

The Woodworker's Journal

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In This Issue:

- **Mahogany Chairside Table**
 - **Cockleshell Corner Cupboard**
 - **Furniture From 2 x 4's**
 - **Doughbox End Table**
 - **Versatile Cutoff Table**
- and much more...**

Shoptalk

A friend of a friend telephoned me one day recently, and asked if he could come over to the shop and use our drillpress for a deep drilling job. He had picked up two turned posts from an old maple cannonball bed and wanted to drill through them end to end for conversion into table lamps.

I invited the gentleman over, and after the posts were drilled, we naturally started talking about woodworking. He was a mature individual and a most interesting conversationalist. He disclosed the fact that he had, for many years, been building high quality ship models for museums and private collections. Some of his ships were also built especially for television commercials, which I found very intriguing.

His models were built in the time-honored way...from the keel up, with individual ribs, knees and decking made up of many individual tiny strips.

I asked him if there was much interest in this type of detailed work at the present time and he replied that too many people now lack the tranquility to engage in such work which could take anywhere from 500 to 1000 hours for a first class job.

I thought his remarks were a rather sad commentary on our national attitudes and lifestyle, and although there is some justification for his opinion, I have more than a hunch that older craftsmen of ancient Greece probably felt the same way.

Through letters from our readers, I have, over the last couple of years, begun to develop a sense of what woodworkers are doing...not only in this country, but around the world. And I can honestly say that there are a surprising number of people out there who can be considered master crafts-

men in every sense of the word. Craftsmanship is not dead. It's not even on the decline.

In a society where we, as individuals seem to have less control over our own destinies, we need the feeling of self-sufficiency that woodworking imparts. We also need the therapy that woodworking provides to revitalize ourselves in order to face the ever-increasing tensions brought on by crime, crowds, traffic, inflation and our collective anxiety due to the threat of nuclear extermination.

In this brand-new decade, which has already been tarnished by both foreign and domestic problems, let's all take time to relax and enjoy some careful woodworking. Enjoy the feel and smell of freshly planed wood and let the wrinkles unfold.

This issue starts our fourth year and I think it's an exciting edition. We've been doing a survey of reader's interests and, as a result, have added The Gift Shop, which will be a regular feature from now on. It seems that there are quite a few people who are interested in gift and novelty items for themselves and for sale...so The Gift Shop should help fill their needs.

The Contemporary Love Seat in this issue is part of something we've wanted to do for a long time and that is to design a series of pieces which can be built from ordinary framing lumber at very little cost. Other publications have tried this approach but I've always felt that many of the designs were rather clumsy and crude looking. I hope that you will enjoy this series, and look forward to your comments and suggestions. Have a good winter season.

Jim Mc Quillan

The Woodworker's Journal pays for contributions from readers. We are interested in original plans for furniture (all styles), toys, clocks, jigs and furniture accessories. Submissions must include dimensioned sketches, written instructions and high quality black & white photos. We re-draw all sketches so they need only be clear and complete.

THE WOODWORKER'S JOURNAL

25 Town View Drive
P.O. Box 1629
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Editor and Publisher..... James J. Mc Quillan
Managing Editor..... Thomas G. Begnal
Contributing Editors..... Charles C. Burke
John W. Olson
Donald F. Kinnaman
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LETTERS

When reading your May/June issue I noticed plans for the patio settee. I like the style of a couch that has only cushions to maintain and when it comes time for reupholstering, the cost is not so great. If you have plans or know where I can get them, please let me know. C. Coffua, W. Warwick, RI

We also have been intrigued by that style of furniture, so for this issue we've designed an attractive contemporary love seat that offers just the features you are looking for. The result is a piece of sturdy furniture that's economical to build and easy to maintain. Costs are kept to a minimum because it's built almost entirely from lumberyard 2 x 4's. Matching pieces will be offered in future issues.

I am writing to see if you have any information on wooded tool chests. I have been trying to find plans for a wooded tool box. Please advise if possible. J. Griggs, Hot Springs, AR

The November, 1979 issue of *Popular Mechanics* offers plans for a very handsome and functional tool chest. Write to them at P.O. Box 10063, Des Moines, IA 50374, for details on how to order back issues.

I am interested in where I can buy some specialty hardware, such as new, large, antique coat hooks to use on a mirror and a hall tree that I want to make in my workshop. G. Buehler, Wooster, OH

The Wise Company, 6503 St. Claude Avenue, Arabi, LA 70032, offers several styles of antique coat hooks. Their catalog is available for \$1.50.

For some time now, I have been looking for plans to build a corner cabinet for our dining room. I have had no luck and would appreciate your advice on where I could get plans. Michael Werner, Stamford, CT

In recent months, we've had a number of readers express an interest in plans for a corner cabinet, so in this issue we are offering a design that we hope you and many other readers will like. The plans are being presented in two parts. This issue contains Part I, and detailed construction of the basic carcass, shelves and ogee feet. Part II will be included in the March/April issue and will cover the cockleshell carving, door construction, assembly and finishing details.

I am currently looking for a set of plans to construct a workbench. G. Benson, Batavia, IL

Plans for a basic, yet sturdy bench were offered in our Jan/Feb 1977 issue. It measures 33 inches wide x 72 inches long. Back issues are available for \$1.50 each.

One more word about stainless steel spikes for meat carving trays (*Woodworker's Journal* Sept/Oct 1979). If you're willing to cut and grind your own, getting stainless steel is easy. Just look in the yellow pages for the nearest specialty steel supply house. Every city of any size has at least one. There you'll find all the stainless rod you'll ever need in any size you want. If you're in a small community and don't have a supply house nearby, ask your local welder where he buys his stainless. A. Takas, Chagrin Falls, OH

EDITOR'S NOTE

Here are some more requests by readers in search of woodworking supplies. If you can help them out, drop us a note. If we come up with any answers, we'll print them for everyone's benefit in the next issue.

...I'm trying to locate parts for a Wallace-Turner 14 inch bandsaw I bought at an auction. I've been through all the usual channels and can find no parts. I would appreciate anything you could do.

...Could you tell me where I would purchase 1 1/2 inch diameter and thicker dowels, 5 feet long in Ash or Oak.

...Can you help me out. I wish to make a high quality canopy bed, but cannot make the four tall posts myself. Where can I buy 4 very high quality mahogany or walnut bedposts?

...Many times I have seen woodwork shows in our local mall that sell bread boxes with glass inserts that say "Bread" or "Cookies" etc. Also silk screened glasses for medicine cabinets. I have not been able to find where to buy these.

...Can you please give me a source for brass bands such as are used on redwood planter boxes. They are about 1/2 inch wide and are wrapped around the boxes to cover nails and add support to the joint.

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The Beginning Woodworker

DOWELING DETAILS

Most woodworking books tell the novice what to do and how to do it properly. All well and good...but what happens when difficulties arise that the book doesn't cover. The problem is that basic woodworking encompasses such a large area of knowledge that it's difficult to cover every little kink between the covers of one book. The beginner is therefore given a rough framework of basic knowledge and then spends years filling in this framework with more detailed knowledge gained from experience.

When I first became seriously interested in woodworking, I decided to build a large blanket chest. This involved a lot of edge-joining in order to build up boards of sufficient width for the deep box. I wanted the chest to be strong so I chose to use dowel pins to reinforce the joints.

Some 3/4 inch diameter dowel stock was purchased at the local lumberyard, along with a single-twist 3/4 inch auger for a hand brace and a doweling jig of the type that has a revolving turret for various size drills.

Everything went according to the books until I tried to use the doweling jig. To my surprise, the 3/4 inch auger would not fit into the hole marked 3/4 inch on the jig. This was unexpected and rather disturbing. After pondering the problem for awhile, I borrowed an electric hand drill and an ordinary 3/4 inch twist drill bit. I found that the twist bit fit perfectly in the jig so I proceeded to bore all the dowel holes.

All went well until I cut some dowel pins and tried to get them into the holes. It took considerable pounding to drive the pins in and I lacked sufficient experience to realize that the pins were too tight. In the process I finally split a board. What went wrong? I had followed instructions and yet ended up with a mess.

The problem was that I assumed everything I bought would be standardized and perfectly uniform. I had not yet become aware of the reality of plus and minus tolerances or the moisture content factor affecting the dimensions of dowel stock.

Mindful of my early frustrating experience with doweling, I'd like to discuss the equipment and techniques needed for making dowel joints and hopefully anticipate and offer solutions for the problems that may vex the novice.

The use of dowel pins to join frame corners, legs and rails and leg-stretcher assemblies has been criticized by some advanced woodworkers as being a method suitable only for the unskilled and not appropriate for fine furniture. This negative attitude is unfortunate and smacks a bit of snobbery. Doweling, like other joining methods has its advantages as well as faults.

I do not propose that dowel joints be used on exact reproductions of antiques which were held together with the traditional mortise and tenon joint. In this case the authenticity of the method is questionable rather than its efficiency.

Craftsmen of the 18th century had to rive (split) their pegs from hardwood blocks; planing them to square or octagonal section. Sometimes the pegs were used in that form and sometimes they were driven through a sized hole in an iron die to reduce them to rounds. The point is; if nice uniform birch dowel stock had been available then, perhaps the doweled butt joint would be more traditional and hence more acceptable today.

From a production viewpoint, the joint is preferable to the mortise and tenon for it is more quickly made with

either hand or power tools. That's why furniture manufacturers use the dowel joint extensively.

For most furniture applications, it's a strong enough joint, but of course there are exceptions. A small stand or table designed to support the great weight of a 50 gallon aquarium, naturally requires special consideration.

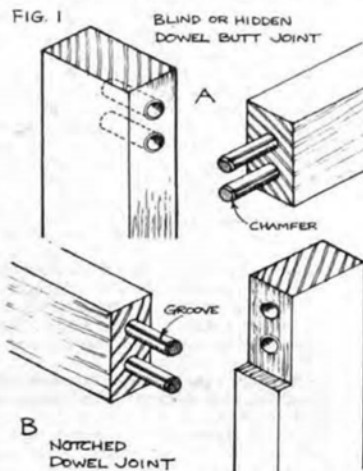


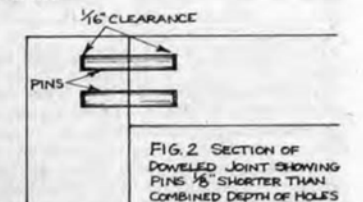
Fig. 1A shows a typical blind dowel butt joint while Fig. 1B shows a notched joint that obviously will do a much better job of supporting weight; the notch provides a good bearing surface while the dowels hold the members together. Most importantly, this is an easy joint to make...and easy does not necessarily imply poor craftsmanship.

Probably the most relevant criticism of the simple dowel joint is that sometimes the dowels shrink and loosen in their holes, eventually causing the joint to come apart. If care is taken, this need not happen.

Good dowel joints begin with the dowel stock itself. It's sold at most hardware and building supply outlets in three foot lengths, in sizes from 1/4 to 1 inch diameter. Hobby shops sell dowel as small as 1/16 inch diameter. The small sizes are very useful for use as locking pegs for other types of joints.

The woodworker chooses dowel diameter according to the thickness of the parts being joined. A rule of thumb is to use dowels of a diameter the same as, or a little less than half the thickness of the stock. Thus, for lumber of 3/4 to 1 inch thickness, a 3/4 inch diameter pin is used.

For practically all work using blind or hidden dowel pins of 1/4 to 1/2 inch diameter, a pin length of 1 1/2 inches is fine. An important point to remember is that the total depth of the holes bored in joining parts should be about 1/4 inch longer than the pin itself (Fig. 2). This extra depth allows a pocket for excess glue and helps prevent splitting of the members due to hydraulic pressure.



Most woodworkers buy their dowel stock in 3 foot lengths and cut pins as needed. Properly prepared, dowel pins are important for successful joints and there is a fair amount of work involved in preparing them. They should be chamfered at each end to ease their

entry into holes and most importantly, they should be grooved to allow trapped air and excess glue to escape.

If you choose to make your own pins, as most woodworkers do, you'll want a jig to assist in grooving the dowel stock quickly. One such jig, which scores a

Cont'd on Page 4

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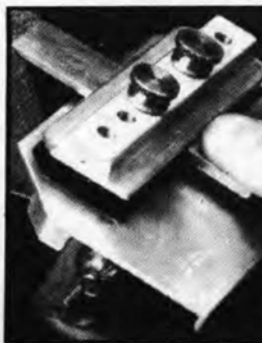
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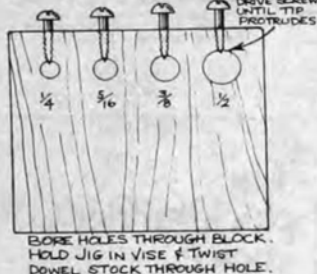


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The Beginning Woodworker (Cont'd)
spiral groove, as the stock is twisted through, is shown in Fig. 3. Another method is to simply lay the sharp edge of a wood rasp diagonally on the dowel stock and use the rasp to roll the dowel along the bench top. With downward pressure, the rasp will score a spiral groove in the stock.

FIG. 3 DOWEL GROOVING JIG



If you intend to do a lot of doweling and shop time is limited, you may prefer to buy pre-cut dowel pins. These are available in diameters from 1/4 to 1/2 inch in lengths of 1 1/2 inches and

come already chamfered and grooved. They're sold in lots of 100 or more by most mail-order firms specializing in cabinetmakers' supplies. It's worth noting that I've used these pins to save time but have found considerable variation in diameters. In a lot of 1000 1/4 inch pins, some were too loose a fit in the holes.

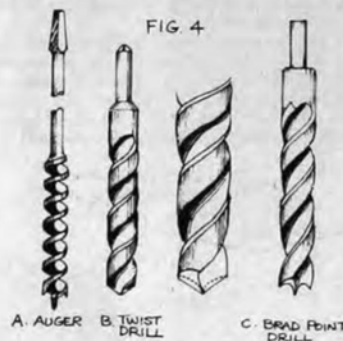
Ideally, it should take a light mallet tap to seat the pins. Pins that can be easily inserted or removed with the fingers are too loose. Also, pins that must be driven home with heavy blows are too tight and stand a good chance of splitting the workpiece.

To overcome the possibility of having the joint work loose because of dowel shrinkage, it's vitally important to use only thoroughly dry dowel stock. If moisture content is too high to begin with, it's a certainty that the pins will later work loose.

If you want the best possible joint (and who doesn't?), store your dowel stock in a warm dry place, such as over the furnace; and don't use dowel stock fresh from the lumberyard. If you're in a hurry, dowels can be dried in the oven for a few hours at 200 degrees... but this is rather wasteful of energy.

There's such a variety of drills available that the beginner can be easily

confused as to which is best for drilling dowel holes. Years ago, before the electric hand drill, cabinetmakers bored holes with an auger chucked into a hand brace (Fig. 4A). Many still use this method, but it's slow, and with hardwood, more physically demanding. Then too, augers bore rather rough holes...and as I once discovered, some augers will not quite fit in doweling jigs.



High speed twist drills; the kind commonly sold in hardware stores, are probably used by more woodworkers than any other type (Fig. 4B). This, in spite of the fact that they are designed for drilling in metal rather than wood. Because they lack a center spur, they tend to wander a bit and although this may not seem important when using a doweling jig, I don't think they are the best choice for boring clean holes in end or edge grain.

Probably the best approach is to purchase a set of brad-point drill bits (Fig. 4C) for use with an electric hand drill or drill press. The brad point on these bits digs in at dead center before the drill is switched on and the double spurs cut clean holes. Like everything else, there is some variation in the quality of these bits and I find that they should be used at fairly high speed...but all things considered, they will do the job better than the other types.

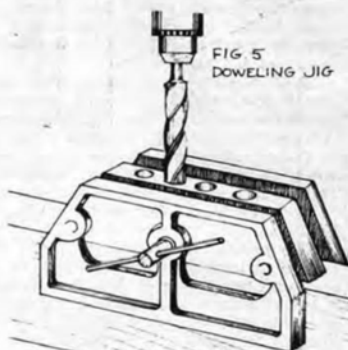


FIG. 5 DOWELING JIG

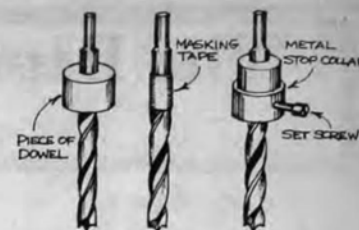


FIG. 6 DRILL BIT DEPTH GAUGES

a strip of masking tape wrapped around the drill bit at the proper height is sufficient. Others drill through a small hardwood dowel or block and use this as a stop. Commercial gauges are generally small steel collars that fit the drill shank and can be locked on at any point with a setscrew. You're striving for maximum accuracy in all operations so take the time to use some sort of depth gauge.

Set your depth gauge to drill a little deeper than half the length of the dowel pin. After drilling, blow chips from the holes. Chuck a countersink bit in your drill or hand brace and lightly countersink each hole. This leaves a little clearance trough for excess squeezed out glue; a small detail to be sure, but one that is observed by master craftsmen.

Use a thin sliver to spread glue around insides of dowel holes or use a squeeze bottle with a thin nozzle for feeding a spiral of glue around the edge of the hole and letting it drip down. Also, coat each dowel lightly with glue before driving.

Determine how far the pins should be driven in, still allowing for a small space at the bottom. Use a scrap of wood as a stop and drive pins in until their tops are flush with this stop (Fig. 7).

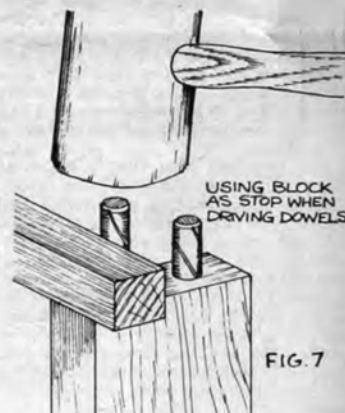


FIG. 7

Last, but not least in our consideration is the type of glue used for good furniture joinery. The polyvinyl or white liquid glue sold practically everywhere in plastic bottles is very widely used. It's a good glue but not the best for our purposes.

A better glue is the aliphatic resin type which is yellow in color. This glue has the same clamping time as white glue but can be used at any temperature above 45 degrees...an important point in unheated shops.

If time is not an important factor, liquid hide glue has excellent holding power, but clamping time is about twice that of the white and yellow glues. This also is a room temperature glue but warming the glue container in a pot of hot water will enable you to glue at colder room temperature.

It is hoped that some of the seemingly small but important points discussed here will get the novice on the right track to successful dowel joinery. The right tools and techniques are important but equally important is a deliberate and tranquil attitude toward the work. This fosters accurate layout and careful work habits which really is what cabinetmaking is all about.

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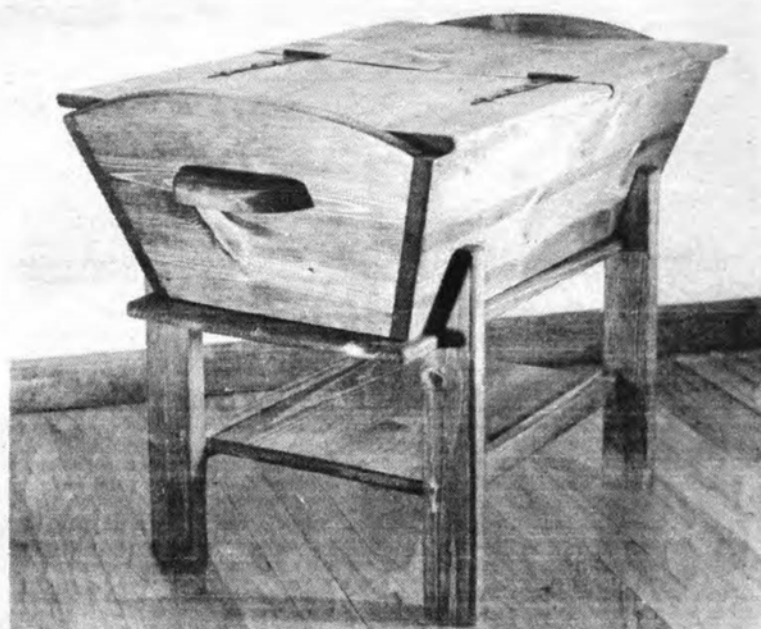
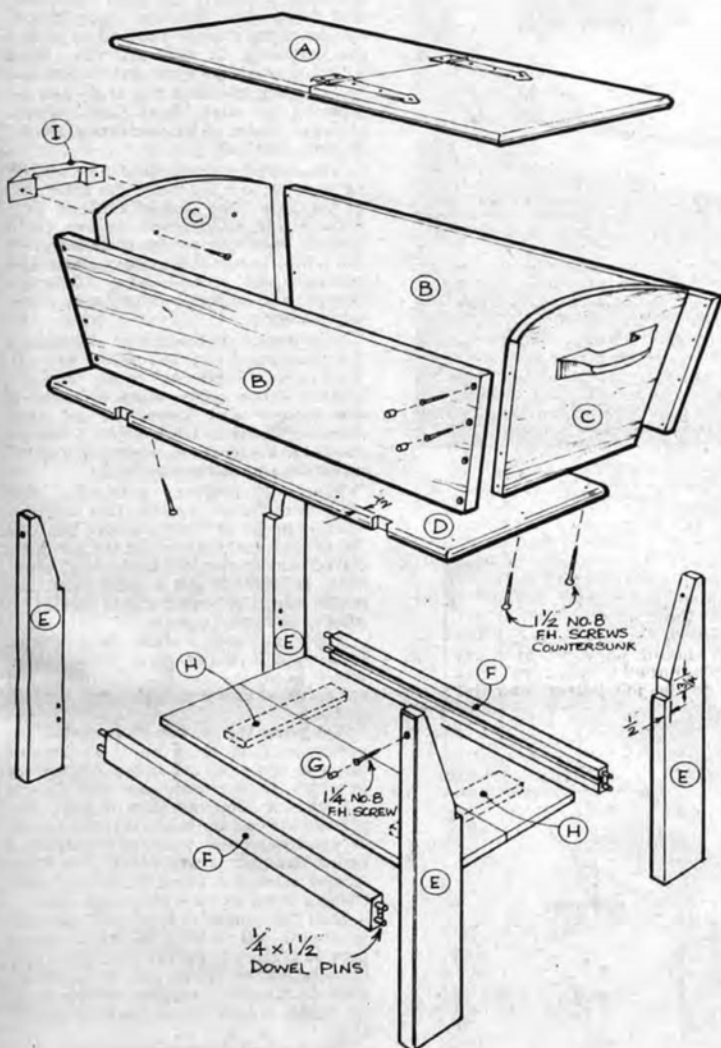
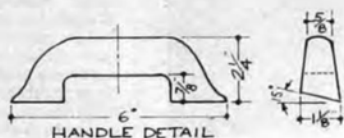
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Doughbox End Table



Doughboxes have always had considerable nostalgic appeal and although no longer needed for their original purpose, many fine antiques and reproductions are in use as chairside tables. Their large storage compartments are ideal for magazines or knitting.

Our adaptation, with shortened legs is a very pretty piece in white pine and its construction is just challenging enough to be interesting.

The sides (B) and ends (C) of the box can be cut from 1 x 10 and 1 x 12 inch stock respectively or glued up from narrower boards. The lid (A) and base (D) however, must be made by edge-joining and gluing stock to width. Reinforce these joints with $\frac{3}{4}$ x $1\frac{1}{2}$ inch dowel pins. Cut sides to a finish length of 28 $\frac{1}{2}$ inches, then setting the table saw miter gage at 15 degrees, cut each end to a 75 degree angle, then with the blade inclined to 15 degrees, bevel the bottom and top edges.

The box ends are cut to 15 inch length and the angled sides are cut with a tapering jig. The curved top is laid out using a thin strip of pine bent on edge to a fair curve as a guide for the pencil. The bottom edges of both ends are also beveled to 15 degrees.

Sand all four parts and join with glue and $1\frac{1}{4}$ inch No. 8 F.H. screws counterbored to be covered with $\frac{3}{4}$ inch diameter pine plugs cut from

scrap with a plug cutter.

Next cut the platform and two-piece lid to finish size. Using leg stock as a guide for width, lay out and cut notches for the legs in platform edges. The box is fastened to the base by driving $1\frac{1}{2}$ x No. 8 F.H. wood screws up through the underside of the base. It's best to set the box in place on base and run a light pencil line around inside and outside of box. Drill angled pilot holes midway between these guide lines using a bevel gage set at 105 degrees to guide the drill bit.

Legs are cut from $\frac{5}{4}$ inch pine, notched to half-lap over the notches in base and angled down to the notches to fit flush against the box sides.

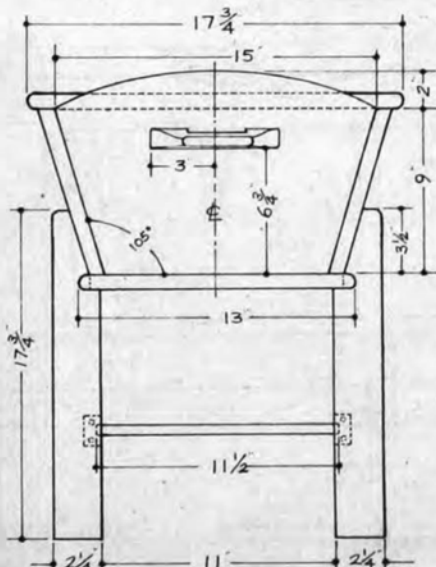
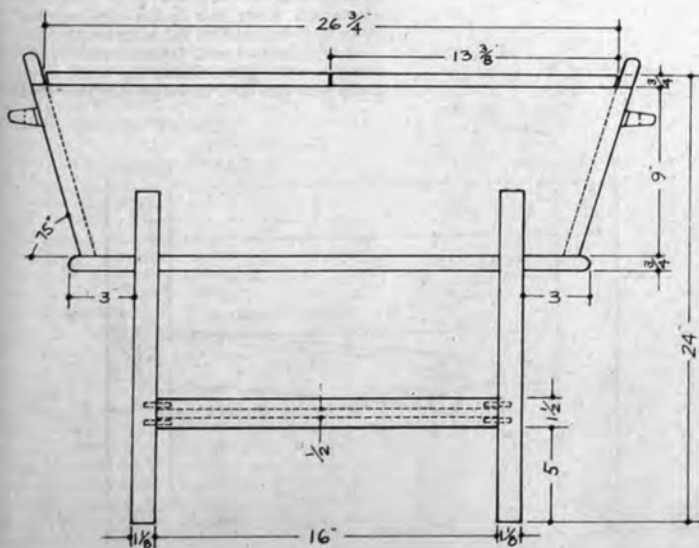
Groove rails (F) to take a $\frac{1}{2}$ x $11\frac{1}{4}$ x 16 inch shelf made up of two or three boards edge-joined and held together with two $\frac{1}{2}$ x 2 x 8 inch cleats (H) screwed on the underside. Shelf rails are doweled and glued to legs, making sure that the rails meet legs squarely.

Lay a leg-rail assembly flat on the workbench, add shelf and slip box-base into leg notches; then add the other leg-rail assembly and fasten base to legs with $1\frac{1}{4}$ inch x No. 8 F.H. screws counterbored and covered with $\frac{3}{4}$ inch plugs.

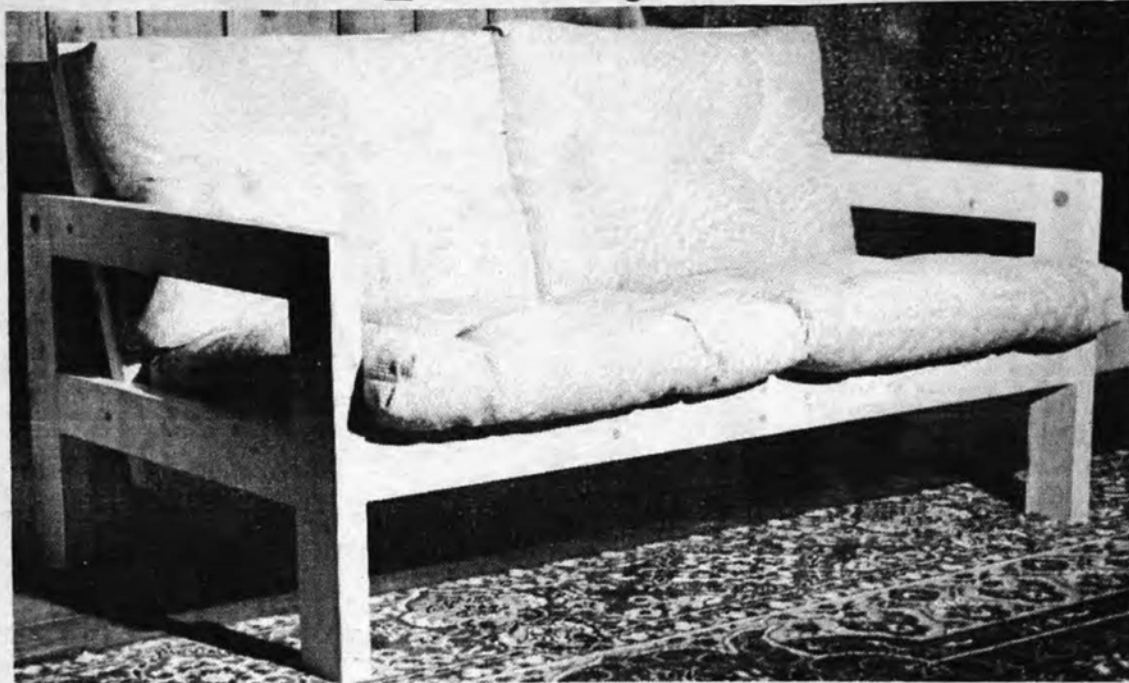
Handles (I) are cut from scrap $\frac{5}{4}$ inch stock beveled along one edge with blade set at 15 degrees and shaped as shown. They are screwed to box ends from the inside. Fasten one half of lid to box sides using finishing nails which are set below the surface. The other lid half is set in place and hinged with flush mounted 6 inch black strap hinges. The lid edge should project sufficiently beyond the box sides to afford an easy grasp.

This piece looks well if exposed edges are well rounded to simulate wear and the surfaces are distressed before stain is applied. Our distressing technique consists of a few judicious clouts with a set of tire chains, and an irregular chunk of concrete; finishing off with some jabbing with a sharp pointed awl. The piece is then given a final sanding before staining. At present, a brown or golden-brown tone is most popular for pine reproductions.

After drying, seal the stain with a 50/50 mixture of white shellac and alcohol. Sand when dry to remove the slight roughness of raised grain and apply two or three coats of a good grade of varnish. Allow each coat to dry completely before rubbing down with 3/0 steel wool. Take care to remove all dust with a stiff brush and tack cloth before applying each coat of finish. The final coat is rubbed to a uniform soft glow.



Contemporary Love Seat



If you've been looking for furniture with clean contemporary styling that's easy and economical to build...consider this handsome love seat. It's the first design in a continuing series of smart furniture made almost entirely of ordinary lumberyard 2 x 4's.

The seat is sized for two ready-made cushion sets consisting of two 4 1/2 x 22 x 23 inch seats and two 4 x 17 x 23 inch back cushions. The total cost of our cushions was \$50.00 but you may want to make your own from foam rubber and the fabric of your choice.

Seven yards of reinforced rubber webbing supports the seat cushions, and for a neat finished appearance, special metal clips were used to secure the webbing in rail grooves. Both webbing and clips were purchased at a local upholstery shop but they can be ordered by mail from The Woodworkers' Store, 21801 Industrial Blvd., Rogers, MN 55374.

The cost of webbing and clips should not exceed \$15.00, while the total cost of the love seat should be less than \$100.00. In subsequent issues we'll feature matching pieces including coffee table, lamp tables, easy chair and ottoman...all good-looking inflation beaters and all made of ordinary framing lumber.

You'll need 35 linear feet of hemlock 2 x 4 lumber (1 1/2 x 3 1/2 inches actual). Take care to choose clean, straight stock with no splits, warp or twist. If the lumber was stored in an open shed, it's best to let it sit in a heated room for about three weeks to reduce moisture content before using.

Framing lumber generally has slightly rounded corners. This will present no problem except where the legs (B) of each end frame and the uprights (G) of back frame join horizontal members. In order to get a good joint, the inside edges of both B and G should be planed or ripped square.

Figures 2 and 3 show these members with a width of 3 7/16 inches which accounts for this trimming. All other frame members are a full 3 1/2 inches in width.

The parts for the two end frames are gotten out first. Note that the tenons of the arm rests (A) are a full 3 1/2 inches in width. If your table saw will not cut 3 1/2 inches deep mortises in legs (B), the tenons can be made 3 inches wide or even narrower with no problem as far as strength is concerned. For safety and accuracy, use a tenon jig when cutting these joints with a table saw.

Rail C is butted to legs and held with glue and two 1/2 inch diameter dowel pins at each end. Before gluing up end frames, check them for squareness, then disassemble and lay out the angled dados which cross both A and C rails.

Set a bevel gage to 108 degrees or table saw miter gage to 18 degrees and mark the dado on each rail. Cut with a dado head, or by making repeated passes over the blade, using the miter gage set at 18 degrees in a crosscut operation. Keep the dados a bit on the snug side to account for later sanding.

Sand parts of end frames and reassemble with glue, clamping until dry. Later you can drill through mortise and

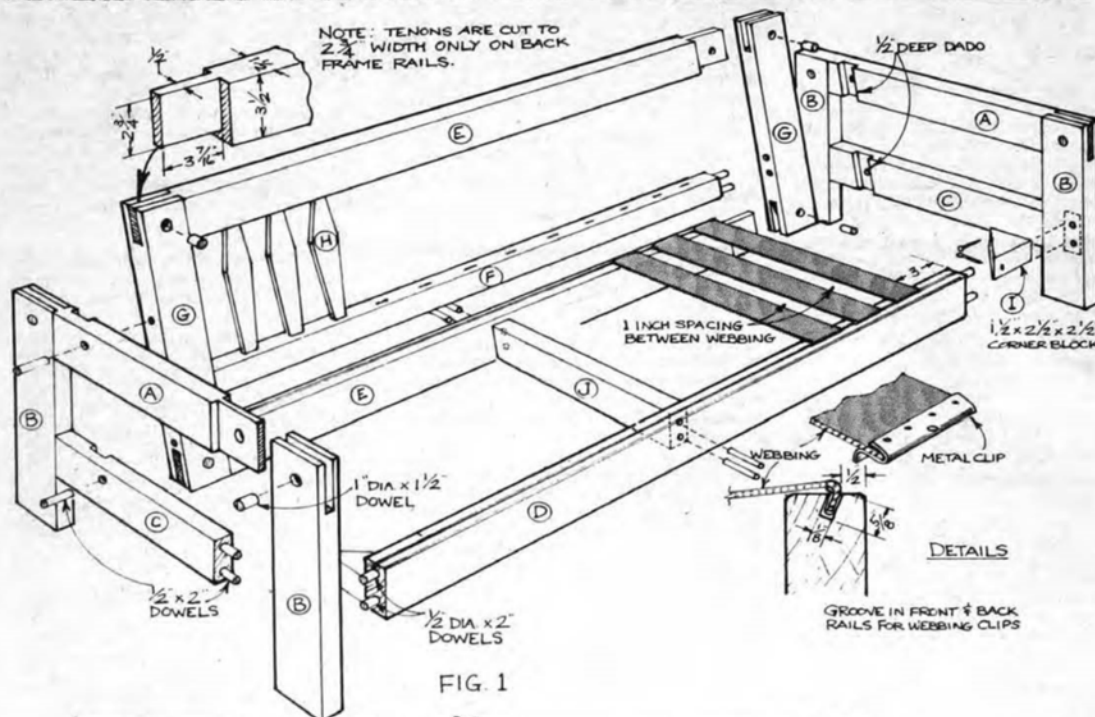


FIG. 1

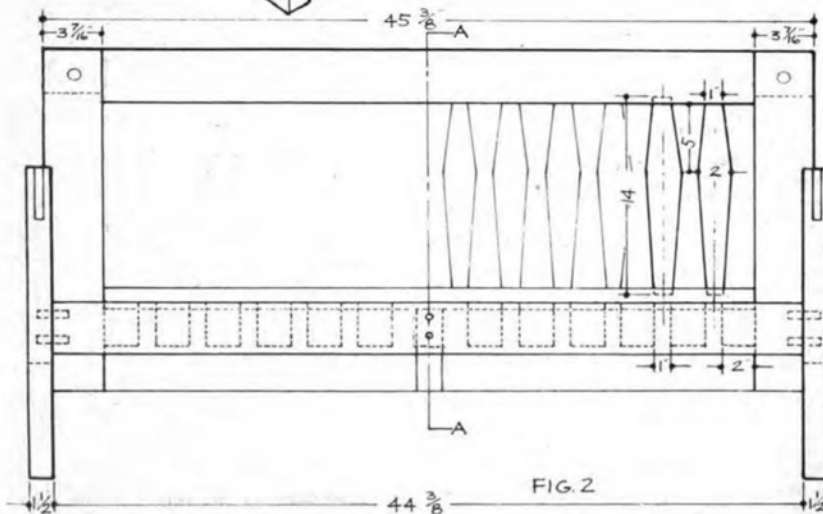


FIG. 2

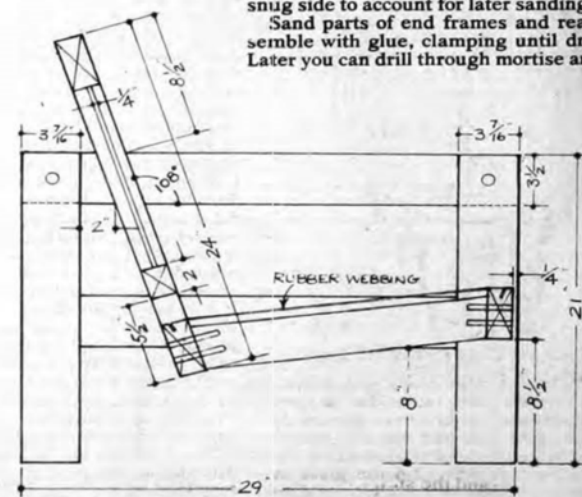


FIG. 3 SECTION A-A

tenon joints for a 1 inch diameter x 1 1/2 inch dowel peg which is glued in place. Clean up joints with a belt sander.

The front rail D is cut to length, bored for 1/2 inch diameter dowel pins and grooved along the top edge with the saw blade set at 20 degrees as shown in the Fig. 1 detail. This groove should be carefully sized to hold the webbing clips snugly. A kerf of 1/4 to 5/32 inches is about right.

The clips have a hole by which they can be screwed to the top of the rail thus doing away with the need for ripping angled grooves, but this method doesn't look nearly as neat as hiding the clips in a groove. When boring dowel pin holes in legs for rail D, note that the rail is set back 1/4 inch from the front edges of legs.

Back frame rails are a full 1 1/2 x 3 1/2 x 45 1/2 inches, while the slat rail F is 1 1/2 x 2 x 38 1/2 inches. The uprights G are ripped to 3 7/16 inches as were the legs. Tenons on rails E are 2 1/4 inches wide with corresponding mortises on parts G.

These tenons are narrower because the lower E rail must be grooved at an angle and it's easy to run the groove from one end to the other over the saw blade. If the tenons were of full width, this groove would run right through the tenons and would be visible when the joint is assembled. Upper rail E has no groove but the tenons are cut the same for the sake of uniformity and ease of setting up the tenon jig.

Temporarily assemble back frame and lay out locations of 1/4 x 1/2 x 1 inch mortises for the back slats. Starting from either end, locate the first mortise exactly 2 inches from the G rail and centered in E and F rails. Mortises are spaced 2 inches apart until 6 sets have been located; then start at the other end and again work toward the middle. This spacing will result in a 2 inch space between the two slats nearest the center of the back frame.

Stock for slats is resawed from birch, maple, ash or oak to a trifle over 1/4 inch thickness, then planed or sanded down to 1/4 inch. Shape slats as shown and sand smooth with rounded edges.

Slats are inserted, without glue, into mortises and the entire back frame as-

semble is glued and clamped together. Bore corner joints for 1 inch diameter dowel pins.

When back frame is dry, you can begin final assembly. Spread glue in dowel holes and on ends of rail D and join it to end frames. Then slide back frame into glued dados of end frames so that 8 1/2 inches of the back extends above the tops of armrests.

If you lack pipe clamps long enough to span the seat, connect 2 lengths of pipe with threaded pipe couplings or screw temporary blocks to inside faces of E and D rails to provide a clamping point.

After glue has cured, reinforce dado joints with 1/2 inch diameter x 2 inch dowel pins. Also, glue and screw two corner blocks (I) between ends of rail "D" and legs. The center brace (J) is ripped from 2 x 4 stock to a width of 3 inches and rough length of 17 inches. Trim ends to angles of 8 degrees, apply glue and clamp between front and rear rails. Bore through rails and into brace for two 3/4" x 3" dowel pins at each end.

The rubber webbing is stretched when installed to provide the right amount of resistance to the weight of a seated person. Cut webbing into 18 inch lengths and fasten clips to each end by squeezing them on with pliers. Drive one clip into the groove in rail E, right up against G, then stretch webbing until the clip at the opposite end can be hammered into the D rail groove.

You will find this is a two-person job as it takes a good bit of muscle to stretch the webbing. Make sure that the rear clip is well anchored when stretching the webbing as a serious injury can result if this end pulls out under tension.

Working from each end, the webbing straps are spaced 1 inch apart. The last strap is centered on the rails as shown in Fig. 2.

All that remains is a final sanding and slight rounding of sharp edges. Stain if desired and follow with two or three coats of clear sealer rubbed down when dry with 3/0 steel wool to an even soft luster.



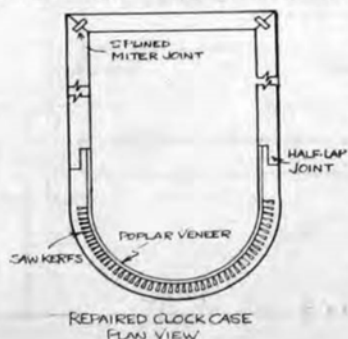
BILL OF MATERIALS

Part	Description	Size	No. Req'd.
A	Arm Rest	1 1/2 x 3 1/2 x 29	2
B	Leg	1 1/2 x 3 7/16 x 21	4
C	Rail	1 1/2 x 3 1/2 x 22 1/2	2
D	Front Rail	1 1/2 x 3 1/2 x 44 1/2	1
E	Back Rail	1 1/2 x 3 1/2 x 45 1/2	2
F	Slat Rail	1 1/2 x 2 x 38 1/2	1
G	Upright Rail	1 1/2 x 3 7/16 x 24	2
H	Slats	1/4 x 2 x 14	12
I	Corner Block	1 1/2 x 2 1/2 x 2 1/2	2
J	Center Brace	1 1/2 x 3 x 17	1

der with an outside diameter equal to the exterior width of the case. Since the curve fits a geometric figure, the length of the board was easily calculated. The length was half the circumference plus the two legs. The ends of the legs and the center were marked by lines at right angles to the length.

To get really nice bend in a piece of wood, it is necessary to construct a form whose surface is equal to the desired curve. I find that a male form is generally easier to construct and use. That is not to say that the opposite is not true in many cases. For the clock case, several pieces of 1/4 inch common pine were bandsawed to the desired curve and then glued together to bring the thickness of the form to the width of the case side. If a form is to be used only once, pine or any other soft wood will do quite well. When a number of units are to be made, the form should be made of maple, birch or other very hard wood.

Preparation of the repair piece for bending required cutting close-set saw kerfs at right angles to the length so as to leave an outside thickness of something less than 1/16 inch. These kerfs extend the total length of the curve.



The next step was to soften the remaining 1/16 inch with moist heat until it became flexible. I used an old refrigerator vegetable pan with just enough water in it to cover the board. A piece of iron prevented the board from floating and about 45 minutes boiling time made the board soft and flexible. The board was then clamped onto the form immediately and left overnight to cool and dry. Upon removal from the form there was a tendency for the board to straighten and assume somewhat less than the desired curve. This was remedied before it happened by making the form curvature somewhat acute so that the board assumed the desired curve when removed from the form. To secure the curve and to prevent future movement due to changes in temperature and humidity, a piece of poplar veneer 1/28 inch thick was softened by steaming and then glued to the kerfed inside curve of the repair piece. This was done by sanding the bending form to diminish its size by the thickness of the veneer and then clamping the form, veneer, and curved repair piece overnight. A piece of wax paper between the form and the veneer prevented the veneer from sticking to the form. White polyvinyl glue was used in the joint. After the completed repair piece was removed from the form, it was carefully fitted to half lap joints in the sides of the clock case. Cutting the half laps in the repair piece was delayed until this time so that final fitting would leave an almost imperceptible joint.

While the repair piece described above was in clamps, I reassembled the rest of the case using epoxy glue and nails salvaged from the case itself during disassembly. Epoxy was also used to assemble the half lap joints.

In the next issue, I'll discuss the procedure for the repair of the door frames, final assembly, and finishing techniques.

Restoring Antiques

by John W. Olson

Some years ago, while looking at Victorian houses in the older part of the city, I had a bit of luck. In one of them, in an out of the way corner in the basement, I came across one of those wall clocks that used to be called regulators. The kind with a round face, 14 or 18 inches or so in diameter, having a smaller housing for the pendulum protruding below.



REGULATOR TYPE CLOCK

This one was in really sad shape. The case was battered and scratched and the lower end had been burned away in a fire. The face was a corroded bare zinc pan, but miraculously, the hands were in place and the glass in the large face and the small lower door were intact; however the joints had

completely deteriorated. When I questioned the owner he said the clock had been in the basement for years. I offered to buy it but he refused to sell and instead gave it to me saying, "That's just junk." We took it home in pieces in a cardboard box, a collection of boards, metal and glass.

The first step in a restoration of this type is to disassemble the object and in so doing take an inventory of the missing pieces. The case, an elongated box to which the large face was attached, almost fell apart. The frame for the glass door in front of the face was loose and the frame for the glass in the small lower pendulum door lacked one piece of molding and a second was so badly charred that it had to be replaced.

The logical place to begin was with the basic case. Since the round pendulum end had all but been destroyed by fire, less than a third was left and that all charred, it was necessary to cut off the charred portions and to steam a new end. The stuff the case sides are made of is a discolored and water stained fine-grained hardwood belonging to the poplar family. This species of wood isn't known for its adaptability to wood bending techniques; but with care, a creditable job can be done.

The first step was to get out a piece of poplar that matched the case sides in width and that was thinner in thickness by the amount required to glue a piece of veneer on the inside surface. The size and form of the piece was determined by making a full scale drawing. The round portion is a half cylin-

Chairside Table

If you have a preference for fine traditional furniture, this distinctive little table should prove to be an appealing project. It's equally useful as a portable chairside table or as a display stand for plants or curios. The original was built of mahogany but walnut or cherry are also appropriate woods.

Construction of the stand itself will present no problems for most woodworkers, but the trays will require some care; particularly when applying veneer and fitting the steam-bent rims. It's a fussy job but the procedures involved are quite interesting and the experience gained will build the confidence needed for more advanced work.

All parts of the stand are of 1 inch stock (13/16" actual thickness) and the two trays are of 1/2 inch birch or other smooth plywood. Resist the temptation to use ordinary fir plywood. It's a lot cheaper but the coarse hard and soft grain tends to eventually "telegraph" through the thin veneer. The choice of a face veneer on the tray tops is left to your discretion. We used book-matched figured mahogany for the tops and plain mahogany for the undersides. Tray rims are resawed from 1 inch birch or cherry while moldings are made from 1/2 inch diameter birch dowel stock ripped down the middle.

Start by ripping all cross rails and posts to 1 1/4 inch in width. Rails will be joined to posts with notched dowel joints so make sure the rail ends are trimmed perfectly square.

Lay out and notch posts 1/4 inch deep for the two tray support rails and the lower stretcher. Cut notches just a shade on the snug side. Mark posts and rails for 1/4 inch dowel pins. Bore dowel holes and dry fit the joints. Be sure to use grooved and chamfered pins and allow for a slight glue relief pocket.

Prepare a template for the upper

curved rail and transfer outline to a piece of 13/16 x 5 x 15 1/4 inch stock. Make sure the ends are squared; then cut the curved shape with saber or bandsaw.

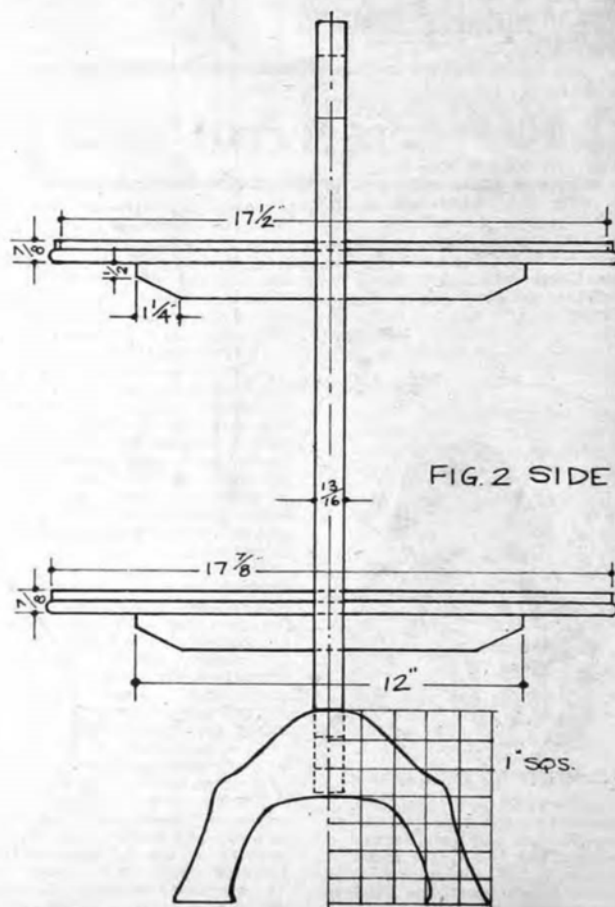
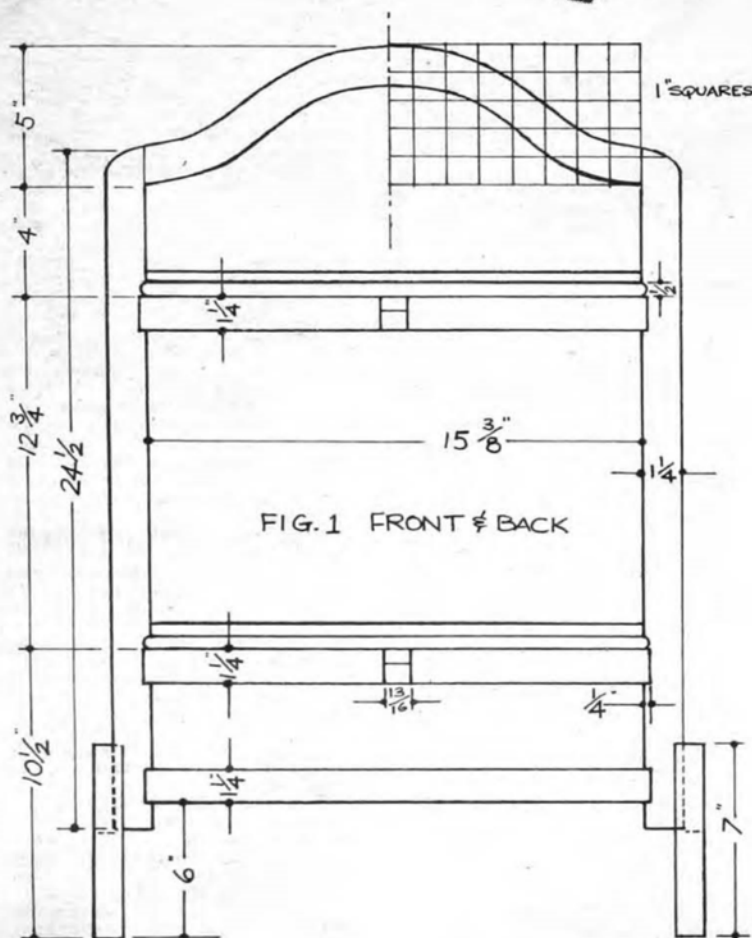
The pattern for the arched legs is transferred to 13/16 x 7 x 10 inch stock with the grain running as shown in the exploded view. While the workpieces are still square, run a 13/16" wide by 1/4" deep dado up the middle for a snug fit over the posts. The joints are further reinforced with two 3/4" x 1 1/4" dowel pins spaced wide to clear the stretcher pins, and driven completely through the arched feet and into posts. Finally, cut the short support rails and notch them and the two long rails for a half-lap joint at their centers.

Sand all parts of the stand, working up to 220 grit paper. Round off sharp corners, taking care not to dub off the very ends of rails where they fit into post notches. Do not assemble stand until trays are completed and in place on the tray supports.

The two oval trays are easily laid out on a 3' x 3' piece of plywood so that the grain runs across the 15 inch width. Cut to shape, keeping just outside your line; then sand edges smooth. Be careful to keep the edges square so that the rims will fit fairly all around.

Figure 3 shows a typical bending form cut from scrap 3/4 inch stock. This has squared off holes for the jaws of 5 to 7 "C" clamps (if you don't have many clamps, you can get by with 5). If, like most of us, you have an assortment of different size clamps, the locations of the holes will vary depending on the throat depth of the clamps you use.

We originally tried bending 3/16 x 1/4" x 3 ft. mahogany rim stock but abandoned mahogany because of its tendency to twist and split even after



being well steamed. Birch or cherry will cause no problems in this respect though it's important to choose stock that is straight grained and clear.

A simple steam box can be made from a 4 foot length of steel pipe with an inside diameter of 1 inch. One end is threaded for a pipe cap.

Fill pipe about half full of hot water and insert one length of rim stock. Heat the pipe down near the capped end until the water boils and steam escapes from the open end. A propane torch, charcoal grill or even the kitchen stove can be used but you will have to devise a means of supporting the pipe at an angle over the flame.

About one-half hour of steaming should be enough. While the rim is "cooking", place your bending jig in the bench vise and get your clamps adjusted. You must work quickly once the stock is removed from the steamer.

Put on an old pair of gloves, remove the rim stock and immediately start clamping it to the form, starting at one end. Allow a couple of inches of the rim to overhang the form as shown.

The clamped rim should be allowed to dry at least overnight, but while waiting, you can start veneering a tray. If you haven't done much veneering before, you've got two practice tries on the tray bottoms before doing the tops. After veneer is applied, sand with 220 grit paper.

The rim when removed from the bending form will have a fair amount of springback from its original bent shape. However, it should easily bend around half of the tray. Before fastening with 2p box nails, drill small pilot holes for the nails along the rim and spaced about 2 inches apart. Finish-sand the rim, rounding off the top edge; then nail the rim in place and set nails flush with rim surface.

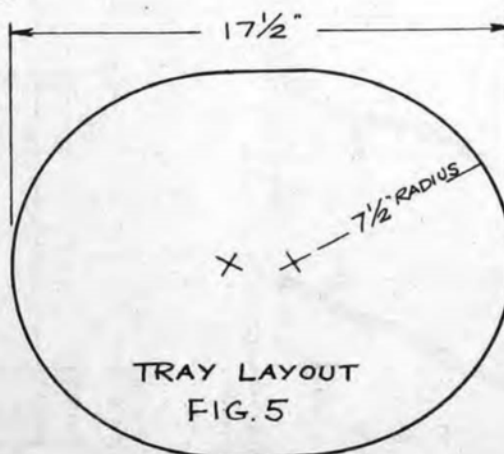
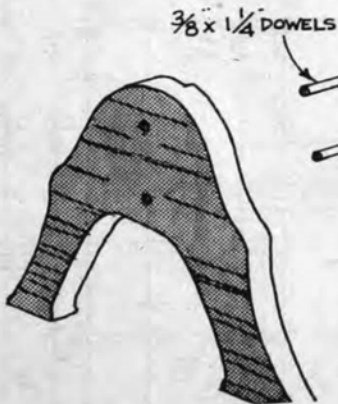
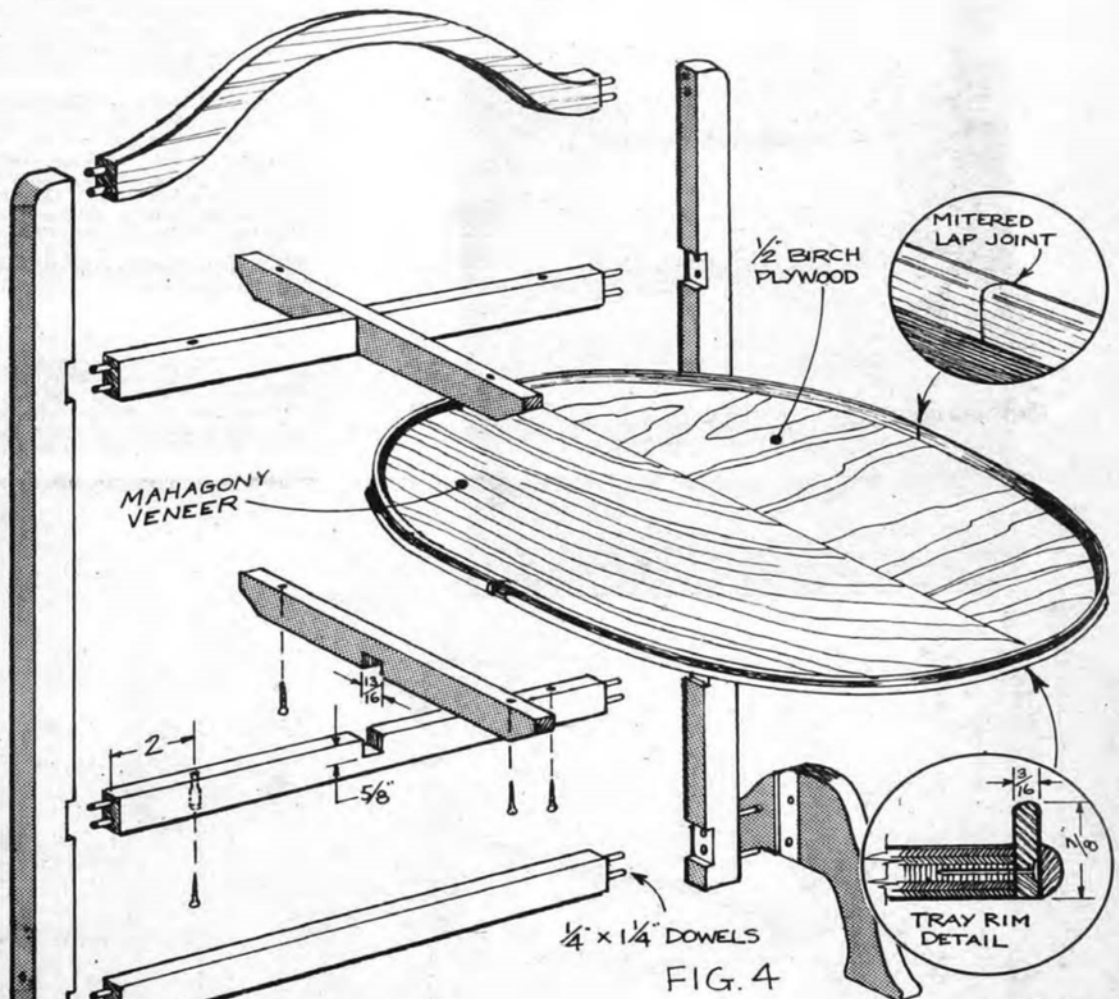
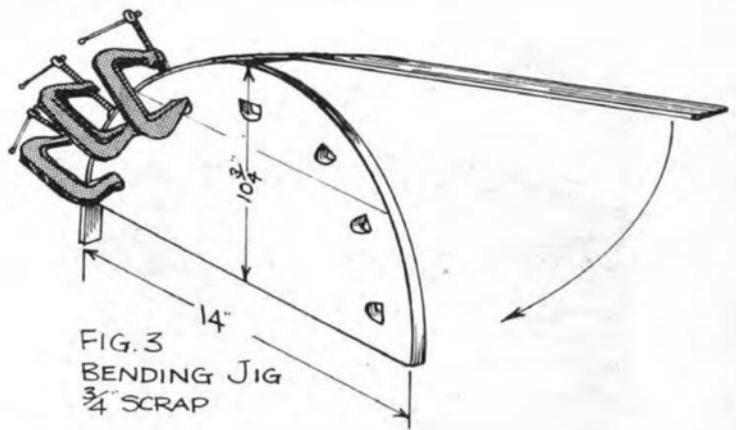
Steam another rim and repeat the procedure on the rest of the tray. The rim halves are joined with a mitered half-lap. Proceed with great care when cutting the second rim half in order to get a good tight joint.

The small half-round molding can be shaped with a router and $\frac{1}{4}$ inch rounding bit or planed by hand. We simply ripped a $\frac{1}{2}$ inch birch dowel down the middle using a thin kerf saw blade.

The moldings are also steamed and clamped to the same form used for the rims. When dry, they are fitted with glue around the rims, covering the nail heads. A flexible webbing clamp holds the molding in place until the glue cures. A few small brads will also help keep the molding in place.

When trays are completed, they are screwed to support rails and the stand is assembled with glue, using four pipe clamps to hold things together until dry.

Finishing will depend on the type of wood used and your personal preferences as to stain and degree of gloss desired. In general, walnut can be finished with a penetrating oil such as Watco Danish Oil or Tung Oil. Mahogany and cherry can be varnished. In view of the small size of the stand and the lack of large flat surfaces, we elected not to fill the open mahogany grain with a tinted filler. A penetrating oil stain was used followed by four coats of urethane varnish. The first three coats were each rubbed down with 2/0 steel wool followed by careful dusting and the use of a tack rag. A final coat was laid on and when completely dry, was rubbed down with 4/0 steel wool. This produced a soft even sheen. A light coat of wax, well buffed, completed the project.



Correction

The "Table Saw Round Tapering Jig," shown on pages 12 and 13 of the Nov/Dec 1979 issue, has several incorrect dimensions.

1) In the "Bill of Materials" change the following:

- a) part "G" to $\frac{1}{4}$ " x $3\frac{1}{2}$ " x $4\frac{1}{4}$ "
- b) part "H" to $\frac{1}{4}$ " x $3\frac{1}{2}$ " x $2\frac{1}{4}$ "
- c) part "I" to $\frac{1}{4}$ " x $3\frac{1}{2}$ " x $2\frac{1}{4}$ "

2) The location of the headstock turning center "Q" is not dimensioned. It should be shown as 2 inches from the bottom and 2 inches from part "D". This locates it directly in line with the tailstock turning point.

3) The angle adjuster detail (pg. 12) shows a $28\frac{3}{4}$ " radius. The radius should be $18\frac{3}{4}$ ".

4) The adjustment slot is shown on page 12 as $\frac{1}{8}$ " x 30". It should be $\frac{1}{8}$ " x 31".

Corner Cupboard Part I

by Roger E. Schroeder



Two hundred years ago, corner cupboards with carved cockleshells and arched door frames were found only in the mansions of the wealthy...but you won't need a Georgian townhouse to properly display this fine piece. It will contribute an aura of elegance to even the most ordinary room.

The first cockleshell carvings I saw adorned built-in shelves on either side of a fireplace. I was immediately aware of the original cabinetmaker's mastery of handtools and wood. Little did I realize then that such a project could be achieved by anyone less than a seasoned craftsman. Yet, with only an intermediate woodworking background, I created such a shell in a week's worth of evenings.

The corner cabinet that houses the cockleshell is designed for a room with an eight and a half foot ceiling. Scaling it down though should take nothing away from its appeal and distinctive lines.

The pictured cabinet is built from 1 inch birch plywood sides and back, pine for the shelves and red oak for the uprights, doors, moldings, turnings and feet. Instead of oak, cherry or walnut can be substituted. If the cupboard is to be painted, and many originally were, white pine can be used throughout.

Eastern white pine was the choice of the old-time craftsmen for carving the

cockleshell but basswood, which I used, has much to offer.

The project begins by cutting to size the sides and back; parts A and B. The rear edges of A are ripped at a 45 degree bevel, while both edges of B are ripped at the same angle. This allows for a flush back when the parts are joined with countersunk wood screws.

If the inside of the cabinet is to be painted, now is the time to apply a primer and a latex paint; perhaps an antique white. If your shop has a low ceiling, the cabinet can be assembled fairly easily in the corner where it will ultimately stand.

The six shelves and top (E) are made next. Constructed of glued up pine, they are of equal size though three of them have a cloverleaf scrolled front edge. Their diagonal sides are most easily cut on a bandsaw, then run on a jointer. Shelves must be carefully cut so no gaps are left where they meet the sides and back. Play it safe and leave a bit of extra wood on their sides before they are fitted. Use countersunk wood screws to fasten shelves; three through each side and one through the back.

Cutting the uprights C and D is next. One edge of these parts is ripped at a 22½ degree bevel on the table-saw. This is shown in Fig. 3. They are joined at their bevels with ¼ inch thick

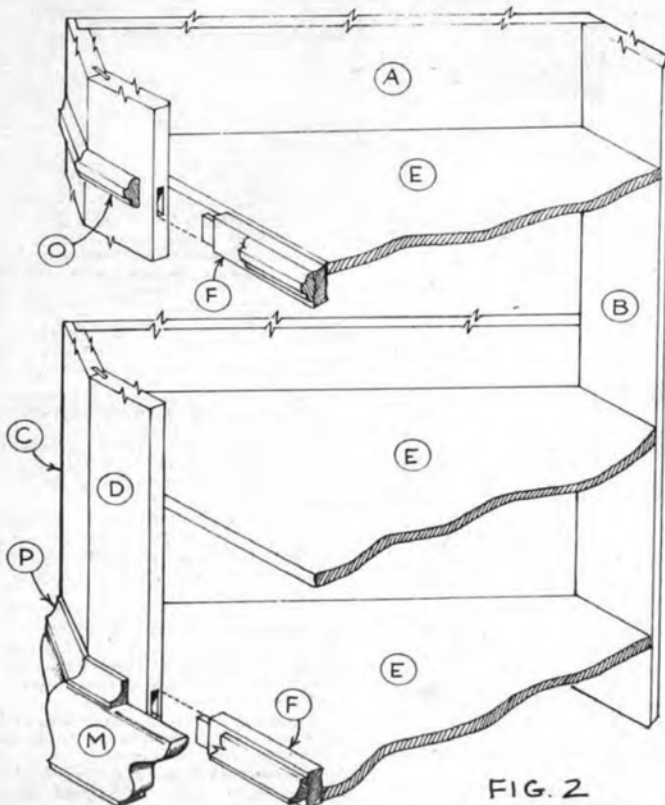


FIG. 2

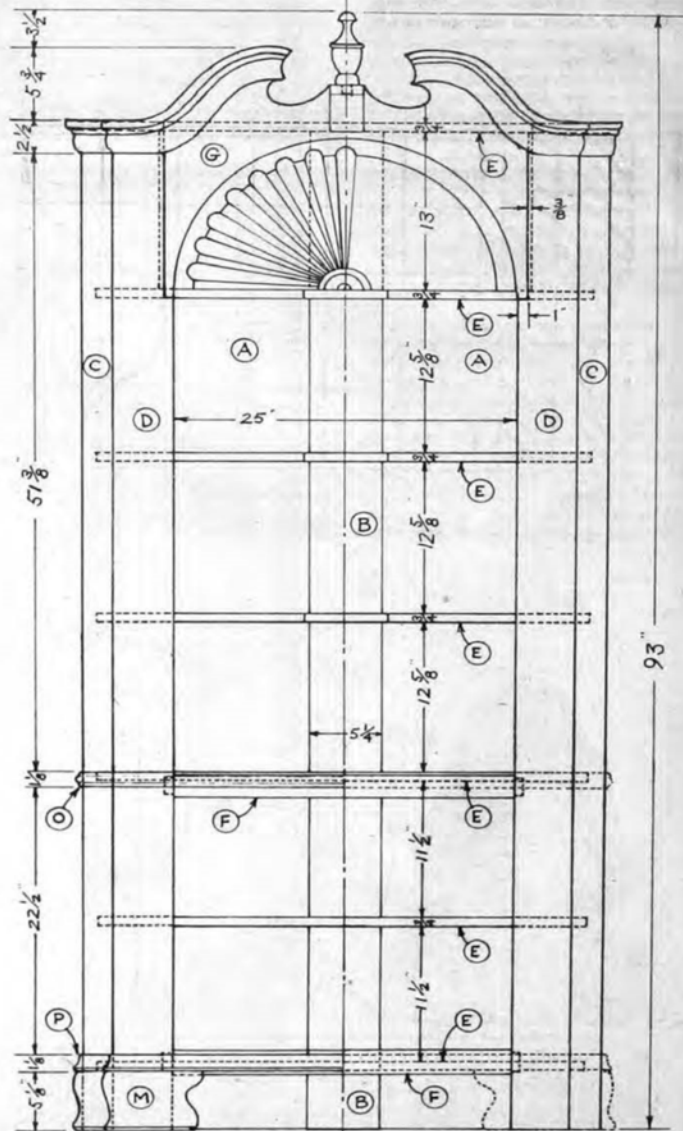


FIG. 1

plywood splines.

The spline grooves can be cut with a router and $\frac{1}{4}$ inch straight bit, using a 1" x 2" wood fence clamped to the router base. Before gluing, the 1 inch stepped-in cut at the top of parts D will have to be done. This is shown in Figures 1 and 4. Also, a $\frac{3}{8}$ inch deep by $\frac{1}{4}$ inch wide groove is cut to take the tongues of the pediment board, part G.

On the outer edges of parts C, a $\frac{3}{4}$ inch wide by $\frac{1}{4}$ inch deep rabbet cut will have to be made. This is where the sides are nailed to the uprights. When C and D parts are finally joined, web clamps will facilitate gluing.

Before the uprights are joined to the sides, the rails F and the pediment board are cut to size. The uprights could, at this time, be temporarily nailed to the sides so accurate measurements can be taken. Don't forget to make mortises in the edges of parts D for the tenons of rails F.

The pediment board of this cabinet shown in fig. 4, consists of two edge-glued boards that are butted and doweled so that the grain directions meet at a right angle. In this way, the diagonal grain accentuates the cockleshell.

A semicircle is scribed and cut out to form the opening which exposes the flutes and channels of the shell. The $\frac{3}{4}$ inch tongues on the ends of the pediment board can be cut with a router. The broken arches at the top are cut using a full size template enlarged from the grid pattern.

Before the pediment board can be installed, the cockleshell must be carved and added to the top shelf as the pediment board covers the top edge of the cockleshell. The gluing up

and carving of the shell, doors and moldings will be taken up in detail in part II which follows in the March-April issue.

In the meantime though, the ogee bracket feet can be constructed from 2 inch lumber. A board 5 $\frac{1}{8}$ inches wide and at least 24 inches long is run diagonally across a tablesaw blade for a coving cut. The fence can be a piece of straight scrap stock clamped at an angle to the top. Several passes are made, raising the blade no more than $\frac{1}{8}$ of an inch at a time.

After the ogee hollow has been cut, rip piece along its top edge with the blade set at a 20 degree angle. This operation will remove most of the waste prior to forming the curved top edge. An outline of the desired molding will be needed as a guide. You'll also need a push stick of the type used with a jointer. This will hold the board flat with the hand kept well above.

After this cut is made, the board is then turned over and the bottom of the feet are cut at a 45 degree bevel. Cabinet scrapers, a hollowing plane and a jointer plane will all help to smooth and shape the ogee curve.

Each foot is made of two pieces that fit on the outside of the uprights. The two parts of each foot are cut with a miter box at 22 $\frac{1}{2}$ degrees and splined together at their bevels. The bracket design is bandsawed before the pieces are glued up. The completed feet are joined to the base of the cabinet with wood screws countersunk from the inside.

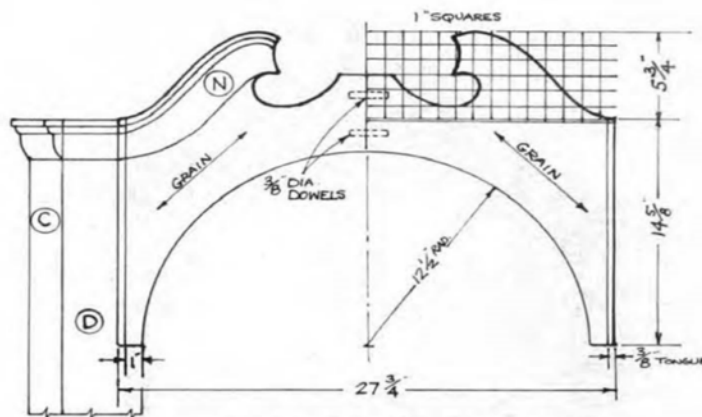
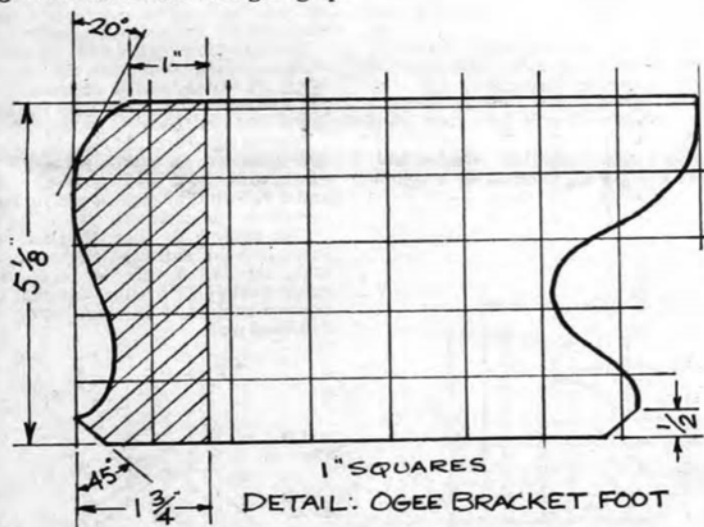


FIG. 4 - PEDIMENT PART G

BILL OF MATERIALS

Part	Description	Size in Inches	No. Req'd.
A	Sides	1 x 23 $\frac{3}{4}$ x 84	2
B	Back	1 x 5 $\frac{1}{4}$ x 84	1
C	Side Uprights	13/16 x 3 $\frac{1}{4}$ x 84	2
D	Front Uprights	13/16 x 4 $\frac{1}{2}$ x 84	2
E	Shelves, Top	1" pine (see Fig. 3)	7
F	Rails	13/16 x 2 x 25 $\frac{1}{2}$	2
G	Pediment Board	13/16 x 20 $\frac{1}{2}$ x 27 $\frac{3}{4}$	1
H	Raised Panels	13/16 x 9 $\frac{1}{2}$ x 18 $\frac{1}{2}$	2
I	Door Stiles	13/16 x 2 x 22	4
J	Bottom Door Rails	13/16 x 2 $\frac{1}{2}$ x 11	2
K	Top Door Rails	13/16 x 4 x 11	2
L	Door Knobs	1 $\frac{1}{2}$ x 1 $\frac{1}{2}$	2
M	Ogee Bracket Feet	See Detail	2
N	Pediment Molding	See Detail	2
O	Waist Molding	See Detail	
P	Feet Molding	See Detail	
Q	Finial	2 $\frac{1}{4}$ x 6 $\frac{1}{2}$	1
R	Bracket	13/16 x 2 $\frac{3}{4}$ x 4 $\frac{1}{4}$	1

Note: Material for cockleshell given in Part II



DETAIL: Ogee Bracket Foot

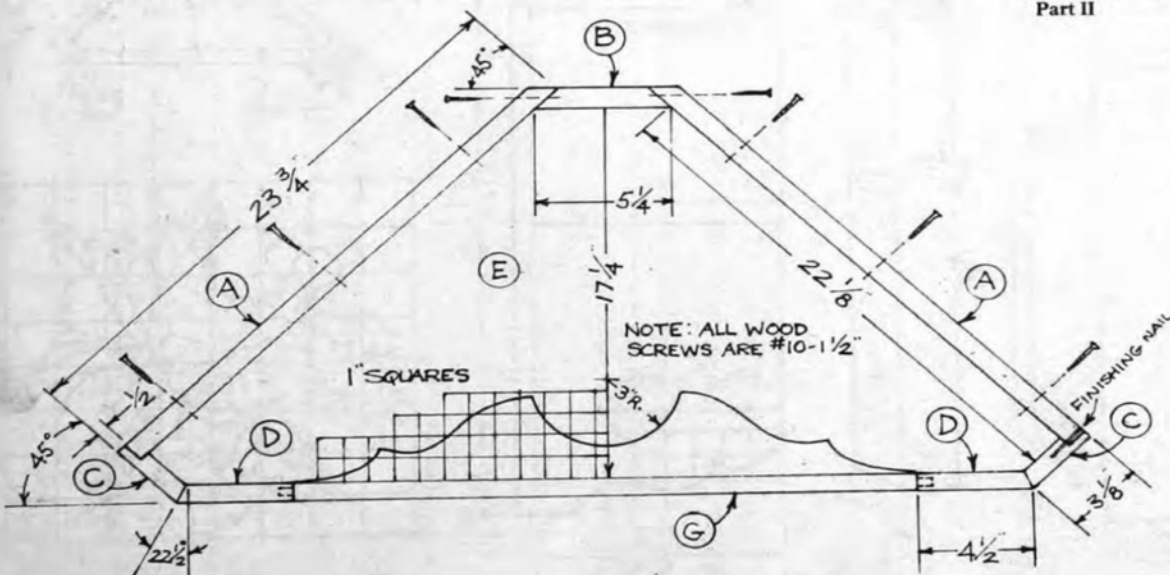


FIG. 3 TOP VIEW SHELF & CARCASE

Shop-Tips

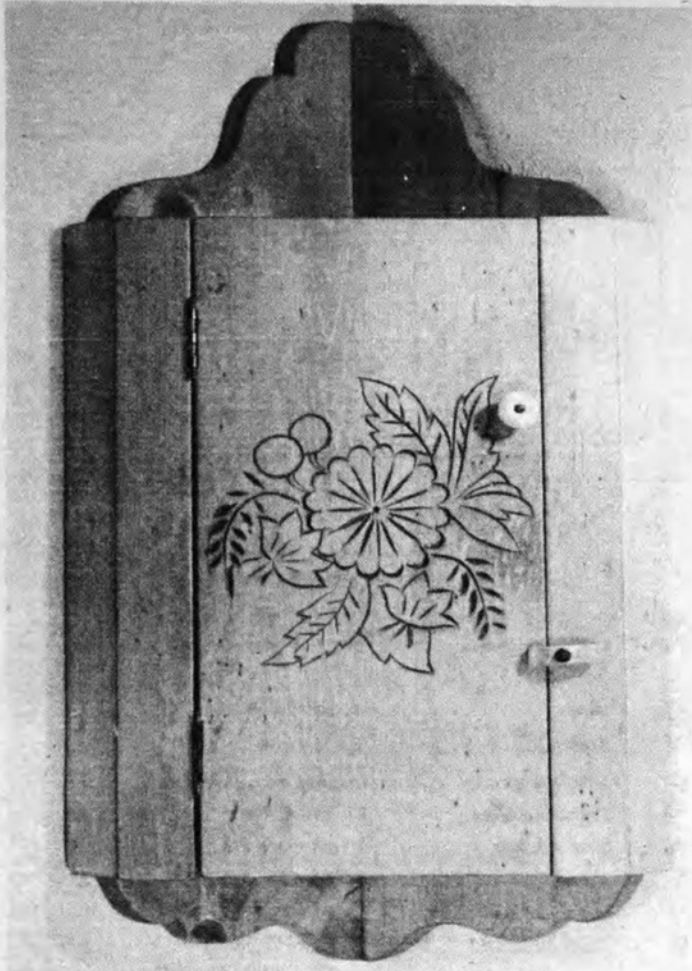
When thin strips of sandpaper are used "shoeshine" fashion to round corners, the strips often tear before wearing out. Prevent this by sticking cellulose tape to the back of the sandpaper.

To securely hold dowel stock in a woodworking vise, place the dowel between two steel wool pads before clamping.

To clean pitch from drill bits, soak them in a jar of lacquer thinner until the pitch softens. Then it's an easy matter to wipe them clean with a rag.

Put a paper towel or an old piece of cloth over stain cans when you tap the lid down with a hammer. This will keep any stain trapped in the rim from giving your shirt unwanted polka dots.

Pine Corner Cabinet



You'll find it hard to resist building this striking little corner wall cabinet. It's built entirely of 1" x 10" number 2 pine, so no edge-joining is necessary and all parts are held with glue and 2 inch nails. For those who enjoy working solely with hand tools, this is a good weekend project.

Start by cutting a 1" x 10" into two 28 inch lengths for the sides of the cabinet. Note that the sides are unequal in width, since one butts against the other. Rip sides to widths of 9 1/4" and 8 1/2" inches.

Enlarge grid patterns for upper and lower scrolls on cardboard and cut templates for tracing on the workpieces. Cut the scrolls with saber or jig saw.

Next rip the four uprights from two 17 1/4 inch by 4 inch lengths of pine. Set tablesaw blade for a 22 1/2 degree bevel and slice the pieces down the middle, then bring the blade back to the zero setting and trim the uprights to finish width of 1 3/4 inches. If you use only handtools, lay out the bevel on inside face and end with marking and bevel gauges and plane to the scored line.

The three shelves are laid out with a square and cut with the grain running as shown in the exploded view. Cut them first as triangles, then nip off the base corners at a 45 degree angle.

Sand parts carefully, starting with 80 grit production paper and working down to 220 grit. If the cabinet is to be stained, you may want to stain these parts now to forestall any problems caused by glue smears on the raw wood.

Glue and nail the sides together, using 2 inch common nails spaced about 4 inches apart. Next add the shelves, gluing and nailing through sides. Use three nails into each shelf side.

Before the uprights are added, locate and lay out notches for 1 1/2 inch

brass butt hinges. Cut notches into upright equal in depth to the thickness of one leaf hinge and located so that the hinge barrels stand approximately 1/4 inch away from the upright.

If you temporarily tack the uprights in place at this point, you can get an accurate measurement of the exact width of the door which should be just about 8 inches, allowing for about 1/16 inch clearance at both sides. Fasten uprights with glue and 2 inch finishing nails set well below the surface.

The carving on the door is a lot easier to do than it looks. Enlarge the design on to a sheet of paper using 1 inch squares. When the design is completed, transfer it to the door with carbon paper.

The carving was done with only two tools; a 1/2 inch gouge and a small skew chisel. The gouge was used only for outlining the petals of the large central flower. Each petal was cut by driving the gouge straight into the wood. A second cut was then made about 1/4 inch in back of this, with the chisel held at about a 45 degree angle; removing a crescent-shaped chip.

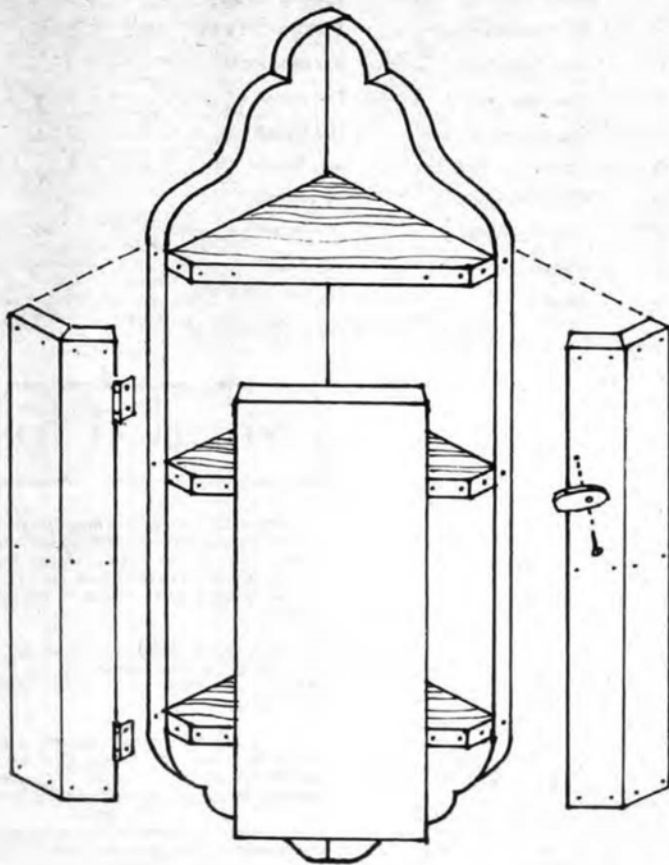
All other design details were simply incised with a very sharp skew chisel cutting first from one side and then from the other to form a clean V shaped groove. The widths of the cuts were varied according to the design; thus the veins on the leaves are thinner than the outlines of the leaves themselves.

After completing the carving, give all surfaces a careful sanding. Round off the door edges to simulate wear, then use 220 grit to finish sand.

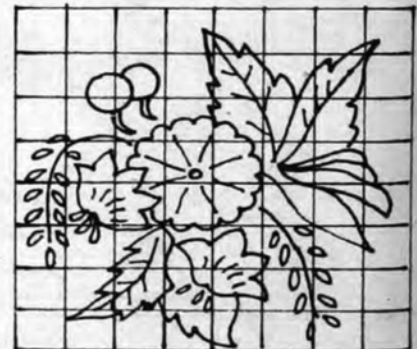
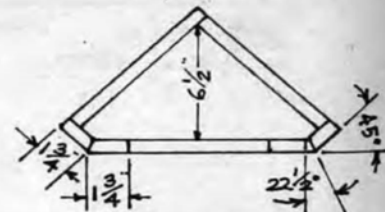
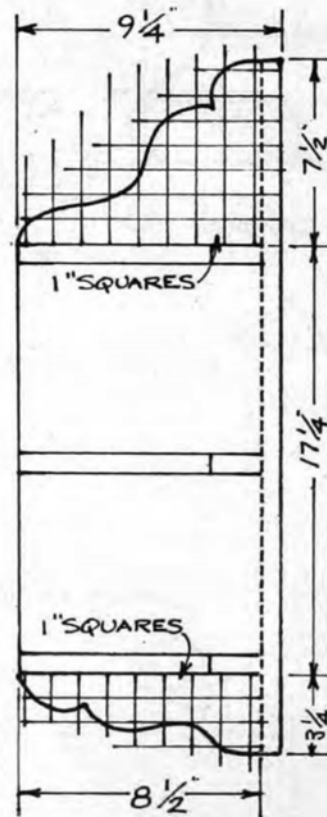
Use a brush to apply a liberal coat of stain, working it well into the carving. Wipe off excess and if necessary, apply another coat to make sure the carving is dark enough.

The door is then notched for hinges and attached. A small curved wood turnbutton, held with a black screw and a 3/4 inch diameter porcelain knob, completes the cabinet.

The cabinet is then finished with three coats of satin polyurethane varnish, sanding lightly between coats. After thoroughly drying, the final coat is hand rubbed to an even luster with 3/0 steel wool.



NOTE: ALL PARTS 3/4" PINE



1" SQUARES

The Gift Shop

Here's a useful kitchen aid that holds six knives, a sharpener and a removable cutting board. The base, sides and top are of 1" (3/4" actual) pine. The back is 1/8" plywood and the cutting board is 1" (9/16" actual) maple.

Cut the base to size shown on exploded view. The 2 sides are then cut 3 1/2" wide x 11 1/4" long. Use a dado head to cut the 3/4" x 3/4" groove for the cutting board. Next, cut the 3/8" deep x 2 1/2" long notch.

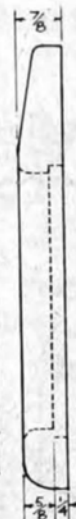
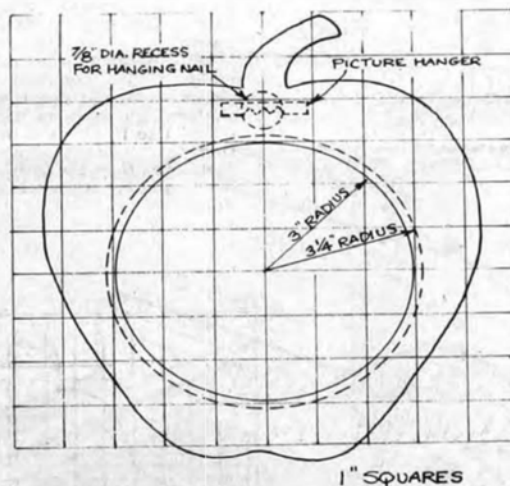
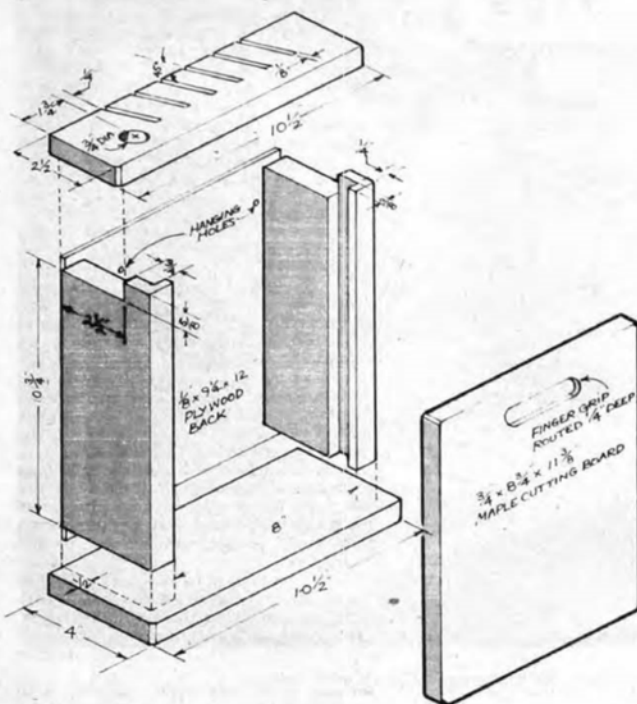
After the top is cut, a 3/4" dia. hole is drilled at a point 1 1/4" from the end and 3/4" from the front. Cut the knife grooves, noting that the first groove starts 2" from the left end and grooves are spaced 1" apart. Each groove is cut 1 1/2" long.

The plywood panel is cut 1/8" smaller than the full length and width of the knife rack.

The cutting board is made up of narrow widths of edge-glued maple, planed down to an easy sliding fit in the groove.

Before assembly, give all parts a good sanding. Join bottom, sides, top and back with glue and finishing nails.

Except for the cutting board, the rack can be stained to suit and finished with a clear sealer. The side of the cutting board that comes in contact with food should be left natural or given a coat of special salad bowl finish.



Apple Mirror

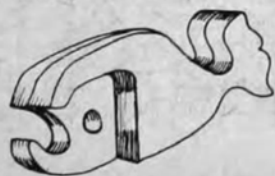
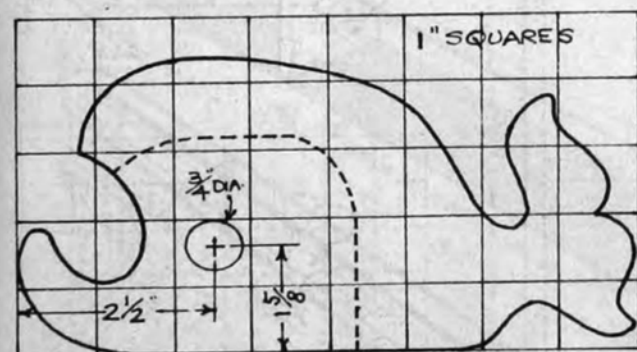
An unusual and lovely design submitted by A. Nichols of Woodbury, Connecticut.

Enlarge the pattern on a sheet of paper and transfer to a piece of 1" x 10" x 10" cherry or maple. Locate center of mirror and lay out opening and circular rabbet.

Use a sabersaw and pivot beam to cut the 6" dia. opening. The rabbet can then be cut with a router and 1/4" rabbeting bit with pilot; or both operations can be done with a drillpress and flycutter.

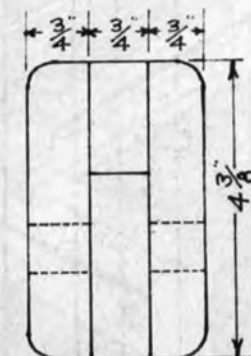
After circular cuts have been made, cut out the apple shape. Then drill a 1/4" dia. hole about 3/4" deep near the stem for a hanger hole. A strip of metal, notched and screwed over the hanger hole will keep the mirror on the hanger nail.

Use extra care when sanding; rounding all edges nicely and finishing up with at least a 220 grit paper. Our cherrywood frame was left unstained and given several coats of a penetrating oil finish lovingly hand-rubbed to a soft glow. Secure mirror with brads or small glaziers points.



This little whale holds a standard plastic dispenser for 1/2 inch tape. A removable dowel peg holds the roll securely, yet permits easy replacement. It's a nice little desk accessory and a good way to get rid of those leftover short ends you've been saving.

Transfer shape to a 1" x 5" x 8"



piece of stock, then cut three identical shapes individually, or as a stack with the bandsaw. Part of one piece, which will be the center of the lamination is cut away at the dotted line to provide a recess for the dispenser.

Glue and clamp the three pieces together and drill a 1/4" dia. hole for a



dowel which should be sanded to fit the hole with a light resistance.

Sand the piece and round edges. Finish with a few coats of varnish or penetrating oil, and glue two strips of rubber or felt to the bottom.

Tape Dispenser

Woodworker's Jigs

by Don Kinnaman



Author Don Kinnaman using cutoff table to crosscut 22 inch wide stock.

photos by Tom Sweet

Versatile Cutoff Table

FIG. 1
BASIC CUTOFF TABLE

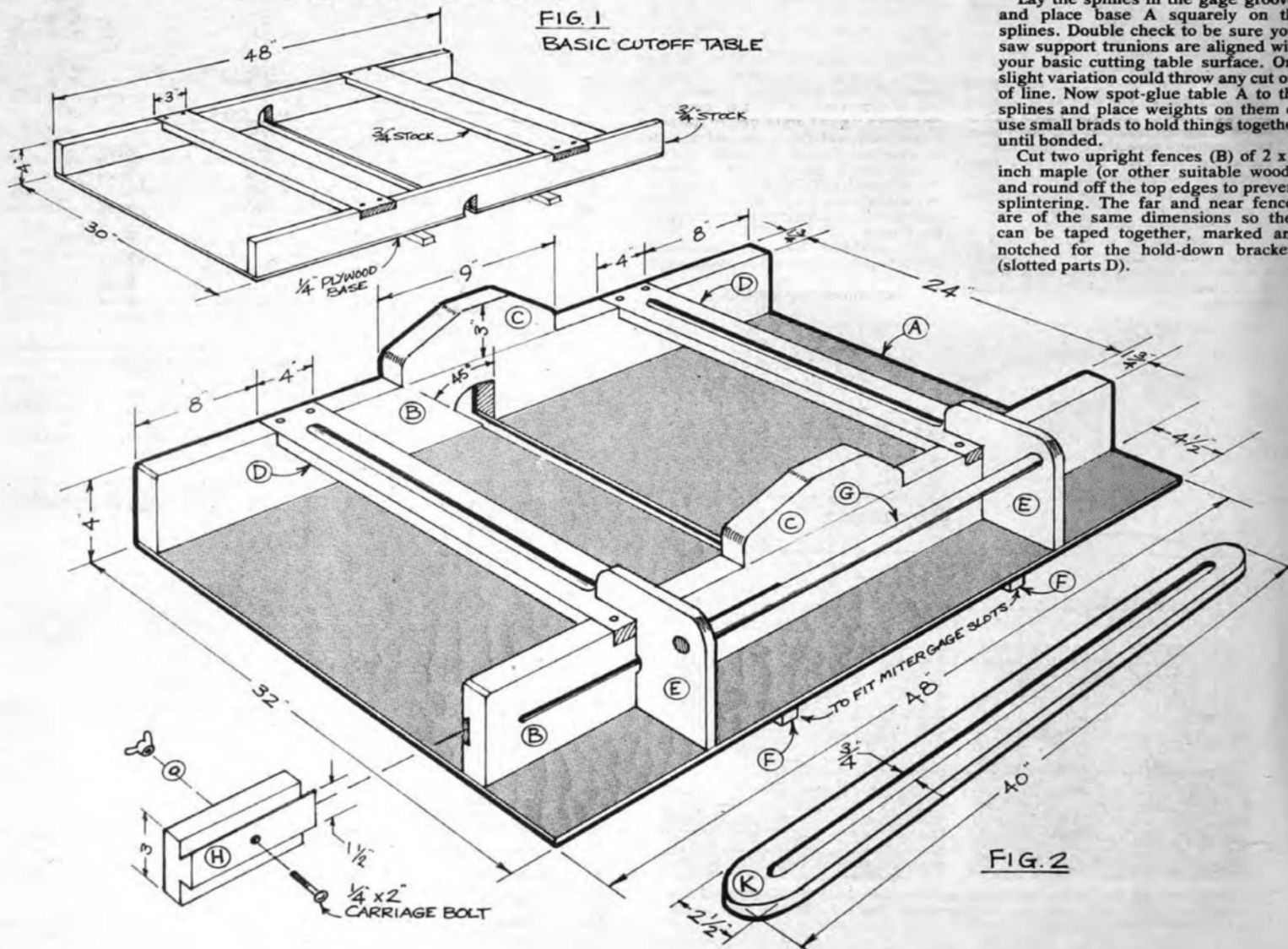


FIG. 2

The near side B is then grooved dovetail style to take a cutoff block(H) which is added later. Measure about 2 inches in from the left end of the fence and lay out a slot for the adjustment. A $\frac{1}{4}$ " carriage bolt is used to clamp the block to the near fence. When laid out, drill holes at each end of the slot and remove waste with a saber saw. Note that the slot runs to about 4 inches from the saw blade slot in the base. This is to prevent the fully tilted blade from cutting into the adjustment slot, so give yourself plenty of leeway. Dovetail slots can be put on both the left and right sides of the blade for different cuts.

Next, carefully set parts B in place with glue, again making sure that they are perfectly square with the blade. At this point you may flip the assembly over and fasten parts A and B with flat head screws. Also use countersunk screws to fasten splines to the table base. Be careful to center the screws in the splines; if they split they will bind in the miter gage slots.

Cut two parts C from 2 x 3 x 9 inch stock and fasten with glue and screws directly above the blade slot. These will help to keep the table square and rigid. The prototype shown in the photos has these parts notched into the fences but this is not really necessary.

Two adjuster braces (D) are cut and slots $\frac{1}{4}$ inch wide are laid out. Bore $\frac{1}{4}$ inch holes 2 inches in from each end, then draw tangents to these holes and cut slots with the saber saw. These braces will support adjustable hold-downs for cutting uneven stock. Chamfer sharp edges lightly and temporarily screw them into position on fences. They will be removed later for the addition of hold-down clamps.

Cut two blocks E from $\frac{1}{4}$ inch stock for the control handle. Tape them together for identical cutting with saber or bandsaw. Round off corners and sand smooth. Bore a hole in each for a 1" x 30" birch dowel rod (G) glued into each block. The handle should be above the line of saw travel although it is not expected that you will push your table *entirely* through the saw blade. For safety you may wish to wrap that section of the handle which is in line with the blade with a brightly colored plastic tape but remember to keep hands away from the blade.

Note that part E nearest the viewer in Fig. 2 has a slight cove cut out to accommodate the adjusting bolt of block H. Glue and screw parts E in position as shown.

At this point you may want to re-check your table for squareness and place it on your tablesaw for the initial slotting cut. After the slot has been cut through both fences, tilt the blade to 45 degrees and make a second cut. The intervening distance between the two cuts may then be trimmed out with a sabersaw or just left for many other cuts at various settings.

Using solid or glued up stock make part H to fit the dovetail on part B. Again note that the carriage bolt is passed through from the operators side, through the groove and then through the cutoff block H. Make sure that this block slides easily. The wing nut and washer are on the inside of the table.

You will note that a portion of the base extends toward the operator. This is intended to be used as a clamping shelf for those operations that require a stationary table.

Make a long link (K) from $\frac{1}{4}$ " stock as shown in Fig. 2. This will enable you to fasten a moveable centering jig anywhere on the table and at any angle to the blade for some surprising cuts. Round the ends and cut slot with saber saw. File and sand smooth.

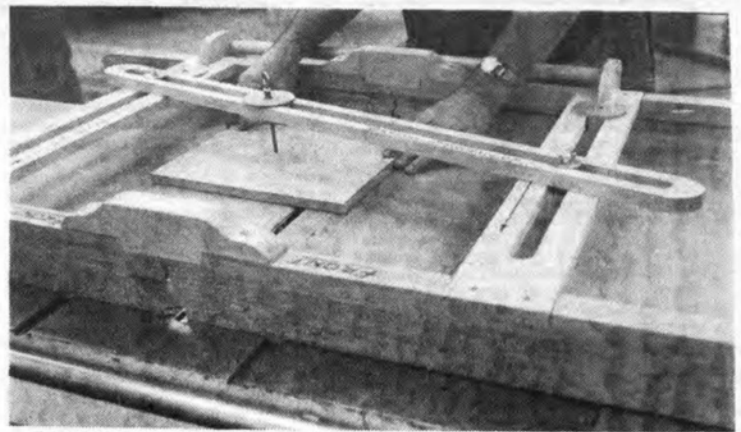
The clamps which hold parts K and D together are made of sections of dowel (S). Bore a $\frac{1}{4}$ " hole through the center and secure to K with carriage bolt, washers and wingnuts. You will need two of these clamps.

Another useful addition are special hold-downs for crooked, warped or long stock. Each hold-down consists of two 3" dia. x $\frac{1}{4}$ " thick hardwood discs (I) fastened to a sliding spacer (J) which rides in the slots of D or K. To make these hold-downs for D rails, glue and screw one disc to the top face of J, then slip through a D slot and secure a second disc on the bottom face of J.

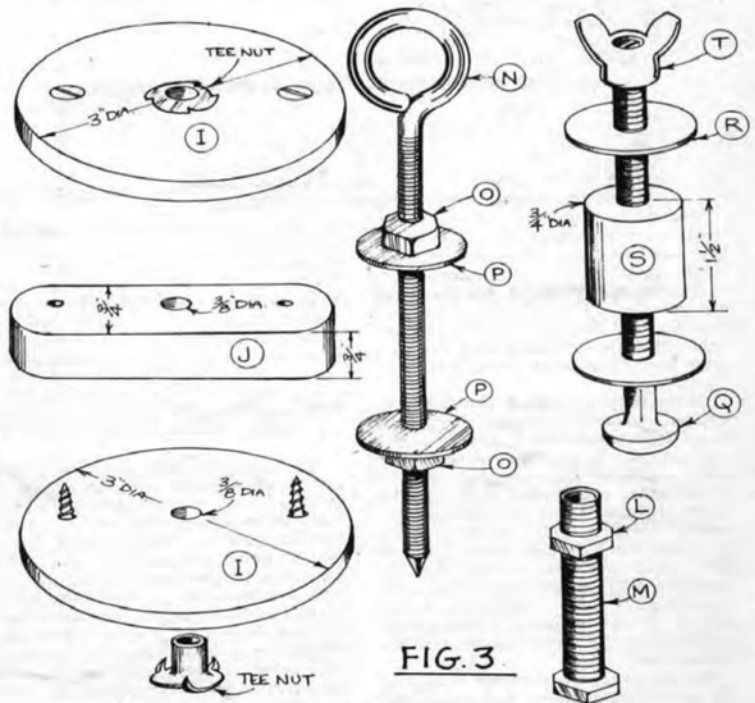
Using a drillpress or portable drill stand, carefully centerbore I and J assembly with a $\frac{1}{8}$ " hole to take a tee-nut on both sides. A $\frac{1}{4}$ " x 6" eyebolt is ground to a point and fitted to the I and J assembly with jam nuts and washers as shown in Fig. 3. To avoid marring stock always place a pad between workpiece and hold-down. Make another hold-down for the other D rail and then permanently fasten D rails to the fences.

An additional hold-down assembly consisting of parts I and J is next made

(continued on page 16)

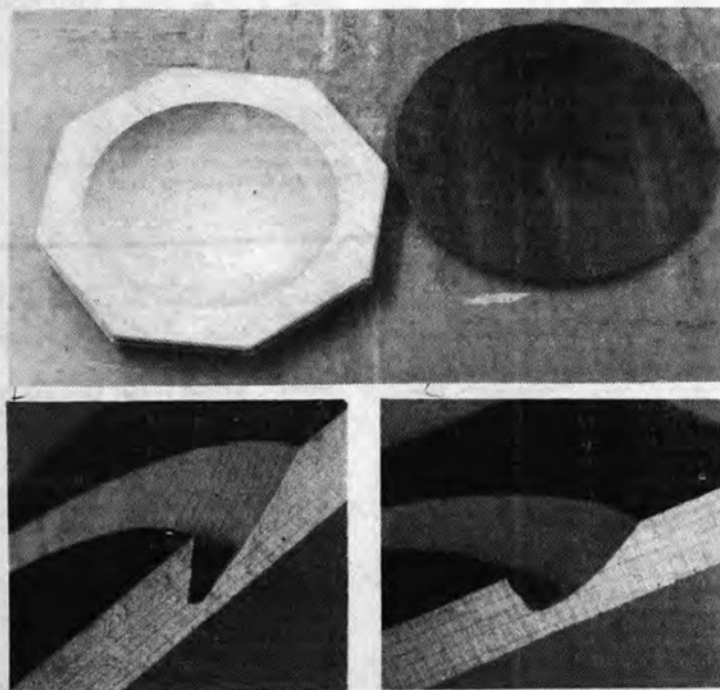


Using locking clamp with pivot pin (parts I,J,L,M,N,O,P), Kinnaman prepares to make a circular cut.



BILL OF MATERIALS

Part	Description	Material	Size	Pieces
A	Table Base	Ply or Hardboard	$\frac{1}{4}$ x 32 x 48	1
B	Braces	2" Maple or Birch	$1\frac{1}{4}$ x 4 x 48	2
C	Reinforcements	2" Maple or Birch	$1\frac{1}{4}$ x 3 x 9	2
D	Adjuster Braces	Maple or Birch	$\frac{3}{4}$ x 4 x 27 $\frac{1}{2}$	2
E	Handle Brackets	Maple or Birch	$\frac{3}{4}$ x 6 x 6	2
F	Miter Slot Splines	Maple or Birch	$\frac{3}{4}$ x $\frac{3}{4}$ x 32	2
G	Push Handle	Birch Dowelling	1 x 28 $\frac{3}{4}$	1
H	Cutoff Block	Birch or Maple	$1\frac{1}{4}$ x 3 x 4	1
I	Support Flange	Birch $\frac{1}{4}$ " Ply	$\frac{1}{4}$ x 3 Dia.	2/clamp
J	Support Block	Birch or Maple	$\frac{3}{4}$ x $\frac{3}{4}$ x 3	1/clamp
K	Slide Adjuster	Birch or Maple	$\frac{3}{4}$ x 2 $\frac{1}{2}$ x 40	1
L	Lamp Pipe Nut	Brass	For $\frac{3}{8}$ " Lamp Nipple	2/clamp
M	Lamp Nipples	Brass	$\frac{3}{8}$ x 1 $\frac{1}{2}$	1/clamp
N	Eye Bolt Holddown		$\frac{1}{4}$ x 6	1/clamp
O	Jam Nuts		$\frac{1}{4}$	2/clamp
P	Fender Washer		$\frac{1}{4}$ " Hole	2/clamp
Q	Carriage Bolt		$\frac{1}{4}$ x 2	1/clamp
R	Fender Washers		$\frac{1}{4}$ " Hole	2/clamp
S	Spacer Block	$\frac{3}{4}$ " Dowelling	$\frac{3}{4}$ x 1 $\frac{1}{2}$	1/clamp
T	Wing Nuts		$\frac{1}{4}$	1/clamp
U	"T" Nut		$\frac{1}{4}$	2/clamp



Some of the special circular cuts that can be made by using part K and the pivot pin. Upper left; bowl cut. Upper right; disc cut. Bottom left; bevel cut. Bottom right; cove cut.

(Woodworker's Jigs cont'd.)

to be used on slide K with a pivot point for disc and other circular cuts. This hold-down is centered with a $\frac{3}{4}$ " dia. hole but is not fitted with tee-nuts. Instead, secure a $1\frac{1}{2}$ " length of $\frac{3}{8}$ " o.d. lamp wiring nipple and fit it with two nuts. The lower nut is epoxied so it will not turn while the upper nut is left free. This assembly is shown in Fig. 3 as parts L and M.

When setting up slide K for special cuts, the parts L, J, L and M combine to make a self-contained locking clamp. The eyebolt assembly is inserted through the clamp and adjusted to secure the workpiece.

Soften all edges of the cutoff table and give entire unit several coats of sealer. When dry, sand the underside of base lightly and apply a coat of wax. When in use, spray underside occasionally with silicone spray for a nice gliding effect.

Note the photos showing cut-aways of some of the circular cuts that can be produced. Using slide K and centering unit NOPLM with hold-down LJ, discs or bowls can be cut.

When making these circular cuts,

take light passes over the blade, raising it slightly for each new pass. When cutting discs, establish the radius by clamping the pivot point into workpiece the desired distance from blade, then remove waste by making tangent cuts with repeated straight passes. After waste is removed, clamp the platform to the saw table with the center line of the work near the front edge of blade. Rotate work slowly against the direction of blade rotation.

You may be surprised to find that the blade seems to cut a circular cove on the underside of the workpiece, but the resulting disc edges will be square. Removing waste first reduces the considerable amount of sawdust generated.

The variety of circular cuts that can be produced is almost limitless depending on location of pivot in relation to saw blade and the angle of the blade itself. Experiment with scrap stock to become familiar with the jig's capabilities. Be sure to observe basic safety rules, wear goggles and make sure you know where the saw blade is at all times.

Workshop Income

Charles Burke

Too many woodworkers who try to make money through their woodworking activities fail because they are overly ambitious or overly timid. Both make the same mistake, but for different reasons. The mistake that they make is that they fail to sell at wholesale prices to retailers who are in a good position to make things easier for them.

The overly ambitious woodworkers get hurt because it breaks their heart to sell their goods to a dealer at wholesale prices; they want to maximize their profits by selling at full retail to the ultimate consumers of the goods. Many of them reason that the retailers who'd buy their woodworked products for resale don't deserve the big 40% or 50% chunk of the retail price that the retailers get, so they don't sell to retailers. They figure they'll do better selling to consumers by themselves and keeping the entire retail price for themselves.

But not every woodworker is cut out for retail selling. Many don't have the time or the temperament or the right knack, and they might be handicapped also by a lack of access to their market. Unfortunately, some of them outright refuse to face the facts of the situation. They want to keep all the profit for themselves, so they keep beating their heads against a stone wall by trying to sell at retail when they're just not set up properly for it. The shame of it is that many of them eventually give up in disgust and pass up a good income that they could have had if they hadn't had a phobia about letting someone else in on their action.

I think it's a big mistake for woodworkers to try to avoid dealing with shopkeepers on that basis. Sure, dealers take a hefty slice of the retail for themselves, but they're entitled to

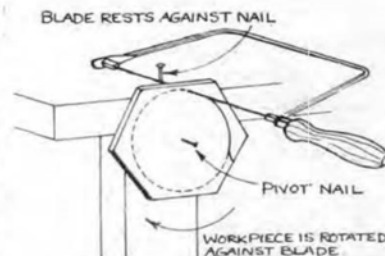
it. They're performing very important services: they're providing a marketplace where potential customers can view woodworker's products, and they're doing the woodworkers' actual retail selling for them. Those are economically important functions, well worth their cost. Unless a woodworker can fulfill those functions better... more economically, more efficiently... than a dealer can, he's very foolish to try selling directly to consumers by himself.

The overly timid woodworkers have a different reason for not selling to dealers: they don't want to contact them. Maybe they're afraid of the embarrassment of having their goods turned down, maybe they think that they're not experienced enough to deal with retailers on a wholesale basis, maybe they just dislike the idea of having to make a sales pitch to a stranger. My advice to hobbyists who recognize themselves as belonging to this category is to stop worrying and start selling. Don't be afraid of approaching and dealing with retailers on a wholesale basis. You're not begging or looking for a favor, so there's no reason to be timid. You're offering a straight business deal, and they're going to view it exactly that way. A retailer is in business to make money, and if he has any brains at all he's going to give your proposition the same careful consideration he'd give to any other seller's.

So if you're a woodworker who'd like to cash in on your skills, don't pass up the idea of selling to retailers. Don't let it bother you that dealers might end up making more than you do on each piece sold, and don't avoid them because you think that you're not in their league. Put them to work for you.

Shop-Tips

If you work only with hand tools, here's a neat kink for cutting perfect discs with a coping saw. Just scribe the circle on the workpiece and start the blade into the cut. Then fasten workpiece to the edge of your bench with a small nail driven through the center. Another larger nail at the edge of the bench top acts as a stop for the blade. Continue sawing while rotating the workpiece into the blade.



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