2 pr. butterfly hinges, black, hammered finish
2 knobs, 1” dia., white porcelain
3 knobs, ¾” dia., white porcelain
1 gr. No. 10-1½” flathead wood screws

Miscellaneous

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How To Weave

RUSH SEATS

ENNO R. HAAN

Weaving a rush seat for a ladder-back chair, (such as described in the last issue), a Windsor or other chair can be done with genuine twisted rush, although “fiber cord,” which is twisted kraft paper, is similar in appearance, costs less and will last longer.

In ladder-back and some other chairs, the upper rungs between the legs form the seat frame. The front and rear rungs are parallel, and the side rungs are at an angle. On such seats the trapezoid-shape opening must first be reduced to a rectangle by weaving only along the sides and front. To start, hold a small square against the front rung, Fig. 1, mark each side rung where the square crosses it. Cut off a piece of cord about 4 ft. long, and tack one end to the left side rail at the mark just made, using No. 3 tacks. Then weave as indicated in Fig. 3. Keep the cord taut and tack it to the right side rail at the other mark; cut off the surplus. Sometimes it is helpful to insert a ¼-in. dowel or pencil temporarily at the legs as shown to keep the crossing strands at right angles.

Next, make equidistant pencil marks on the side rails from the tacks to the rear legs, with the last marks not closer than 1 in. from the joints. The marks are spaced so adjacent lengths of cord tacked
at successive marks will lie together snugly after being drawn up tightly. Space the marks about 1 in. apart. Now install all the individual cords to form a rectangular opening, Fig. 2. Ten cords were required in the example. Diagonal lines formed when the cords cross should be kept straight by applying uniform tension. Too much tension will distort the rectangular shape of the opening. Also, you will find that the cord sometimes tends to untwist while weaving. It should be twisted back again to prevent it flattening and widening where drawn over the seat edges. After installing the individual cords they are compacted tightly at the seat edges, and the last cord is tacked temporarily to the undersides of the rungs. In subsequent weaving the cord should be compacted and tacked temporarily at every fifth to seventh turn to prevent it slipping.

To produce a nicely contoured seat that won’t sag after the chair is in use, insert four fillers made of corrugated cardboard. The larger front one is detailed in Fig. 5. Pinch the corners together to form pointed ends that can be pushed between the weaving, Fig. 4. The other three fillers are similarly made and installed after weaving enough cord to hold the ends in place. They are not as long nor as wide as the front filler, and you may have to cut one end of the side fillers at a different angle to keep the diagonal edges parallel to the diagonal lines produced by weaving.

To continue the weaving before installing the three smaller fillers, tack the end of a 20 to 25-ft. length of cord to the inside left rail about ½ in. from the rear leg and weave in the same manner as before. However, this time don’t tack the cord to the right rail but run over the rear rail, Fig. 6. After all the fillers have been installed, Fig. 8, weave over and under them so they are enclosed.

When passing through the center opening you can pull the loose end through or form it into a small coil, Fig. 9. When you reach the end of a cord, tie on another length using a square knot, Fig. 7, but be sure the knot will be on the underside of the seat and away from the edges. In many seats the side rails will be covered before the front and back rails. If this is the case, continue weaving over the front and back rails, Fig. 10, to finish the seat. Tack the loose end of the cord permanently to the underside of a rail, then cut off the surplus. Apply two coats of varnish or lacquer, Fig. 12, to finish the seat.

Chairs with frames recessed between the corners so the rush comes flush with corner surfaces, and having square or rectangular openings, are quite simple. A Windsor chair seat is shown in Fig. 11. After tacking the starting end of a 25-ft. length of cord, weave in the direction of the arrows. It’s the same as weaving long cords on a ladder-back chair. Corner fillers are not usually needed on seats having wide frames.

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You can transform many ordinary stones and pebbles into sparkling gems for use in rings, brooches and other jewelry with the aid of homemade equipment costing only a few dollars. Stones best suited for this purpose should have sufficient hardness to retain a high polish and have exceptional beauty as to color, grain, shading, or design. Many kinds of semi-precious stones can be found, but also are available at nominal cost from dealers of gem-cutting supplies.

Baroques are stones left in their original shape as much as possible, then finished to a moderate sheen. Cabochons are ground to predetermined size and shape before polishing to a high luster. They have flat or rounded surfaces and are of many shapes, Figs. 1 and 2. By using templates, such as in Fig. 4, you can make cabochons to fit in standard ring mountings and other jewelry. Some faceted stones are shown in Figs. 1 and 3. They usually are transparent and have numerous flat surfaces ground and polished at precise angles so the light they reflect gives them great brilliance.

Start by making cabochons. Large stones or slabs require sawing to smaller pieces. Using small stones or preformed blanks that you can buy eliminates the need for sawing. You first grind a stone to shape and size, then sand and polish it, using progressively finer abrasives. To manipulate a stone more easily and accurately, you cement it to a dop stick as will be detailed later. When the final luster permits you to see reflected objects clearly on the stone surface, you have done a good job.

About the simplest kind of improvised equipment for grinding, sanding and polishing stones is shown in Figs. 5 and 6. The unit in Fig. 5 consists of a 1/4-H.P. electric motor fitted with an adapter to hold 1 x 6-in. grinding wheels and 6 or 7-in. sanding and polishing wheels, as detailed in Figs. 11 to 14. The grinding wheels are silicon-carbide, 100 and 220 grit. It is possible to use a 7-in. silicon-carbide cut-off saw on this unit, but this involves the making of a saw table to hold the work securely.

This direct-coupled unit will give creditable results even though it does not provide variable speeds, recommended for the most efficient grinding, sanding and polishing. A combination wheel guard and splash pan of sheet metal serves as protection and confines most of the water applied to the grinding wheels.

Water for grinding is supplied by a can suspended at a height of 24 to 30 in. above the unit. To shut off the water use a pinch clamp on the tubing or lower the can to bench height. Adjust the nozzle to direct water on the side of the wheel about 2 in. from its edge. Centrifugal force brings the water to the wheel face.
You can use a drill press for gem cutting, Fig. 6, mounting the wheels on an arbor that fits the chuck. Each wheel is lowered into a splash pan that is bolted to the table, and the spindle then is locked. While offering the benefit of some variable speeds, this setup has the disadvantage that grinding is done on the side of the wheels which is less desirable than using the faces, as can be done with the setup in Fig. 5.

While improvised equipment gets you started in gem cutting at small cost, it also has definite limitations. After some experience with it you will be better able to select whatever precision equipment you may want later. Factory-built machines for making cabochons are of the horizontal type, Fig. 9, or the vertical type, Fig. 10.

You can use ¼-in. plywood for the rigid backing-disks of sanders and buffs. First saw out a disk, drill the ¼-in. center hole, mount the disk on a ⅛-in. arbor, then turn down the edge. Turning can be done on a motor by using an adapter arbor and improvising a rigid tool rest. Disk sanders and buffs having resilient work surfaces can be made as in Figs. 11 and 14. The resilient disks are cemented to the backing disks. For sanding you cement silicon-carbide cloth to the resilient disks. It will be advisable to have two or three sanding disks of 220, 400 and 600-grit cloth.

The plywood disk for the canvas buff in Fig. 14 is grooved. After soaking the canvas to make it more pliable it is stretched over the disk and tied at the groove with strong cord, or held with a coil spring or heavy rubber band. You can buy drum-type wheels, Fig. 12. These will enable you to get into 90-deg. corners. A hollow-type wheel, Fig. 13, has the sanding or polishing cloth stretched over the rim to provide resiliency. Leather, hard felt and stitched muslin buffs also can be used.

It is highly advisable to wear goggles for eye protection when grinding or sanding. Use 1 x 6-in. or larger grinding wheels, one of 30 to 120-grit for initial coarse grinding, and one of 100 to 220-grit for fine sanding, both silicon carbide. Grind on the face of the wheels, Fig. 7, when possible. A grooved side weakens a wheel. Run the wheel at a peripheral speed of about 5,000 surface feet per minute, (s.f.p.m.).

Direct a tiny stream of water against the wheel to prevent it glazing too rapidly and to keep the work cool. Don't permit water to drop on a wheel when it is idle, or let the wheel stand partly in water. This will produce an unbalanced condition that may cause the wheel to shatter while running. Always use cardboard washers to cushion the wheel from the flanges bearing against it. As hard stones wear away grinding wheels rapidly, frequent dressing is necessary to restore the shape and balance. Use an abrasive stick or other type of wheel dresser.

For a single cabochon you first grind the back of the stone flat and also remove much of the waste from the top, using the coarse stone. When grinding—and also when sanding or polishing—keep...
the stone moving continuously with rotary, rocking and brushing movements. Apply very little pressure except when a relatively large section must be ground off. After grinding the back flat, mark the finish shape of the stone on it with a piece of pointed aluminum as marks from this do not rub off easily. If you are following a template, this will give you the finish shape. Then grind down the edge of the stone almost to the marked line. It will now look somewhat like the one in Fig. 8, and is ready for mounting on a dop stick.

Get a length of dowel slightly less in diameter than the girth of the stone at its center when finished. The length may vary from 3 to 6 in., whichever is most suitable for you. Cut off one end smoothly at right angles. Soften sealing wax over a flame and apply it to the warmed end of the dowel. Don't let the wax burn. Now, heat up the stone a little, Fig. 16, and while the wax on the dowel is heated almost to the dripping stage, push it tightly against the flat surface of the stone at its center, bringing the stone in firm contact with the wax-coated wood. Then, keeping the wax soft over the flame, mold it to the shape shown in Fig. 15 with the moistened fingers. Cut off excess wax that projects beyond the edge of the stone.

Sealing wax, properly applied, will have sufficient holding power for most work. A cement having greater holding power can be made by melting together: sealing wax, 4 parts and flake shellac, 1 part. This will not soften as quickly as sealing wax alone when stones are heated by sanding or polishing. Removal of a stone from a dop stick after polishing is done by again applying heat. Scrape off remaining traces of wax with a knife or dissolve them with alcohol or lacquer thinner.

After using the coarse wheel to grind the stone to the right shape and symmetry, slightly oversize, you finish the grinding on the fine wheel. Before doing so be sure to scrub the stone, dop stick and your hand to eliminate traces of grit that may be left from the coarse wheel. Then dress the stone down to exact size and shape, eliminating surface irregularities. The girdle width should be from 1/16 to 1/8 in., as in Fig. 17, and a narrow 45-deg. chamfer should be ground along the bottom edge to protect it against chipping. The stone now is ready for sanding.

Before sanding, Fig. 20, you again scrub the stone, dop stick and your hands to eliminate grinding grit. Do this every time you change to a finer abrasive insand-
When cementing stone to dop stick, both stone and dowel are warmed to make sealing wax adhere. Dry sanding produces dust. This can be avoided by wet sanding with silicon-carbide cloth that can be used wet or dry. For wet sanding a suitable shield and pan are necessary. Rubber-bonded abrasive wheels, available in coarse, medium and fine grades, are used for sanding gem stones, including the harder varieties such as rubies and sapphires. These wheels are run at speeds not exceeding 5,000 s.f.p.m.

Some polishing buffs commonly used, and their maximum peripheral speeds in s.f.p.m. are as follows: Stitched muslin, 3,000; hard felt, 2,000; canvas, 2,000; leather, 1,500. A muslin buff produces less heat than the others and is best for softer stones. Fine abrasive powders such as tin oxide, cerium oxide, levitated alumina and rouge powder are used for polishing. They are mixed with water to form a thin paste that is brushed on the buff as in Fig. 21.

Sanding and polishing of large quantities of stones, particularly baroques, is done automatically with tumbling machines such as shown in Fig. 19. Containers or "barrels" holding the stones and abrasive are rotated slowly causing the "charge" to slide on the inside. This rubbing action is continued for periods as long as 50 hrs. for sanding, and 150 hrs. for polishing, and is repeated with progressively finer abrasives. In a battery of (Continued on Page 53)
Quite likely the original of this chest stood in the corner of a village chemist's shop and was used to store herbs and other raw ingredients from which he brewed primitive medicines.

Pine is used on this reproduction to match the original. Precise cutting is required, but the construction of the chest is quite simple. After the sides and center partition are cut, carefully mark the dadoes. On a radial-arm saw use a new fence and run the dado blade through it to provide a gauge. On a table saw fit an extension on the miter gauge and use it for a gauge.

Use a good-quality glue in the assembly and clamp the completed unit until the glue has set. Simple molding was cut on the edges of the drawer fronts on the original, but if you do not have the tools simply rounding the edges is all right. The edges of the top and the base were shaped with a molding cutter, or a portable router can be used. If you do not have these tools, glue and nail on strips of trim molding.

The parts for the drawers and the "shelves" on which the drawers fit can be cut on an "assembly-line" basis. This will speed the work and help assure that the parts are exact duplicates. After the chest has been assembled sand all surfaces lightly. You can, if you wish, round edges and corners and nick and damage the wood to "distress" it for an antique look. Apply a quality maple stain, then a couple of coats of clear sealer. Alternately, simply apply several coats of paste wax over the stain.

Use square to carefully mark positions of dadoes in center partition.

On radial-arm saw, use new fence, cut through with dado blade so that it can be used as gauge to locate dadoes marked on sides and partition.
When cutting dadoes on table saw, extension is necessary on miter gauge to position stock properly over the saw blade.

Material List
1" Ponderosa Pine
Sides, 12" x 43 1/4", 2 req'd.
Center partition, 11¼" x 39 1/2", 1 req'd.
Back, 14" x 41 1/2", 1 req'd.
Top and bottom spacers, 12" x 14", 2 req'd.
"Shelves", 6¾" x 11¼", 14 req'd.
Top, 13 3/4" x 17 1/2", 1 req'd.
Front of base, 5" x 16 1/2", 1 req'd.
Sides of base, 5" x 12 1/4", 2 req'd.
Drawer fronts, 4 3/8" x 6 1/2", 18 req'd.
Drawer sides, 4 1/4" x 11", 32 req'd.
Drawer backs, 4 1/4" x 6 1/4", 16 req'd.
¼" Plywood
Drawer bottoms, 5¼" x 10 3/4", 16 req'd.
Miscellaneous
Knobs, 1" wood or porcelain, 16 req'd.

Trim strips can be added to edges of top and base, or these parts can be shaped with portable router or molding cutter.
Resilient Ceramic Tile

As old as civilization, yet as modern as tomorrow, ceramic tile has always been known for its beauty and great resistance to wear. A third quality now has been added: resiliency. The beautiful colors and patterns are the same, the long-wearing surface is still there, but when you walk on this new concept of an age-old product you note a resiliency; your footsteps are cushioned.

In each of the new 9-in. "tiles" are 64 individual tiles 1 in. square. The small tiles are permanently bonded in a preformed flexible-rubber grid. The grid between the tiles becomes the "grout" line, so no grouting is necessary when a floor of the resilient tile is installed. This means that the tiles can be installed quickly; the floor is ready for use the moment the tiles are in place. On this and the following pages are photos showing the step-by-step procedure in installing a floor of the resilient tile.

The first step is to remove any wax from the old surface, as well as any oil or grease. Firmly-bonded paint or other finish need not be removed, but should be

First step is to thoroughly vacuum or broom-sweep the floor. Grease, wax and oil should be removed completely.
After striking off lines to determine center lines of room, start spreading mastic at intersection of lines.

Roughed with sandpaper to provide a good "tooth" for the adhesive. If a floor is in poor shape, an underlayment of 3/16-in. plywood or other material will make an ideal surface for the tile. To save time and assure joint alignment the tiles must be laid within a perfect rectangle. This is done by first finding the center line of the main rectangle, as in the drawing, then snapping a chalk line to the same point on the opposite side of the room. From the center point on this line use the 3, 4, 5 method to locate a line at right angles. Lay a loose row of tiles from the center point to points A and B', your longest straight walls, and determine the space left for border cuts. If necessary relocate the guide lines up to 1 in. in either direction so that a knife cut through the rubber grout line will produce a good fit. Remember that any quarter-round and base shoe should be removed before the tile is installed.

Adhesive is permitted to "cure" for 15 to 30 minutes. It will darken, also indicating it is at right "tackyness."

Carefully place first few tiles in exact alignment with both guide lines at starting point, butting tile snugly.

When using ceramic-tile cutter, as shown, score tile and break them, then use knife to cut through rubber back.

Complete first quarter of floor, except for border cuts. Apply adhesive to second quarter, then return to border.

For border measurements place loose tile #1 on top of last tile in row. Place tile #2 on top, against wall, mark 1.
base and trim then will cover irregularities at the edges. Start spreading adhesive at the intersection of the guide lines and completely cover one quarter of the floor area. Start placing tiles at the intersections of the guide lines, keeping them aligned with the lines and butted tightly against each other. When you get to the border rows that require cutting, stop and go to an adjacent quarter of the room and spread the adhesive. While the adhesive is “curing” as explained in the photo captions, cut and install the border tiles in the first quarter. Several methods of cutting and trimming tiles can be used, and are shown and explained by the photos. There will be locations, such as around pipes, where the rough edge of the tile need not be smoothed, as trim rings or escutcheons will cover the edge. The same is true along the walls where a base shoe and quarter-round will be reinstalled. In places, such as door casings, where no trim is used, a calking is available to fill the small joint between the tile and casing. The calking is the same color as the rubber joints between the tiles. The final step is to use cleaner to remove any adhesive or calking from the tile surface.

Knife is used to cut along grout lines with tile on solid surface. Align grout lines, then press tile firmly into mastic. If tile nipper is used, nip each individual tile, then slice through rubber back with knife. Trim can cover rough edge.

Make smooth contour fits with an abrasive grinding wheel after making rough nipper cuts about \( \frac{1}{8} \) in. from line. Contour cuts made with grinder are smooth, can be made to fit exactly in areas where no trim will cover edge of tile.

On door casings or areas that will not have molding or base to cover edges of tile, use special calking in joint. Spots of adhesive or calking should be cleaned up immediately after tile is installed.
Youngsters often wonder why and how an airplane is controlled. This model demonstrates the actions of the various controls, the effect on the plane.

Built originally to teach our young son the fundamentals of how an airplane is controlled, this tabletop trainer would be a fine project for scouts or other groups who are interested in how an airplane is made to turn, dive and climb.

Any solid, silhouette-type airplane model can be used; once the plane is assembled the control mechanism takes only an evening to assemble. The rudder, elevators and ailerons must be cut free, then re-attached with light cloth hinges. Make sure the control surfaces are fitted loosely enough to pivot down of their own weight. No dimensions are given for the various parts, as they will vary with the size of the model plane used. The U-shape member must fit snugly against the sides of the fuselage and allow the plane to angle 45 degrees up and down. It also must be long enough so the plane can bank 90 deg. right or left without striking the yoke that supports the U-shape.

The column is a length of tubing, in which is fitted a dowel that is fastened to the underside of the yoke. The tubing is fitted in the base with locknuts. The base can be a cigar box, or can be assembled from scraps of 1-in. solid stock and %4-in. plywood. The control block in the base is two strips of wood spaced %4-in. apart to permit inserting the control stick which is a %4-in. dowel. The control block is designed to rotate on two pins or dowels fitted in the ends of the block and in holes in the base.

The control wires are heavy black thread or fishing line, rigged as indicated. The lengths of piano wire slipped through tabs on the control surfaces are arranged as shown so the various control surfaces will respond as they do in a real aircraft when the rudder pedals and control stick are moved to make the plane turn, bank, climb or dive. The wires should be springy enough to return the controls to neutral position when the controls are in a neutral attitude.

When fitting the various control wires, use common pins to position the various control surfaces in a neutral position. Some adjustment may be required in the control wires to make the plane respond properly.

Shown clearly are the yoke, U-joint and control wires that actuate the control surfaces on wings and tail.
Working with Concrete Block

PHILIP TAYLOR

Whether you build a fence or a wall with concrete block, the procedure and methods are the same. You will need a 48-in. level and a masons’ trowel. You also need a masons’ line, (chalk line will do), and a joint tooiler. The latter will vary in shape depending on the type joint you wish to make. The most common is simply a length of ½-in. pipe bent in a slight curve. You will need a course pole; a straight pole marked every 8 in., (if you are using 8-in. block), to show where the top of each masonry course is located.

Mortar, the only variable, should be carefully made. Prepare mortar by blending with water, masonry cement, one part and mortar sand, two to three parts. Alternately, mix regular Portland cement, one part, hydrated lime, one to one and one-quarter parts and mortar sand, four to six parts. In both instances the sand should be slightly damp, but free-running and not caked. Add as much water as possible to the mix, but not so much the mortar is difficult to handle. Mortar should be just stiff enough to adhere to the block without dripping. For small jobs the mortar can be mixed by hand in a wheelbarrow, for larger jobs rent a power mortar mixer. Mortar sets up like concrete, so never mix more than will be used in about 2½ hrs. Discard any that remains after this period of time.

A concrete-block wall must be laid on a concrete footing that extends below the frost line. It should be as wide as the wall, preferably 4 to 6 in. wider. The top of the footing should be as level as possible. First step in building a wall is to string out the first course of blocks.
without mortar, Fig. 2, to determine if a wall can be completed with full blocks or end with half block slightly narrowing or widening the mortar joints. A standard joint is % in. Next, spread a thick coat of mortar along the footing and furrow it with the trowel, Fig. 3. This assures sufficient mortar along the lower edges of the block. Before setting the first unit in place, "butter" the leading edge. Several can be done at once, Fig. 4. Handling mortar can be a sloppy job, but need not be. When picking up mortar shake the trowel with a quick, vertical movement. This "packs" the mortar on the trowel, Fig. 5, keeps it from dropping off the trowel when applying mortar, Fig. 10. Blocks in the first course are pushed solidly into the mortar bed, Fig. 6, and against the adjacent block. After placing three or four blocks, level each block, position on the same grade and align them. Use the trowel handle to tap them into position. The remaining courses are laid in the same manner. The top of the wall can be finished by installing a cap of solid block, Fig. 7, using a special cap block or by filling the last course with concrete.

Build up corners four or five courses higher than the rest of the wall, Fig. 1. String a line between the corners, Fig. 8, to aid in keeping courses level. If your wall is built carefully, the last block should slip in neatly, Fig. 9. After about three courses have been laid,

5. Expert masons give trowel a quick vertical snap to "pack" mortar on trowel when taking it from board.

6. Position each block in the first course carefully. Press each one into mortar and against next block.

7. One way to "top off" wall, help make it weatherproof, is to cover top cores with solid masonry units as here.

8. To help keep each course level, stretch a masons' line, or chalk line from one end of wall to the other. Course pole also will help here.

9. Last block in top course, "closure block," should fit neatly in place.
10. To “butter” ends of block already in place, tip trowel slightly, as indicated. This packs mortar firmly on edge.

11. Shaping a mortar joint can be done with tool made from piece of pipe, or regular jointer can be used.

FIG. 13
MORTAR JOINTS

- CONCAVE, MOST COMMON, WEATHER-RESISTANT
- V-SHAPE; WEATHER-RESISTANT, EMPHASIZES JOINTS
- FLUSH; MADE WITH CARPET-FACED BLOCK, MUST BE CAREFULLY PACKED TO BE WEATHER-RESISTANT
- WEATHERED; INTERESTING SHADOW, SATISFACTORY WEATHER-RESISTANCE
- STRUCK; POOR WEATHER RESISTANCE, EMPHASIZES HORIZONTAL LINES
- BEADED; SPECIAL EFFECT, LOWER EDGE WILL COLLECT MOISTURE
- SQUEEZED OR WEEPING; MADE BY FORCING MORTAR FROM BETWEEN BLOCK WHILE LAYING, HAS POOR WEATHER RESISTANCE
- RAKED; GOOD JOINT EMPHASIS, BUT EXPOSED LIP ENCOURAGES WATER PENETRATION

the mortar should be firm enough for tooling, Fig. 11. In Fig. 13 are shown various joints. Scrape off excess mortar as you work along, Fig. 12. If you do smear any, let it dry before removing. Rubbing on it while wet will only smear it worse. Flick off the dry mortar with the trowel, rub with a scrap of concrete block. A stiff-bristled brush should finish the job.

Epoxy mortars are expensive, allow little room for adjustment with their joints of about 1/16 in., rather than the 3/16 in. of a regular mortar joint. No doubt the cost will be reduced in the future, and more information will be given the home handyman. △ △
Here is an item that will please our sun-worshipping readers, and one which our flower-loving gardeners also can utilize. The sun sled can be moved easily to keep in the sun when a nice tan is the goal, or it can be utilized as a "portable" platform on which to display blooming, potted plants.

Construct the sled of 1-in. surfaced, well-seasoned redwood or cypress. Begin by making accurate, full-size patterns of both ends of the sled top. Start assembly by joining the upper, curved sections of the runners to the long portion of the runners with corrugated fasteners. Next, attach the rope yokes with screws driven through from the inside surfaces of the runners. Use countersunk, flathead brass screws where another member will be set over a screw, otherwise use round-head brass screws. Now, attach the inside front curved member to the front runners. Notch and attach side cleats to sides ¾ in. from the top; assemble with stretchers and strengthen with corner braces. Assemble front cleats at 10-deg. angle with front stretcher. Position the center long and short rails and fit on wide, curved-end slats. Note that the head slat is ¾ in. shorter at each end than the one at the foot. Space remaining slats along the side cleats, leaving at least ¼-in. space between each. Trim where necessary. Run the rope pull through the yokes, and the project is ready for the patio. The sled can be painted, stained, or left to weather naturally.
1. Striking arch design gives this coffee table unique appeal. It is 17 in. high, stark white with tile top.

"GOTHIC"

Coffee Table

All white, including the tile-mosaic top, this table, Fig. 1, will give a living room a touch of classic grace. The stylized Gothic arches blend well with furniture of any period. The table is an interesting project for any woodworker, yet its assembly is simple enough so that it requires only a couple of evenings. A novice craftsman should have very little trouble in making this unique item of furniture.

Cost is moderate; a piece of %%-in. plywood measuring 3 x 4 ft. will do the entire table. The mosaic on top will require about 3 sq. ft. of tile. Cost of the mosaic will vary with the kind of tile used. Tile for the top can be purchased at most art-supply and hobby stores, as well as many of the larger mail-order and department stores.

Cut six pieces of plywood to 12 x 17 in., Fig. 2. Set the saw blade at 30 deg. and position the rip fence 1 in. from the blade. (Check this by running some scrap over the saw.) Ripping the bevel on both edges of each piece will bring the stock down to 10-in. widths. Next, make the spline cuts, Fig. 3, using two pieces of the beveled scrap as a jig. The blade is vertical for this operation, and the rip fence is moved over so the beveled edges will ride against it. Clamp the supporting jig to the saw table.

A rabbet now is cut along the end of each piece, Fig. 4. This forms a ledge in the completed table into which the top fits. A depth of % in. is produced, so...
4. Upper edge of each leg is rabbeted $\frac{3}{8} \times \frac{3}{8}$ in. to hold table top.

5. Pattern is used to draw outline of each arch, which then is cut with band saw or jig saw. Where possible, stack legs to assure cutting duplicates.

6. Legs are assembled in sequence. Brush glue into grooves, set in splines, then fit together the joints.

7. Plastic electrical tape is used to apply pressure and to keep joints in alignment until the glue has set.

8. Outline of top can be marked with assembly "dry-fitted" as here, or after assembly has been glued together.

The mosaic tile when on the table top will be flush with the upper edges of the arch members. The arch cutouts are made now, being first traced from a pattern developed by enlarging the squared drawing, Fig. 2. The half-pattern, of course, is doubled to make a full pattern. A band saw or jig saw is used for the cutouts, Fig. 5. Cut a batch of splines, of a thickness to fit snugly in the saw kerfs, and start the assembly, Fig. 6. Use plastic electrical tape to hold the joints tight, Fig. 7, pulling the tape taut when wrapping it.

You can mark out the table top either by "dry-fitting" the assembly, Fig. 8, and using it as a pattern, or by using the glued and assembled leg structure. Glue the top in place.

After a day or so the tape may be removed. Sand all surfaces, including edge grain, smooth. Apply a wood filler, sand it when hardened. Apply grain sealer, then two coats of white enamel; on the inside of the legs, also, as they will show. The final step is to cement on the tile and fill the spaces between them with grout. △ △
BUFFET

from old cabinet

1. “Brand new” refreshment bar looks well with other furnishings, has same black-lacquer finish.

2. First steps in renewing cabinet were to remove speaker grille cloth, cut upper front panel in half lengthwise.

WHEN A NEIGHBOR gave me an old radio-phonograph cabinet, thinking I could use the lumber in it, I decided the item was in good enough condition to warrant a reconstruction and modernizing project. While the cabinet I have is of a particular make and model, the methods I used could be applied to cabinets of various kinds and designs to convert them to useful pieces of furniture that will fit in with the decor of any home.

The grille cloth over the speaker compartments was removed, as was the door at the center of the cabinet. The phonograph originally was located in the center cabinet. The hinged top, under which the radio had been located, also was removed. The upper, front panel of the cabinet was taken out, ripped lengthwise and the two halves hinged together, as in Fig. 2. The cabinet and all components then were taken outside and the old finish stripped off, Fig. 3. All nicks, dents and marks in the surface of the various pieces were filled with wood putty, then sanded flush.

The room in which the buffet was to be located, Fig. 1, has furniture with a black-lacquer finish. Gold striping is used to accent the lines of the furniture. I applied the same finish to the cabinet, Fig. 4. Several coats of black lacquer were applied, each coat being allowed to dry thoroughly, then sanded carefully before the next coat was applied. Gold-colored decalcomanias with a Chinese motif were then applied to the various parts of the cabinet. This was followed by a careful striping of the cabinet, Fig. 5, with gold paint. Note in Fig. 6 that I have installed a deep “well” inside the cabinet, reached from the top compartment. You will determine your own needs, so no dimensions or shelf arrangements are shown. Plywood pieces were used to replace the grille cloth, providing a place for the “decals.” After all other finishing and trim had been done, a coat of clear lacquer was applied. This was steel-wooled lightly, and the job was done. The cabinet now has a place of honor in the living room, Fig. 1.

The top pivots up on a hinge-bracket that holds it vertically, the upper half of the front panel pivots down to a horizontal position, providing a flat work surface.

John Orsulak
3. Old finish was stripped off with remover, then all surfaces were sanded smooth, all dents and nicks were filled in and repairs sanded flush with surface.

4. Several coats of black lacquer were applied to cleaned and filled wood surfaces of the various parts of the cabinet. Each coat was sanded smooth, dust removed.

5. Stripping was applied with gold (bronze) lacquer, using narrow brush. Decalcomanias were applied before striping, also are of a gold color with Chinese motif.

6. Here all parts of cabinet have been painted with black lacquer, striping applied along with decalcomanias. Coat of clear lacquer is applied over all to protect finish.
Enclosing A Bathtub

1. Tub is enclosed completely, tile on paneling of enclosure is same as used on walls. Wrought-iron pulls look well, also permit opening drawers.

2. Project starts by framing tub with 1 x 3 and 2 x 3 lumber. Allowance is made to keep framing the thickness of tile below the edge of the tub.

Closing in an old-fashioned bathtub is a hammer-and-saw project, although power tools, as in any case, will speed the job. Start construction by making the framework that goes across the front of the tub, Figs. 2 and 3. Note that the two center uprights are cut to fit against the face of the tub. Tubs will vary in size and shape, so this will require that the uprights be fitted against your particular tub. Make
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High-Fidelity Speakers

Speakers represent probably a greater variety of size, kind and quality than any other component used in high-fidelity systems. Because it obviously is impossible to see and hear them all, an understanding of some of the common terminology will be helpful when you are trying to choose the correct speaker for your specific needs. If you want a speaker for voice use only, as for an intercom system, there is no need for an expensive unit designed to handle music. The following are some often-used terms and their definitions:

FREQUENCY RESPONSE: The range of human hearing is from about 20 cycles per second to 20,000 c.p.s. To reproduce sound in true high fidelity the speaker system must cover this range. In practice the extreme ends of the range are most difficult to reproduce, and some concessions are made in the interest of economy. Also, to more accurately cover the frequency range efficiently, more than one speaker is used.

WOOFER: A large speaker, from about 10 to 15 in. in diameter with a rather pliable cone that provides good bass response. It must be used with other speakers, as it cannot reproduce high-frequency sounds accurately.

TWEETER: A horn or small, hard-cone speaker with excellent treble-reproducing qualities.

MID-RANGE: Used to fill-in the responses between the highs of the tweeter and lows of the woofer. It is eliminated in low-cost hi-fi systems to save money, and because a woofer can handle mid-range frequencies reasonably well.

CROSSOVER NETWORK: It is made up of capacitors and coils, is used to route the proper portion
3. Close-up view of pole-light speaker shows grill above light that covers speaker driven by hi-fi set in house.

of the program material to each speaker; bass to woofer, treble to tweeter, etc. Without crossover, the tweeter will absorb some bass power without reproducing a usable amount of sound. The woofer will waste treble power and the midrange speaker will waste both bass and treble power without reproducing usable sound.

ENCLOSURE: The box in which a speaker is mounted is extremely important. A relatively poor speaker will sound good in a well-designed enclosure, but even the best speaker will not sound good when the enclosure is inadequate. Basic types of enclosures are Bass Reflex, Fig. 4, Folded Horn, Fig. 5 and Infinite Baffle, Fig. 7. The

FIG. 4

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WORKBENCH July-August 1963.
Folded Horn and Bass Reflex have good over-all response and require less amplifier than does the Infinite Baffle. However, an Infinite Baffle is the easiest to build, consisting only of a box lined with sound-absorbent material, and a hole cut in the front for the speaker. The pole lamp, Figs. 3 and 8, is an example of an infinite baffle. Mounting a speaker in a wall or ceiling is another way to create an infinite baffle. Shown in Fig. 6 is a Model M6-A Acoustic Tile Ceiling Grill made by the Lowell Mfg. Co., with an 8-in. speaker by Cleton. The speaker is mounted on the black plate and the assembly screwed to the furring strips that support the tile. The white grill then attaches to the black plate with concealed screws to replace a standard 12 x 12-in. acoustic ceiling tile.

The wide range of speaker styles and sizes is illustrated in Fig. 2. At left is a 2½ x 10-in. speaker that is used where space requirements demand a long, narrow unit. The center speaker is a 2-in. unit as used in portable transistor radios. Because of its severe power and frequency-response limitations it should never be used for high fidelity. The large speaker at the right is an Electro-Voice LT-12 triaxial unit. A triaxial speaker is a woofer, tweeter and mid-range speaker combined in one unit. The LT-12 has a built-in crossover network, with a switch on the rear of the speaker to permit adjusting the frequency response for individual room acoustics.

Outdoor hi-fi will add another dimension of pleasure to your patio parties, bringing dance music, or just 'listening' music to you and your guests. In Fig. 8 are shown two outdoor speakers, plus one for underwater use and one combined with a light. At the left is a University CIB-A, which is limited to use for reproducing voice only. The pole-light in the center is a practical yard light, as well as an excellent speaker enclosure. It is the Lowell Model EPL-8. At the right in Fig. 8 is a University MLC Outside Waterproof hi-fi speaker that has excellent frequency response, and can be mounted in any position with a universal mounting bracket supplied.

If you are a real hi-fi bug, and love to listen to records of train and car sounds, as well as full symphony orchestras—and live in an apartment or have a family with 'sensitive' ears, the Jensen HS-1 stereo headset, Fig. 1, is the answer to your problem. The unit is essentially two small speakers that provide excellent hi-fi listen-
6. In essence, easy guide materials can explain methods.

On the other hand, if the cell has been exposed to a heavy drain, particularly a prolonged, heavy drain, the volume of the electrolyte increases and its consistency is reduced. This condition is much more likely to result in leakage. These factors mean that the best protection against leakage damage is the removal of the exhausted batteries. In fact, a safe measure is to remove cells from the consuming device at any time the device is not operated for more than a week. Since a LeClanché cell is designed for intermittent use, subjecting it to a constant drain represents an abusive condition that may cause leakage.

A heavy drain, such as that imposed by a motor in a toy, will increase the possibility of leakage from a dry cell. Even the lighter drain imposed by a radio, for instance, may cause leakage if it is sufficiently prolonged—say beyond a day or two. Many motorized devices present another potential source of leakage: The voltage of the cell may drop below a point where it can successfully operate the motor. At this time, even though it is not operating, the motor may impose a heavy drain—possibly four to five times as heavy as during normal operation. Because the device has ceased to operate it is not readily apparent that the switch is still on. The heavy drain on the dry cell in such a situation is quite likely to cause leakage. The condition described is quite common in motorized toys operated by children. The youngsters are more likely to be negligent in shutting off the switch than an adult. △

Pocket-Sized Walkie Talkie

We had a teen-ager assemble a pair of these all-transistor two-way radios and he had no problems at all. A 9-volt dry cell powers each unit and they are good for several blocks in the city, farther in open country. These miniature CB rigs require no license and there is no age limit. Fine for youngsters playing soldier and to keep bike-riding friends in contact. Knight-Kit C-100s are $9.95 each from Allied Radio Corp., 100 N. Western Ave., Chicago 60, Catalog No. 63 Y 804.

D R Y C E L L S

(Continued from page 6)
or to moderate-to-light drains of a more continuous nature, the volume of electrolyte is small and the probability of leakage is reduced.

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W O R K B E N C H July—August 1963, 41
To avoid making mistakes in measuring, make pencil marks directly on the pipe. Soft pencil marks well on galvanized pipe.

Locating shut-off valves adjacent to an automatic washer by running plumbing from a nearby pipe is one of the plumbing jobs a home owner can do.

1. When making two similar hookups, such as faucets for washer, use finished first piping for measurements of the second.

You do not have to be an experienced plumber to handle many of the small jobs around the house. Such projects as adding connections for an automatic washer, Figs. 1 through 4, or running a line for an outside faucet require just a few basic tools and simple know-how. Pipe also can be used for construction projects, such as making a lumber-storage rack, stair railings, playground equipment, power tool stands and garden enclosures.

You will need a pipe cutter, Fig. 11, or a hacksaw. A single-wheel pipe cutter is the best, as it is self-aligning. Cutters cost from about 7 to 10 dollars to handle pipe sizes up to 1 in. A pipe threader is required; there are two common types, one has a single handle, with a head that drives in either direction by means of a ratchet device, Fig. 12. Collars and dies are fitted in the ratchet head to fit various sizes of pipe. The other type, Fig. 13, has two handles and the non-adjustable dies and collars.
3. Hacksaw or pipe cutter is used to cut pipe for inserting faucet setup for the washer, or making other changes.

4. When removing old pipe, use wrench on fittings to "back-up" wrench used to unscrew the lengths of pipe.

5. Completely make up the combination of fittings you wish to insert in the line, using the pipe vise to hold securely.

6. Turn on the assembly, again using two wrenches so strain is taken by wrench, rather than fitting that is not removed.

7. After assembly is screwed back onto pipe, fill-in pipe is screwed into its fitting, then ends of pipe, on which halves of union are fitted, are brought together and union collar tightened firmly. Hose connects to faucet.

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8. Standard pipe vise has latching dog for quick removal and insertion of pipe, notched jaws for firm holding.

9. Chain vise is readily adjustable to various sizes, is tightened by means of screw and pivoting lever.

10. Some regular machinists' vises have jaws inside regular jaws, for holding pipe that is to be threaded or cut.

11. Pipe cutter has cutting wheel, two flat rollers that keep the cutter and pipe aligned. Cutter is fast, accurate.

12. Chain vise is readily adjustable to various sizes, is tightened by means of screw and pivoting lever.

13. A second type vise, Figs. 9 and 11, utilizes a chain to grip the pipe. You will need at least two pipe wrenches, Figs. 4, 6, 17 and 19. An adjustable wrench, sometimes called a "monkey" wrench is handy for tightening such fittings as unions, Figs. 5 and 7, and other fittings that have flat surfaces. In some instances, Fig.
12. This is ratcheting-type pipe threader. With this, or other types, use plenty of oil to cool and lubricate.

13. Two-handled die holder is most common type, non-adjustable dies are inserted in holder, clamped by screws.

14. Pipe reamer has square shank, permitting it to be chucked in brace. Reamer removes burr that results from use of cutter.

15. Threads for water-pipe connections are wrapped with lampwick, then sealing compound is wiped over wick and threads.

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18. In some instances a chain wrench can be used on pipe. It is adjusted by moving links; it has less grip than pipe wrench.

19. Whenever pipes and fittings are tightened, or are loosened, use two wrenches. One "backs-up" other to take strain.

As in the example given in Figs. 1 through 4, when a section of pipe is removed for a setup, make up the complete fitting, as in Fig. 5, to a length that will be the same as the pipe removed. △ △
Refinishing Clinic

When hunting driftwood, keep transport space in mind, then choose pieces that suggest something—a fish, animal, bird, just a graceful shape.

What to do with Driftwood

Part I

PHIL McCAFFERTY

We cannot tell exactly how to make specific items, for no two pieces of driftwood are very much alike. We will try to stimulate ideas, show some fresh approaches and describe how with a little imagination a piece of driftwood can be "transformed" into several different subjects.

Have you ever wondered just what driftwood is? There is much
Selected at random on a beach these driftwood pieces suggest various items, possibilities are shown in drawings.

Driftwood piece No. 1 in the photograph and drawing becomes a fanciful fish or seal with a few added touches.

Driftwood piece No. 6 and 10 are combined, painted with metallic spray to become an unusual and attractive “jewelry tree” for milady.

The delicately toned silver-gray color. Repeated rolling on tide-swept sands rounds the corners, softens the shape. Eternal soaking in salt water tends to preserve the wood.

Eternal? Almost; the piece you find may be at least 50 years old, perhaps 100 or more. The time-etched plank you discover with a rusted, forged-iron ring might well be from a pirate ship.

Rivers close to your home often reveal driftwood treasures that are

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No. 11 becomes an attractive tray when plastic pellets are melted to decorate it, add color.

just as attractive as those from the seashore. If you can’t get to the ocean, investigate the rivers. "Mountain driftwood" from the woods and forests near your home is fine, too. Etched not by the sea, but by the sun and the wind, it takes on many of the shapes familiar in sea-shaped driftwood. Be sure to select firm specimens that have escaped dry rot. Few pieces of driftwood can be used without some cutting or trimming. How you should finish the piece, aside from colored finishes, depends to a great extent on what kind of wood it is. Generally, the softer the wood, the darker it will become when finished, unless special precautions are taken. Hardwoods, with inherently beautiful grain, look like magnificent carvings when the bleached skin is sanded away and a lustrous finish applied.

Selecting specimens is relatively easy if you have a project in mind. First, remember how much space you have in the car to haul the wood, then look for these properties: A graceful shape; such a piece can be utilized in many ways. Look for driftwood that resembles a bird, animal, fish, etc. Run a questionable piece through a mental checklist: Does it look interesting the way I am viewing it now? When I turn it half-way around? Turned completely over? How would it look with a base, legs, tray or plaque? What would happen if it were painted or gilded?

Preparing driftwood for finishing depends on the condition of the wood and the finish you want. If the wood is water-soaked store it off the floor in a dry place for six months to completely dry it.

Simple scrubbing of relatively hard, smooth pieces with water and stiff brush is sufficient for natural and colored-paint finishes.

Sanding is required to smooth pieces that have been abraded by sand. Pieces that are to reveal the natural wood color should be sanded. Use a grit that will remove the roughness, keeping in mind that the gray, bleached color is thin and will be destroyed by sanding. Finish with fine grit paper.

Don’t overlook the kitchen when decorating with driftwood. This fairy-tale tree has copper molds for fruit, hung with cup hooks for easy removal.
If you have an old sofa which still is beautiful, but which simply does not fit in with your decor, do as one woman did and convert it to a striking headboard for a Hollywood bed. First step was to remove the seat. When the bed was measured it was found to be 2-in. wider than the sofa. So, the sofa back was cut at the center and a 2-in. section was inserted. The section was cut from a matching carving on what had been the front rail of the sofa. Lengths of 2 x 4 were nailed to the sofa-headboard to raise it 6 in. so the attractive back would show above the pillows when the bed was made. Strips of 1 x 2 were used to brace the leg extensions and provide a base for attaching the burlap over which the new upholstery was applied.

A sofa with a smooth back would present less of a reupholstering problem than the tufted back shown, and using a spread of matching or contrasting material would make a beautiful ensemble.
Linen-Closet Conversion

When we remodeled our bathroom, shelves for towels and linens were part of the reconstruction program. We took advantage of this to convert the existing linen closet in the hall for the storage of clothes. The upper half of the closet is a cabinet with doors, the lower half consists of three drawers.

We removed the too-deep shelves from the upper cabinet and installed a closet rod. Only “half-length” garments can be stored here, but skirts, blouses and shirts removed from the regular closet provides much more room for coats, dresses and other full-length garments.

Easel What-Not Shelf

If you have a discarded child’s easel-blackboard you can make an interesting whatnot shelf as I did. First, remove the blackboard, then strip the finish from the easel and paint or varnish it. The shelves are attached with metal angles. The assembly can be attached to the wall by driving screws through the legs of the inverted easel into the wall studs, or by using screw eyes in the upper ends and hanging the assembly with picture wire. Mrs. D. McCarthy, Fox Lake, Wis.

Sleep Guardian

As grandparents we automatically are part-time baby sitters. We have no room for a crib or child’s bed in which a youngster can sleep overnight or take a nap, so we converted an adult-size bed to handle the situation. We attached a telescoping safety gate to the headboard, as shown. The safety latch is fitted to the footboard. The holes required for attaching the gate are quite small, and not noticeable when the gate is removed during periods when the grandchildren are not visiting us.
Window Problem windows; square ones, long thin ones, those in awkward locations, may look better with glass shelves and what-nots than with drapes or curtains.

In the example shown the window is 22 x 22 in. and located in the corner of a room. Tiny souvenir bottles change sunlight to brilliant spots of color during the day, and reflect interesting glints of color under the lights at night. The shelves are cut to fit between the sides of the window, and are as wide as the window frame is deep. Strips of ½-in. quarter-round are nailed to the frame to support the glass. The shelves also would be fine to display a collection of small potted plants, a rock collection or a number of other items.

What do you do with a bamboo pole around which a new rug is rolled? That was my challenge and I solved it by making a vase and a wind chime rather than cutting up the pole for firewood. The lower end of the pole has the larger diameter, so three pieces of varying length were cut from this section. Each piece has a joint, located so there is ample stem-length for flowers. Two triangular-shaped scraps of plywood form the base, one drilled, then the holes filed to shape to receive the ends of the bamboo sections. The base pieces were glued together, then the bamboo sections were glued in place. The assembly was finished with clear varnish. When fresh flowers are used, narrow bottles, or plastic tubes in which toothbrushes are sold, are inserted in the bamboo sections to hold water.

The wind chimes are varying lengths of bamboo, drilled so they can be strung on twine, as indicated in the photograph. The ends of the twine looped through the holes are stapled to a length of wood. The bamboo sections are positioned so they strike against each other when a light breeze blows against them. Nail the cross bar holding the chimes overhead on the patio or porch so any stray gust of wind will set the chimes to tinkling with their unusual, exotic sound.

Problem windows; square ones, long thin ones, those in awkward locations, may look better with glass shelves and what-nots than with drapes or curtains.

In the example shown the window is 22 x 22 in. and located in the corner of a room. Tiny souvenir bottles change sunlight to brilliant spots of color during the day, and reflect interesting glints of color under the lights at night. The shelves are cut to fit between the sides of the window, and are as wide as the window frame is deep. Strips of ½-in. quarter-round are nailed to the frame to support the glass. The shelves also would be fine to display a collection of small potted plants, a rock collection or a number of other items.
Organize Your Workshop

If your last project took longer than it should because you couldn't quickly find the tools and supplies, maybe it's time to do some organizing. Here are a few suggestions.

Begin by cleaning all tools, hand and power, thoroughly. Power tools that are not used every day should be given a protective coating of oil, then covered with plastic sheeting to keep out dust and dampness.

Clean smaller tools with a scouring pad and turpentine or other rust solvent. Check handles for signs of wear and repair rough or splintery ones by wrapping spirally with colored plastic tape. It's watertight, strong and provides a firm grip. Helps avoid blisters on the hands, too.

Instead of dumping tools in a drawer or tool chest, hang them on a panel of perforated hardboard. They will be handy, yet out of the way, and sharp-edge tools will be protected. Outline the shape of the various tools on the board with a crayon, felt-tipped marking pen or paint. You then can tell at a glance which tools are missing. When you lend out tools, make a record of which tool and the borrower. Wrap a strip of colored plastic tape on the tool handle as a friendly "reminder" to return the tool.

Check your supply of materials and make a list of what you need in the way of sandpaper, nails, etc. Sort and separate small items, placing them in drawers, boxes and jars. Label the containers for quick identification.

Save time by "color-coding" equipment, matching an appliance with its corresponding cord. Colored plastic tape can be used for this, being available in seven colors, red, white, yellow, blue, green, brown and black.△△

In the Next Issue . . . . . .

Beautify Your Basement
Home Pool Table
Five-Board Bench
Shell-Plate Intarsia
Georgian Wing Chair

Gem Cutting

(Continued from page 41)

tumblers or in one tumbler having a number of compartments, each has a selected grade of abrasive so that several operations can be carried on simultaneously. Before transferring stones they must be washed and rinsed thoroughly to eliminate all traces of grit. Using a single tumbler for different grits involves the time and difficulty of cleaning it thoroughly before changing to a finer grit. Tumbling is done at slow speeds such as 50 s.f.p.m. A charge should not exceed two-thirds of the tumbler's capacity.

To hold a stone securely for drilling you can cement it to a small block of wood with sealing wax. Then the block is held securely in a drill vise or clamped to the drill-press table. Stones not much harder than glass can be drilled with carbide-tipped drills made for glass drilling. Fig. 18 shows the common method of drilling stones with tubing, preferably nickel. The cutting agent consists of 220-grit or finer silicon-carbide or diamond dust, mixed with water or light oil. This mixture is kept at the drill point in a small reservoir formed with putty or modeling clay. Very light pressure is applied and the drill is constantly raised and lowered to permit the cutting fluid to get into the hole and also to prevent the stone from heating. Diamond drills are run at speeds as high as 7,000 r.p.m. and the stones usually are submerged in water while being drilled.

(Continued Next Issue)
Low-Cost Vanity Table

RALPH TREVES

1. Attractive vanity table is built by combining two low-cost, unfinished cabinets with shop-built center section that is joined to the cabinets.

2. First step is to position cabinets in space available, measure between.

Two low-cost, unfinished cabinets, available at many stores and mail-order houses, are the basic components of this attractive vanity table, Fig. 1. These cabinets cost little more than you would pay for the lumber, and are a real timesaver for a project like this.

First step is to locate the cabinets in the space available, Fig. 2, and measure the length from the outside edges of the tops. This will be the length of the new top. The dimension from front to back of the original tops is the one for the new top. Remove the tops from the cabinets, Fig. 3, by taking out the screws driven up through the glue blocks. Use a piece of 3/4-in. plywood for the top, covering the edges with 1/4-in. strips, mitered at the corners, Fig. 4. This requires the top to be 1/2 in. shorter than the final required dimension. The width need not be changed.

Apply plastic laminate to the top, in a pattern and color of your choice. An off-white was used on the original. Use a contact adhesive, employing a "slip sheet" to

3. Remove the solid tops from the cabinets by removing screws driven up through glue blocks in frame into the top.

4. Edges of 3/4-in. plywood used for top are covered with strip 1/4-in. thick; corners are neatly mitered.
5. "Slip sheet" is used between plastic laminate and contact adhesive, to position it correctly in place.

6. Check top for size before building center section. Make sure cabinets are positioned, then mark top.

position the laminate before pressing it onto the adhesive, Fig. 5. Check the top for size, Fig. 6, and mark the locations of the two cabinets on the underside. Build the framework for the drawers, Fig. 7, to the dimensions you wish. A depth of about 6 in. is good. Make drawers to fit.

Attach the framework to the underside of the top, Fig. 8 with glue and flathead screws. The final step is to invert the two cabinets on the upturned top, Fig. 9, and attach the top and the drawer section to the cabinets with flathead screws. In the matter of making drawers, shape them to match the drawers in the ready-made cabinets. If there is a problem with the design of the pulls, replace the pulls on the cabinets with new ones, using the same type on the new drawers.

8. Framework for drawer section is assembled, then fastened to underside of top with flathead screws and glue.

9. Final step is to attach top to cabinets, and drawer section to cabinets by driving in screws. Use pilot holes.
Magazine Rack-Table
If magazines pile up at random on tables and chairs, let this modern rack-table solve your problem. The design is simple enough to permit the unit to be built with hand tools, and it will not only hold magazines but provides space for smoking supplies or a snack on the table top.

Begin by making full-size patterns of the ends and top. It is easiest to start the layout with the 12-in. measurement at the bottom of the legs. This pattern provides accuracy in cutting angles, indicates sizes and proper positions for each piece. Check each member as you cut the various parts. Indicate the positions of screws and bore clearance holes and countersink them before assembly begins. Use glue as well as screws or finishing nails on all joints. After the top has been glued up, begin assembly of the ends by cutting half-lap joints where the legs cross, then join the legs to the top cross members. Mount the V-shape stretcher on the flat stretcher and assemble ends with stretchers and top rails. Space half-round strips along rails and stretcher. Secure with brass screws. Join top to leg unit with countersunk screws, and cover all screws and nail heads with filler. Stain to match or contrast with companion furniture and finish with two coats exterior varnish.

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**WORKBENCH**

July-August 1963
Epoxy Waterproofer

Main source of leaks in basement is joint between floor and wall. Epoxy compound will last as long as the wall.

Ordinary paintbrush (which must be discarded after use) is used to apply two-part waterproofing compound.

Versatile epoxy now is an ingredient in a waterproofing compound for sealing leaking basement walls. It is applied only at the point of leakage, rather than over the complete wall, sets to a light amber color that can be painted any color.

In our tests we determined that it can be applied to a damp surface, but does better if the surface first is dried completely.

Most interesting to us was the mortar that can be made by mixing clean, dry sand with "Epoxite" the brand name of the material. Because of the great adhesive properties of epoxy the mortar will stick to wood boat hulls, metal piping, concrete swimming pools and aluminum and steel rain gutters. It's great for tuckpointing and for filling breaks and cracks in concrete. We used it to coat a slick concrete porch that was slippery in the rain. The mortar produced a slip-resistant, even surface. For a leaflet more fully describing the material write: Epoxite, Boyle-Midway Div., American Home Products Corp., N. Y. 17.

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Making a 4¼-IN Reflecting Telescope

Join the excitement and adventure of the Space Age. Examine at close range the forbidding surface of the moon where man will land in a few years. Scan Venus and see the swirling gases that shroud this planet. Look for the canals on Mars and note the seasonal color changes, see the glory of the rings of Saturn, and watch the boiling surface of the sun. Do all these things right in your own back yard with a good-quality telescope you make yourself.

With the assistance of the Edmund Scientific Co. we determined that of the two types of telescope—the refractor that receives an image through its lenses, and the reflecting-mirror type that "bounces" an image from a mirror to a diagonal mirror and through an eyepiece—the reflecting-mirror type is the easiest and least expensive to build.

Our model has a 4¼-in. mirror. Using the experts' figure that the maximum useful power of magnification is about 50 to 60 times per inch of objective aperture, this means our 'scope will magnify 255 times. The first view through the lens was breathtaking; the surface of the moon has such a varied surface that you can spend hours examining it. Space is a blackness, but the specks of light now are planets and stars each with its own special characteristics.

The telescope mirror can be hand-ground from a blank, but below a 6-in. size there is very little cost-saving over a ready-ground mirror. You can make your own mirror mount with instructions supplied with the mirror, or you can use a factory-made item as we did, Figs. 4 and 5. An equatorial mount, Fig. 1, is almost a must. When properly adjusted the mount allows you to track a planet or star across the heavens as the earth turns. Our equatorial mount is fitted on a wooden tripod. Other mounts are designed to fit on 4-in. pipe, if pipe is used as a permanent, very solid, "tripod." With high magnification a rigid mounting of the complete telescope is absolutely vital. For this reason we exchanged a lightweight equatorial mount for a heavy-duty unit on our scope, Fig. 1. The eyepiece, Fig. 2, is fitted at the front of the tube, the location being determined by the focal length of the mirror. The tube can be fiber, cardboard or aluminum. We chose 5-in. dia.
aluminum tubing. Our finder 'scope, Fig. 3, is 4-power, has cross-hairs for "sighting-in" on a target. Its wide-angle lens covers the sky; the high magnification of the main scope produces a limited field of view.

Because there are a number of alternate methods in building a telescope, and several sizes, we suggest you write to the Edmund Scientific Co., Barrington, N. J., for their complete catalog and make your own selection of components, method of construction and size. △ △

1. Components are fitted to tube, then removed and tube is fitted and bolted to equatorial mount on tripod.

2. Diagonal mirror and eyepiece are fitted near front end of tube, after figuring focal lengths involved.

3. To rear of eyepiece, and offset, is finder scope. This is low-power, wide-angle scope for 'sighting' tube.

4. Mirror is critical part of telescope. This is 4½-in. unit in own mounting. Note magnification of facial image.

5. Mirror is last part to be installed. It must be handled with extreme care, kept spotlessly clean. Note spring-loaded screws for adjusting.

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WORKBENCH July-August 1963, 61

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**Research Department**

Each issue in this column we will choose questions on home and shop subjects from letters sent to us. Only those questions which have wide appeal will be answered here. Questions on specialized subjects will be answered by individual letter from the Research Editor's Desk.

There is a compound made up of sawdust, starch and rosin mixed with water that is used for making figurines. Do you know how much of each ingredient is used? I want to make small animals, so would want the material to stick together well and permit sanding and machining. I was told the compound was one used to make doll heads and the like.

Mrs. L.P., Juneau, Alaska.

We do not recommend the mixture you suggest, simply because it is so very difficult to work with. Figures can be built up over wire frames much easier by using a plastic wood putty, of which there are several makes available under the trade names of "Plastic Wood", "Wood Putty" and so on. After hardening, the materials can be sanded, carved, sawed or planed with ordinary care, and the material does not chip or break up as does the mixture you mention.

How can I remove or bleach out cigarette burns that are on the walnut-veneer of a table top? The table is old and quite valuable, but in constant use.

L. K., Independence, Ore.

What you do depends on the nature of the burn—whether it has penetrated the finishing materials to the bare wood and charred it, or has affected the finish only. You did not describe the burn, and for this reason we can give only general suggestions.

If the burn has not penetrated to the wood, then it often is possible to blend it by rubbing the surface with alcohol. Saturate a small ball of cotton with alcohol (painter's alcohol only) and very gently rub the burn until the finish is softened sufficiently to blend; that is, flow and spread the discoloration. By working carefully one usually can spread the discoloration sufficiently to make it more or less invisible. As soon as the alcohol on the surface evaporates, rub the area with lemon oil.

On the other hand, if the burn has penetrated the finish and charred or otherwise discolored the wood then the problem is more complicated. Usually it's best to try to remove the loose material by working carefully with a stiff-bristle brush. A brass-bristle brush or the type used to clean used leather shoes is just right. Work carefully, otherwise you will be in trouble. Once the loose material, charred wood and oxidized finish have been removed with the brush the problem is to decide whether to fill the depression or to attempt blending with alcohol as described. It would be difficult for us to say definitely without examining the defect. But as a rule we would try blending. If this does not produce a satisfactory result, then we would fill the depression with clear shellac, or with a filler in stick form that is used by furniture refinishers and is known as "Putty-Stik". This latter material comes in a variety of colors that will match almost any common finish used on walnut and other furniture woods, but it should be remembered that it cannot be used under any other finishing material. We would use stick shellac if the burn has affected the wood appreciably. This must be melted, with a soldering iron or alcohol lamp, and flowed into the depression. It then is sanded very lightly so that it is flush. Then the area is polished with lemon oil.

If these methods do not succeed in producing a satisfactory result then, of course, it will be necessary to remove the old finish and re-finish the entire surface or part damaged. However, we would try one or the other or both procedures before resorting to complete re-finishing.

We are remodeling a barn to make a summer home and wonder if you could supply us with some facts concerning how much ventilation an attic or roof crawl space needs. What size louvers should we use, or can we eliminate the use of these entirely? What purpose do such ventilators or louvers serve in an attic? Mrs. J.W.H., Wis.

Dear Mrs. J.W.H.:

Attics and roof spaces are generally provided with suitable openings for ventilation, partly as a means of summer cooling and partly as a means of preventing winter condensation.

Since you mentioned attic or crawl space, we assume that you are not concerned with a flat roof, but either a hip or gable-style roof. For gable roofs, louvered openings are usually provided in the gable ends, allowing at least one square foot of louver opening for each 300 square feet of ceiling area.

For hip roofs, inlet openings are usually provided under the overhanging eaves with a globe ventilator at, or near, the roof peak for an outlet. The inlets should equal one square foot to each 900 square feet of projected ceiling area and the outlets one square foot to each 1,600 square feet.

Please tell me where I might obtain information on residence-type incinerators. Also, are plans available for building such a unit, one that is spark-free? Mr. H. A., Lewiston, Idaho.

There are a number of gas-fired incinerators manufactured for installation in homes. Inquire of your local dealer. If they do not stock them, they will be able to get one for you. We do not recommend that you build one inside your home. An improperly built or designed incinerator presents a definite fire hazard, and a home-built unit might void your fire insurance coverage.
The concrete floor in my basement was floated with a wooden trowel, but was never given a smooth finish with a steel trowel. What can I apply that will bond to the concrete and provide a smooth floor?

Mr. D.D., Indiana

There are special toppings for concrete, but we hesitate to recommend these for a large surface such as entire basement floor. These special materials are designed for work on old concrete. It is possible to have the floor surfaced. This is a job for your local contractor, as he is the only one who might have the equipment for concrete grinding or abrading. Another method is to pour 2 to 3 in. of new concrete over the old. This should be poured with expansion joints at the walls, and over a waterproof membrane and have wire reinforcement. It probably would be cheapest to have the floor abraded by machine, after which the concrete should be sealed to prevent dusting.

I have a cement-block building that has been painted, on which I want to apply stucco. Is there a liquid that can be sprayed on the paint to permit stucco to bond to the blocks, or is metal lath the only answer to the problem?

Dr. K.F.M., Oklahoma.

Have been making cherry furniture for several years, but have a problem: On surfaces where boards have been edge-glued, like table tops, dresser tops, etc., the glue rises in a ridge for years after a piece is finished. It doesn't start right away, but several months after the item is finished. What is the trouble?

Mr. V.E.M., Minnesota.

Excess moisture in the wood at the time of joining and an open glue joint are the common causes of glue ridging as you describe. Be sure the wood is dried to a moisture content of not more than 15 per cent or so and that you make a tight-fitting glue joint. We mean tight; the glue line should be so fine you have to look carefully to see it.

We have a gravity-type, one-pipe steam heating system. I would like to take out two of the radiators in the system and replace them with baseboard Thermodin heating units of 1/4-in. pipe size. Can I hook on the same pipe as the radiators, or do I need extra drain lines?

Mr. I.V.L., New Jersey

Ordinarily we would not advise hooking Thermodin units into an older system because of the "balance" of the present system. We do know of one instance where this was done experimentally, and worked out quite well. This is not to say, of course, that you would get the same results. If you are in a position to test the performance of the units experimentally when hooked into an older system, then perhaps the step is justified. Otherwise, we advise against it.

I purchased a 24-in. disk sander that originally was run off a line shaft. I now am going to use a motor to drive it and would like to know how many r.p.m. a sanding disk of this size should run.

Mr. A.W.R., Wisconsin.

We first must assume that you are to use the disk for sanding wood, and not for abrading metals. You did not state this in your letter. If used for wood, and assuming the disk is very near perfect balance dynamically, it can be run at speeds up to 1500 r.p.m. A speed of half that will still do good work on both hard and soft woods. Disk speeds are not at all critical when sanding wood, as they are when abrading metals.

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The Editors.

WORKBENCH

BUY NAME BRANDS
**Dipsy-Doodle Lance**

- **Rubber Ball (Not Solid or Foam Rubber)**
- **Pole Should Be** 1 1/8" to 1 1/2" Dia.
- **Plumber's Cup**
- **Bore Joint in Bamboo Pole**
- **Rubber Cement**
- **Tie Tightly**
- **Measure and Use as Radius for Canvas**
- **Waterproof Tape 1/8" or 3/8" Wide**
- **To Prevent Slivering**

When an old automobile clock turned up in the odds-and-ends box in my workshop I fitted it in a case made from scraps of plywood and powered it with four flashlight dry cells hooked in series to produce the necessary 6 volts. Four of the dry cells last about a year. The clock is fine for the shop, or can be used anywhere in the house.

_C. Kimbrough, Cleveland, Ohio._

**Battery-Powered Clock**

**Screws In End Grain**

- **Dowel**
- **Bore Pilot Holes**
- **Screw**

Screws will be more firmly held in end grain if they are anchored by a dowel as shown. Make the holes a snug fit for the dowels that are glue-coated, then driven into the stock. Use pilot holes through the dowels to prevent them from splintering.

_Daniel Bousha, Jackson, Mich._

**Shop Oven**

If you have occasional need for a small oven to dry water-soaked items, or to fast-dry small painted objects, make one from an ordinary pail. Cut off the lugs that hold the bail so the pail will fit flat to a concrete floor or other surface, then cut a hole in the bottom for a porcelain electrical socket. An infrared bulb or 200-watt lamp will provide sufficient heat for the "pail oven".

_M. R. Beasley, Detroit, Mich._

**Tube Hangers**

Almost every workshop has a supply of compounds sold in containers that look like oversize toothpaste tubes. To keep these tubes handy, and protected against being damaged I make D-shape hangers from coathanger wire and fit the ends of the tube over them as indicated. The tubes readily roll on the wire when the contents are used, and a hook on the D-ring permits hanging them on the backboard of my workbench.

_A. R. Tanner, Poughkeepsie, N. Y._

**Filing Negatives**

To permit quick identification of negatives, cement a contact print of the photo directly to the glassine envelope in which the negative is stored. If a negative numbering system is used in your file, the number can be entered on one corner of the envelope with a pen.

_Leo Hills, La Habra, Calif._

64 *July-August 1963, Workbench*
Improvised Plug Cutter

When you do not have a plug cutter to make plugs to fit a particular-size hole in a project, make your own cutter. Use a drill bit of the size hole to be plugged, to drill a hole in the end of a rod at least \( \frac{1}{4} \) in. larger in diameter than the bit. File notches and relief on the end of the "cutter" then make a notch about \( \frac{1}{2} \) in. from the end of the cutter through which a punch can be inserted to force out the cut plugs. Shoulder the completed cutter to fit in the chuck of the drill motor to be used.

Walter E. Burton, Akron, Ohio.

Coffee-Egg Cooker

My soft-boiled eggs for breakfast are cooked in the same time it takes to make coffee. The egg shells are scrubbed and the eggs placed in the top of the vacuum coffee maker. The "bubbling" time for the coffee is just long enough to produce excellent soft-boiled eggs.

E. Bentley, Jackson, Mich.

Small-Brush Hangers

Small paintbrushes, such as those used for striping, present a storage problem, as the handles are too small to permit drilling a hole to hang them. Instead, clamp a small electrical connector to the end of each brush handle and hang it on a screw hook driven into a block of wood, or directly into a tool board.

Daniel Bousha, Jackson, Mich.

Bent double, a strip of sheet metal, pivoted on a nail driven in a slot cut in the edge of your workbench provides a simple work stop for planing. When not in use the stop swings down out of the way.

Daniel Bousha, Jackson, Mich.

Eyebolt Hanger

When the tube on which heavy clamps were hung in a cabinet began to sag at the center I used an ordinary eyebolt to support it. The eyebolt in the cabinet top eliminated the need for adding a vertical partition in the cabinet to provide support.

DeCristofofo, Los Altos, Calif.

Flexible Sanding Block

A stiff-bristled brush makes an excellent sanding block for irregular surfaces. Simply wrap the paper around the brush and sand with the bristle side against the surface. The flexing bristles will permit the sandpaper to follow the contour of the job.

M. Robert Beasley, Detroit, Mich.

Curved Molding

When remodeling my basement I used regular molding between the walls and the ceiling, but ran into a problem with a wall that fitted under a curved heating duct. My solution was to glue up a curved strip from lengths of wood ripped to \( \frac{1}{4} \) in. thick. I glued the strips together around a template made from a piece of 1-in. stock. Holes bored in the template permitted easy application of clamps. When the glued-up assembly had set, I used a router to duplicate the cross section of the trim I used elsewhere between the walls and ceiling.

C. Kimbrough, Cleveland, Ohio.

For shaping metal parts around the home workshop, the most versatile "anvil" I have found is a cast-iron cylinder head from a one-cylinder engine. The head has grooves, odd-shape surfaces and holes that permit a variety of bending operations. Heads usually can be picked up from a scrap pile of a small-engine service shop.

Arthur Tanner, Poughkeepsie, N. Y.

Screw Driver Cushion

Ever gotten a blister in the palm of your hand from driving screws into hard wood? Next time you have such a job, cement a disk of sponge rubber to the top of the driver handle. This "cushion" will make the driver more comfortable to use, reduce chances of getting a blister.

M. R. Beasley, Detroit, Mich.
The world is moving fast these days. In good times and bad the ability to handle mathematical problems in our age of electronics, automation and nuclear science is becoming more and more necessary for promotion on the job and for higher pay. If you don't think you have what it takes—and if you believe that 'math' is beyond your power—then you're in for the biggest surprise of your life!

For now you can learn to DIVIDE, MULTIPLY, ADD and SUBTRACT figures not only quickly and easily—but also in a FRACTION of the time the average person requires! You can actually solve such tough problems as multiplying a 5-figure number by a 7-figure number in your head without even touching pencil to paper . . . or dividing 836,791 by 284, for example, in exactly 15 seconds—even if you "funked" math in school!

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