

TODAY'S

Issue 10 ■ \$3.50

WOODWORKERTM

PROJECTS, TIPS AND TECHNIQUES





TODAY'S WOODWORKER™

PROJECTS, TIPS AND TECHNIQUES

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TODAY'S WOOD

Hickory (Carya spp.)

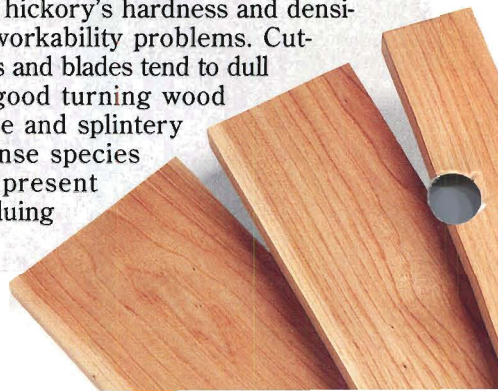
Andrew Jackson, seventh president of the United States, earned the nickname "Old Hickory" for his exceptional toughness as a general during the War of 1812. The name was quite fitting because hickory is one of the toughest and strongest woods among our domestic species. It exceeds ash, oak and maple in both strength and hardness, and has more than twice the shock resistance of those same species.

Exceptional elasticity has made hickory the wood of choice for hammer, axe and other tool handles that experience harsh and sudden impacts. In the early days of baseball, hickory was used for bats, but its use declined because of excessive weight. It's continues to find broad application for structurally critical pieces in lightweight chairs like Windsors, but the weight factor

makes it less suitable for larger furniture assemblies.

Among domestic species, hickory can't be beat for bending properties. Before the introduction of synthetic materials, hickory was commonly used for skis and toboggans. Today, craftsmen employ hickory when a design calls for bent pieces in chair backs.

On the down side, hickory's hardness and density do create some workability problems. Cutting is a slow process and blades tend to dull quickly. It is not a good turning wood because of its coarse and splintery texture. Finally, dense species like hickory often present problems for both gluing and staining.



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Advertisements

Last week Jim Ebner, our director of marketing, received yet another call from someone asking for our "advertising rates". We don't have any, Jim told him. "No rates?" came the slightly astonished reply. No, Jim patiently explained, "We don't allow any outside ads in the magazine." Well, now this fellow was really perplexed. "How do you make money if you don't sell advertisements," he inquired.

It might not be clear to him, but the phenomenal response to Today's Woodworker proves that there is indeed a large market for a magazine with projects, tips and techniques—and no advertisements.

I have been subscribing to your magazine for the past year and have enjoyed it very much, especially the helpful hints. When your Nov/Dec 1989 issue arrived, however, I really became enthusiastic. I decided that I had to make "Lonesome Dovetail".

As you can see from the photo at right, my rocking horse is made of oak, instead of maple and walnut, because of the availability of the wood. I appreciated the clear-cut instructions and drawings but did have a problem daddoing the stretchers. I could not figure out a way to cut the final dado, so I just cut them by hand. Because of the horse, I have two new bits for my router (dovetail and roundover) and already have plans for using them in other projects.

For your information, I am 50+ years old and have spent the last 30 or more years remodeling houses and building bookcases and other amenities that can't be bought to fit.

Ann C. Gould
Tenstrike, Minnesota

I just received my first copy of Today's Woodworker. I subscribed just to find out how to get the issue with the futon sofa bed. Looks like a number of other people had the same idea! Yes, I think a contemporary coffee table to match the futon sofa-bed would be a great project.

I am currently building two of the step stools from the March/April 1990 issue, one for my home and one for my cabin.

Doug Young
Clearville, Pennsylvania

I enjoy your magazine, but I'd like to see a little more description in the drawings and plans for the projects. I had some difficulty with a particular aspect of the serving tray in the Jan/Feb 1990 issue.

I hope you are planning to run an

Ironically, our circulation has grown to the point where we've become an attractive "advertising vehicle" to large companies in the field. These are reputable, honest firms whose products you've seen in hardware store ads in the newspaper, in other woodworking magazines (often close to 50% ads) and at woodworking shows. You see them in catalogs, in card decks, in flyers, in the mail... in fact, it strikes us that the last thing you want to see in Today's Woodworker is yet another one of their ads.

Don't worry, you won't.

Larry N. Stoiaken



annual or biannual index to your magazine that includes both the projects and departments, such as the short article on finger joints that appeared on page 5 of the March/April 1990 issue.

Dancil Strickland
Hillsboro, Oregon

I received my first issue recently. The format is clean, the articles interesting, the drawings superb, all with clear and readable type and no advertising—wonderful! I've got to have that magazine. Just the kind I have been seeking since cancelling another woodworking magazine for doing just the opposite.

Enclosed is my two year subscription, plus an amount to cover the cost of all back issues. Oh yes, please put a note in my file to cancel the first day you yield to the powerful temptation of accepting advertising.

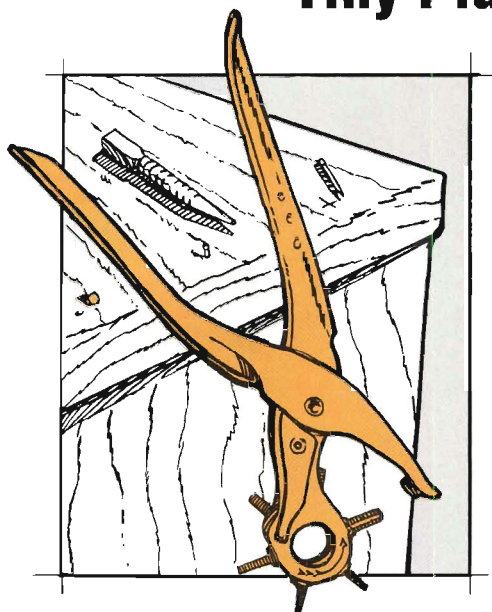
W. T. Skinner
Charlotte, North Carolina

Super magazine! Way to keep those advertisers out. Your crew just keeps getting better with every issue.

Thanks for a quality magazine and keep up the good work.

Randy Crawford
Ames, Iowa

Tiny Plugs, Fancy Push Sticks, Handy Tips



Punch out a Plug

I used to fill all my set finish nail holes with plastic wood or miracle wood putty and was never really satisfied with the match. Recently I discovered that my five-way leather punch will take a 1/4" cross cut from the wood being used to create perfect plugs for these nail holes.

*Earle M. Simpson, Sr.
Rochester, Vermont*

Flushing Up Laminate and Solid Wood

Over the years I have built my fair share of tables that are plastic laminated panels framed with some species of solid wood. It's hard enough to glue them flush, let alone make a perfect glue joint. I have found that it's better to concentrate on keeping the pieces flush while clamping, and deal with the small gaps in the glue line after the glue has set up. Having to flush the solid wood with the laminate after the glue is set could make even the best of us look for a new hobby. It's much simpler to fill these little gaps.

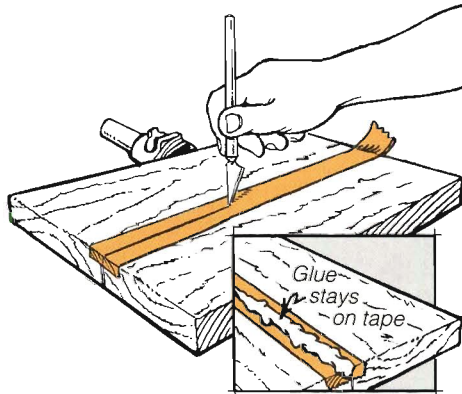
The obvious way to fill the gaps is to grab a can of wood putty and start troweling it on. This leaves you with a big mess to sand off of the wood without touching the laminate. I've done it this way and it's a real nightmare.

Recently I have found an easier way to fill those gaps. You still need that can of putty along with a can of putty

solvent. In a separate container, thin the putty to a heavy cream consistency. Now apply this thinned putty with a rag, the same way you would apply paste wood filler. Carefully wipe it on, being sure to leave no build up. If you happen to accidentally leave a little extra putty on the wood or laminate, you can take a rag, wet it with putty solvent, and wipe the excess off. All of your clean up should be done this way, eliminating the need to remove any putty with sandpaper.

This method of filling gaps in the glue line also works great between a solid wood and plywood mitered joint. When I fill these gaps however, I leave a small build up and then sand it once it's dry.

*Bob Thomas
New York, New York*



Easy Glue Removal

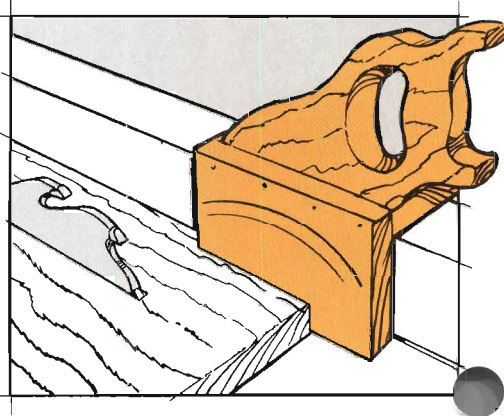
I had been pondering the various options available for removing glue that had oozed out during clamping (wipe it immediately, wait until it is semi-dry and lift it off, or wait until completely dry and chip or sand it off), and decided to try something a little different.

Prior to gluing two pieces, I clamp them tightly together and tape them length-wise with a single piece of regular Scotch tape. I use the widest tape I can find and, with the two pieces still clamped together, split the tape along the edge of the two pieces with a very sharp blade. Each piece now has its edge bordered precisely by half of the tape.

When I finally glue and clamp the two pieces, the glue oozed up as

usual; however, now it oozes up onto the scotch tape on either side instead of directly onto the wood. After a few minutes, once I'm sure the glue has set and the oozing has stopped, I peel the tape to reveal a clean line between the two pieces.

*Mark Findlay
Seattle, Washington*



Push Handle for the Table Saw

A push stick is always recommended when ripping narrow stock on the tablesaw so that your fingers are a nice safe distance away from the blade.

I prefer a push handle which fits over both sides and across the top of the tablesaw rip fence. A comfortable handle (a handsaw handle makes a good pattern) is attached firmly to the top with dowels and glue.

Before final assembly, cut a notch to fit over the thickness of stock to be ripped. The notch pushes the stock and is a great help in holding the board down. Use only glue and dowels to assemble the push handle.

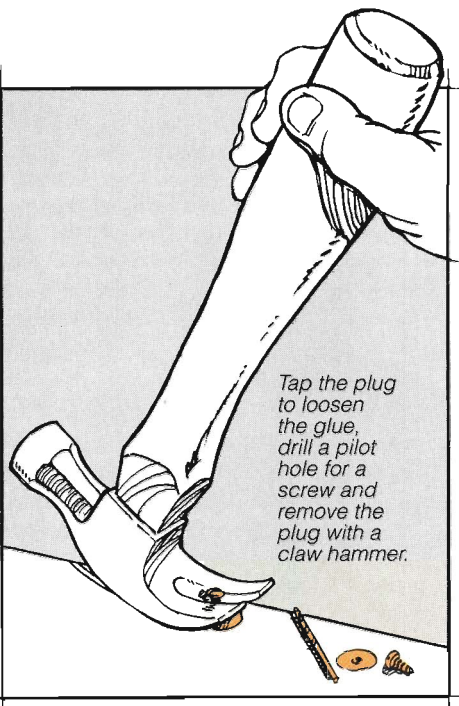
I now have several of these handles in my shop, sized for the most common thicknesses of stock, such as 3/4" and 1/2".

The result is a push handle that slides easily on the surface of the tablesaw, helps hold the work down, won't slip, is comfortable, won't get lost easily and, I think, is much safer than a traditional push stick.

*Richard H. Dor.,
Oelwein, Iowa*

Makita Dust Collector

By Hugh Foster



Tap the plug to loosen the glue, drill a pilot hole for a screw and remove the plug with a claw hammer.

Easy Plug Extraction

Flush mounted screw plugs can be difficult to remove without breaking. We recommend tapping them to jar any glue loose, and then drilling a 1/16" hole in the center for a small screw. A claw hammer is used to grip the screw and pull out the plug. After repairing the furniture, the plug is replaced and the hole filled with the correct shade of stock putty.

This saves time finding the correct stain and finishing the plug to match.

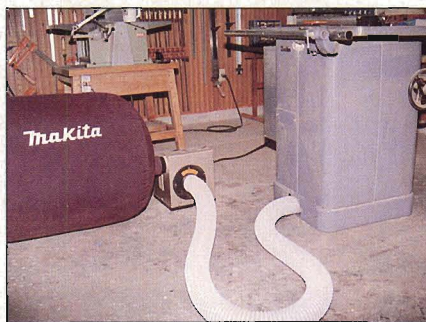
*Alice & Robert Tupper
Canton, South Dakota*

A Handy Tip

My shop tip concerns the care of ten of our most valuable tools —our fingers! I live in a dry climate and this, combined with woodworking, leads to cracked and dry skin, especially the tips of my fingers and the cuticles of my thumbs. Various hand lotions and creams didn't help much, but I have found using preparations designed for chapped lips (such as Carmex) work very well. The heavier consistency of lip balms also helps, as you can concentrate on the dry, cracked spots. I hope you find this tip "handy"!

*David Deyloff
Rapid City, South Dakota*

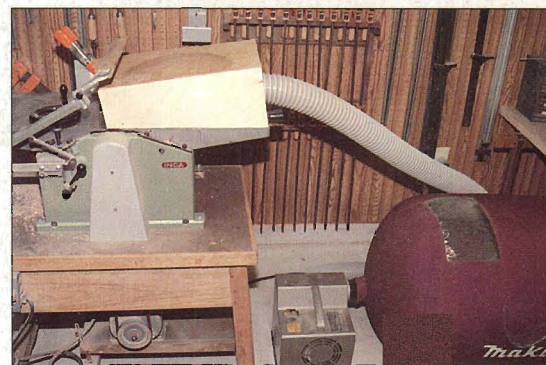
(Please turn to page 7)



After a long day in the shop, cleanup used to start with a shovel, move on to a broom and finally a shop vac. A little experience with the Makita 410 dust collector has convinced me that it is the perfect, and affordable, solution to the problem of shavings and dust in a small shop.

Ever since I first plugged in this \$300.00 unit, I have been impressed by its solid construction and light weight. The 3" flexible hose that comes standard with the unit is the heaviest and smoothest I have seen—it won't be wearing out soon. Makita U.S.A., Inc. (1450 Feehanville Drive, Mount Prospect IL 60056) cautions users that "This tool is for collecting dust or shavings exhausted from wood shop tools. Do not attempt to collect wood chips, metal, rocks, string, lighted cigarettes, or the like." That's because what you pick up with the hose must next go through a squirrel cage blower. While its suction is superior (307 cubic feet per minute), this is emphatically not a vacuum cleaner.

You can use the bag that comes with the unit for pickup, or attach it to another piece of three inch hose or pvc pipe to blow the chips into another area. For longer than I ever expected, I have been using just the bag. A friend has shown me an interesting system that permits him to bypass the bag with an extra piece of hose and direct his waste into a 55 gallon drum. The 410 has far more draw through its three inch opening than my shop vac has, even



Makita's dust collector attaches easily to most tablesaws but for your other tools, you may have to build a quick hood, as shown above.

even when it's reduced to an inch.

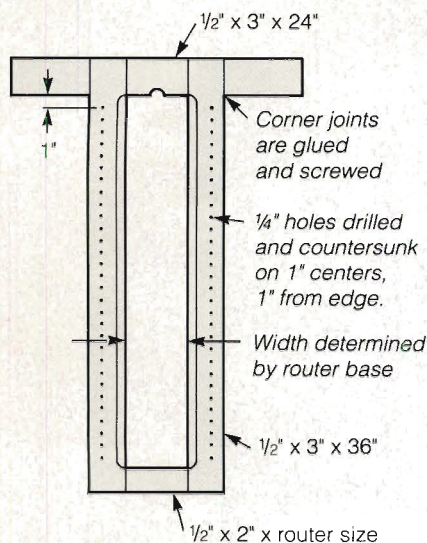
While Makita makes hoods for its planers, fabricating them for your own machines isn't too hard. In just fifteen minutes I made a crude hood for my jointer/planer that is upwards of 95% efficient. For my tablesaw I discovered that I didn't need to fabricate or adjust anything to make the Makita 410 work; I just set the loose end of the intake hose into the 3" x 5" rectangular outlet on the back of the saw. It picked up virtually 100% of the sawdust I generated. When I tried cleaning the inside with the 410 rather than with the shop vac as I always had, I discovered that the machine would, in fact, clean the motor shroud without the trouble of removing it from the saw. Now I'm getting better results from working with cleaner tools, and I'm breathing better.

Moving the Makita 410 from machine to machine is the most inexpensive way I know to avoid building another expensive shop accessory or the odious business of sweeping for half the day. If the proverb "Cleanliness is next to Godliness" is even remotely accurate, then most small shop woodworkers will agree that the Makita 410 is heaven-sent.

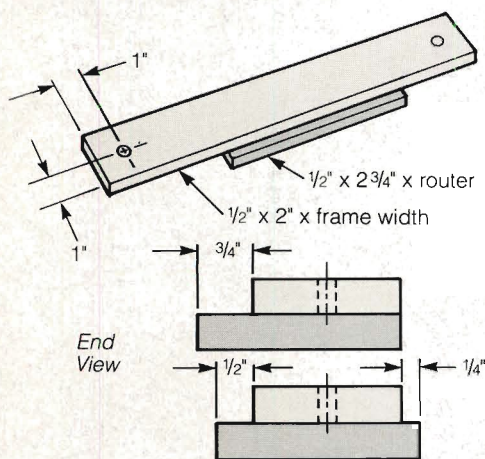
Hugh Foster is an English teacher, furniture builder and freelance writer based in Manitowoc, Wisconsin.

Flexible Router Frame Guide

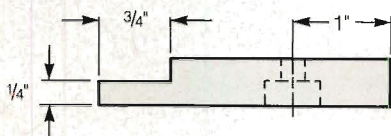
By Hugh F. Williamson



When you're making the frame guide, there are two key points to remember. First, be sure that all corners are perfectly square and second, the width of the jig is determined by your router.



A set of two stops for each end of the frame allows you to start or stop either end of your dado in 1/4" increments.



This cross section of the frame sides shows the recess required for handle clearance with certain makes of routers.



The router frame guide will keep your router bit exactly where you want it to be.

Router frame guides like the one shown here have been around for a long time and are very handy when it comes to cutting shelf dados. The problem with these guide frames is that most woodworkers end up throwing a quick one together for each project they undertake.

When I designed this one, that's exactly what I wanted to get away from. My unit has some flexibility built into it and I'm hoping it's the last one I'll ever have to make.

Medium density fiberboard (MDF) is the material of choice for this project, with plywood as an acceptable second option.

The frame guide is equipped with four adjustable stops (two for each

end) which allow me to start or stop my dados in 1/4" increments.

The space between the two runners will vary with the size of your router base. The length of the runners should be at least 36" (longer for some shops). A series of matched 1/4" holes, exactly 1" apart, are drilled and counter sunk on the bottom of both runners. You'll find that a strip of 1/4" pegboard makes the perfect drilling guide for these holes.

Once you've established your width by measuring your router, assemble the four pieces of the frame with glue and screws, following the drawing in Figure 1 at left. The key is to be certain that you keep the jig square.

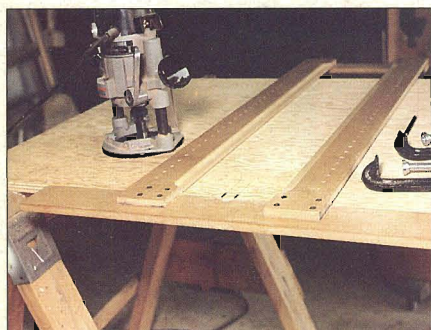
Now make the two sets of adjust-



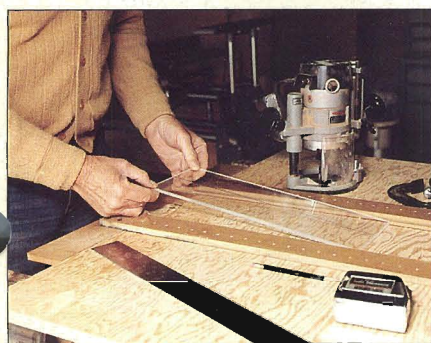
When you screw the stops to the cross arms, be sure the overhangs are exactly 1/4", 1/2" and 3/4", so you can stop dados in 1/4" increments.



After the stops are bolted in place, the adjustable frame guide is tightly clamped to the work piece.



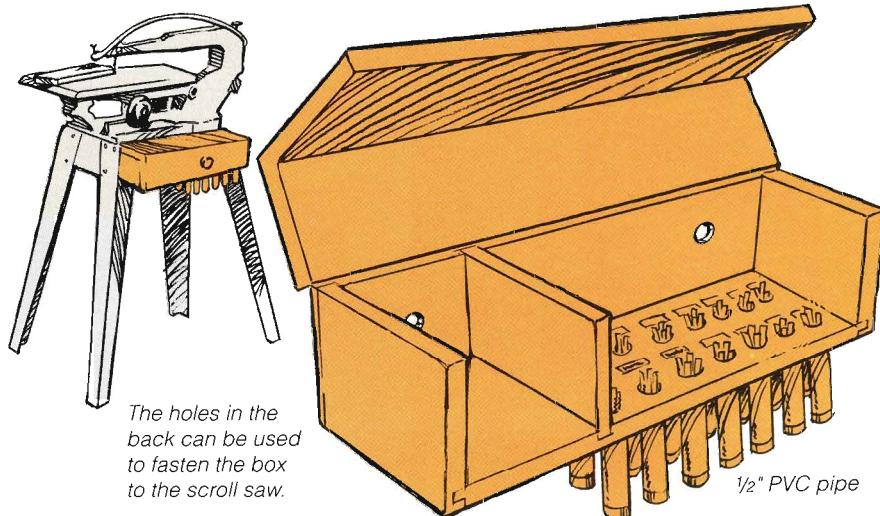
The adjustable frame guide can be aligned to the work piece by simply using the router bit cut in the front guide as a reference point.



For perfect alignment every time, cut a plastic insert to fit into the frame guide and score a center line on it. In use, the plastic insert is removed once the clamps are in place.

able stops that will slide freely in your frame guide. The cross arms that bolt to the runners are made of 1/2" stock and are 2" wide (exactly) with a 1/4" hole centered on each end to match the holes in the runners. The stops are 1/2" x 2 3/4" x (router width). These are attached to the cross arms with screws, as shown in Figure 2. Depending upon your needs, these stops can be reversed and offer 1/4" adjustments along the frame at either end. The cross arms and stops are secured to the frame guide with 1/4" x 1 1/2" flat head bolts, washers and wing nuts. Finally, you may find that the handle of your router requires the routing of a recess on the inner surface of both runners for clearance, as shown in Figure 3.

Wrap up this project by applying a coat or two of finish and keep the guide well waxed for smooth action.



The holes in the back can be used to fasten the box to the scroll saw.

1/2" PVC pipe

Storing Scroll Saw Blades

My solution for storing scroll saw blades is shown above. I fasten my box right onto the machine stand and it works great. You can see at a glance when you need to order more blades.

The blade holders are made from 1/2" PVC pipe about 4 1/2" long. I plug the bottom of each tube with a short piece of 1/2" dowel and epoxy the tubes into the bottom of the box.

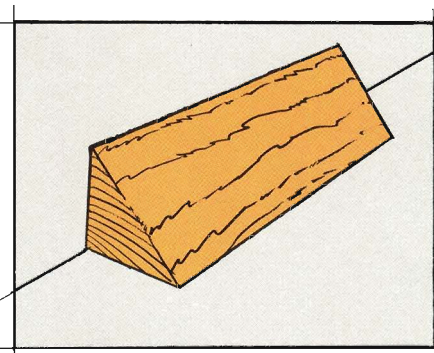
Each slot is marked for easy reference and the box is made a little long to hold any accessories.

John S. Vestal
St. Joseph, Missouri

together the way it was supposed to be, and applied several sizeable glue blocks with hide glue, similar to what the original maker of the piece no doubt used. Not only are they good for reinforcing joints in repair work, they also do an admirable job of stiffening up joints in hard to reach areas of new work.

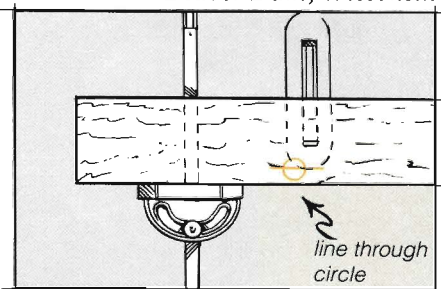
Glue blocks have unnecessarily gone out of fashion. It's time we brought them back.

Bill Flemming
Beaver Dam, Wisconsin



Glue Block Renaissance

While repairing a very old chest of drawers, I discovered that some of the carcass joints had come unglued, but that the piece couldn't be taken far enough apart to reglue the entire joint. Some of the glue that held the glue blocks in place had aged away to nothing. When I noticed that the joints could be drawn tight even though they couldn't be disassembled, I realized the solution to the problem: glue blocks. I clamped the carcass



Stop Dado Guide

When making stop dado cuts on the tablesaw, I mark with a pencil on the table top where I want to stop the cut. Then I put a small circle through my pencil line. During the cut I know I'm getting close to the line when I see the circle. (Masking tape can be used if you do not wish to mark the table top with a pencil.)

Larry Bedaw
North Swanzey, New Hampshire

Today's Woodworker pays from \$20.00 (for a short tip) to \$100.00 (for an elaborate technique) for all Tricks of the Trade published. Send yours to Today's Woodworker, Dept. T/T, Rogers, MN 55374-0044.

Saving Space and Getting Organized

It's just about impossible to keep up with all the new hardware being developed these days, but we thought we'd at least take a stab at it. In this installment of Hardware Hints we present a preview of some of the new hardware that you'll soon be seeing on the store shelves or in your favorite mail order catalogs.

As we looked at the vast array of new products available, one recurring theme stood out. Hardware designers, it seems, are absolutely determined to help us save space and get organized. While the kitchen and home office have received the lion's share of their attention, they've also come up with a new twist on some old standards, like tambour and disappearing pocket doors.



All of the current hardware available for organizing compact discs (CDs) shares one major flaw. Your CDs are stacked horizontally or vertically, forcing you to read the small print on the edge. Bib America has come up with a better idea. Their new compact disc storage strips feature specially designed teardrop supports, which allow for easy arrangement and flip through viewing. With a self adhesive backing, they can be quickly installed in any drawer or shelf.



Rev-A-Shelf Inc. has designed a rail system which effectively doubles the useable space in a drawer—as long as it's at least 3 $\frac{1}{8}$ " deep. The rails install on the inside or outside of the drawer box and allow you to easily add a second tray. Three different sized kits are available in white or almond, with rails to match. The trays, which are made of rubberized polystyrene, can be cut to size for a custom fit.



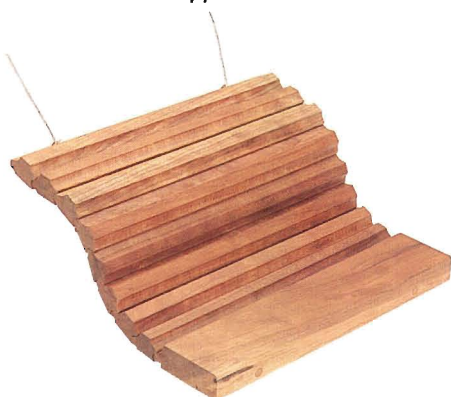
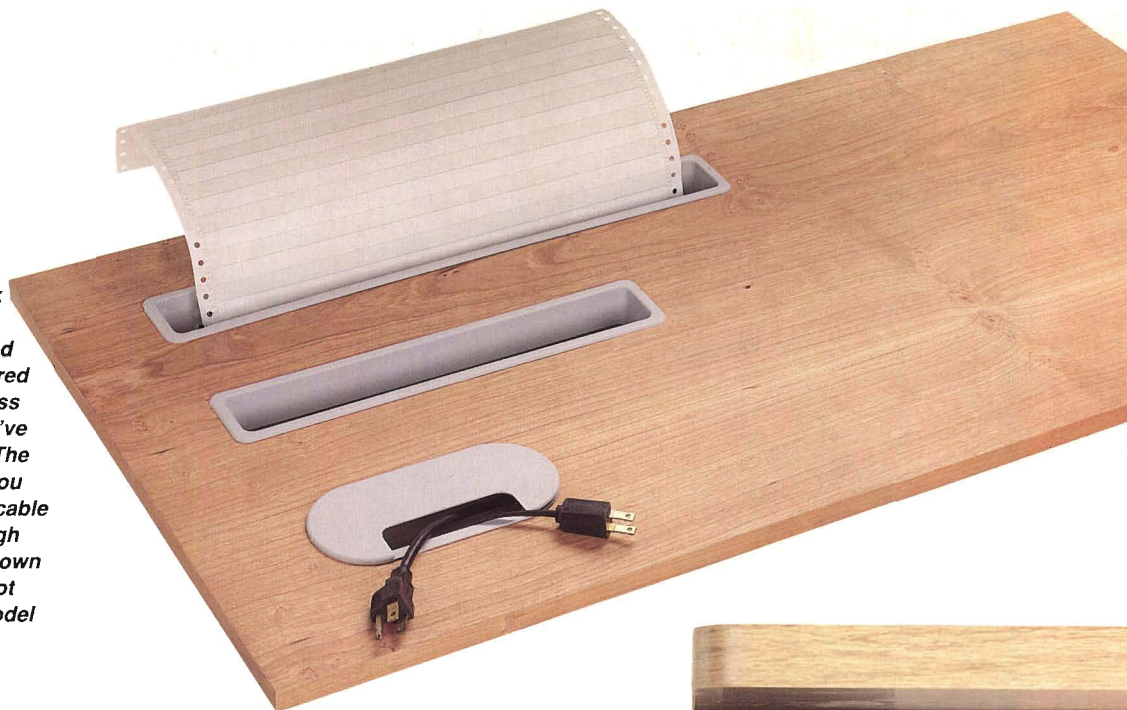
Recycling isn't just a fad anymore, it's a national priority. Feeny Manufacturing Company is doing their part by offering this slide out wastebasket set. If you've got a spare base cabinet that's at least 16" wide and 20" high, you have room for this instant recycling center.



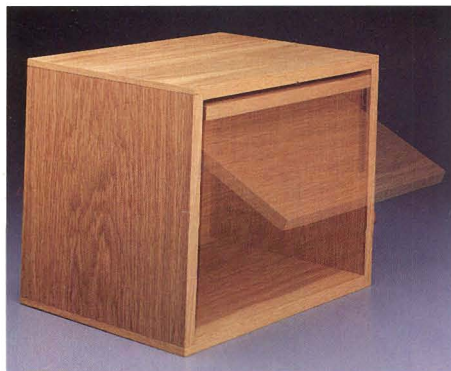
The German-based Mepla company has come up with the perfect kitchen corner solution with their clever pie-cut corner hinge. When you open the two panel corner door, this hinge allows it to fold flush against an adjoining door, providing much easier access to the cupboard space.



Cable clutter at the computer work station has led Doug Mockett & Company to a new line of oversized "King Kong" grommets. The textured cap features a snap-out cord access slot that can be replaced after you've squeezed all your plugs through. The hardware is particularly useful if you have 25 pin computer and printer cable connectors that refuse to fit through standard sized grommets. Also shown are two of the company's paper slot grommets, including a new 12" model for home office applications.



The Woodworkers' Store plans to introduce solid oak tambour "by the slat" in their Fall, 1990 catalog. Instead of buying a whole sheet, you'll be able to order just what you need for the project at hand. The slats are pre-drilled so they can be threaded on 30 inch cables that are attached to the lead strip.



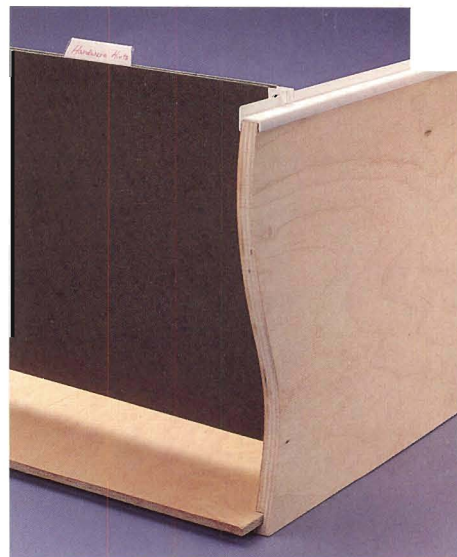
Pocket doors may start showing up in more applications, given the low price on this new hardware from Transfer Flow. Their pocket slide is easy to install and maintains a low profile. We tested it in horizontal and vertical applications and it worked well both ways.



We've been using Weber Knapp's keyboard support mechanism for the past month and have no plans to give it up. You can adjust the height of the keyboard to your own personal preference and easily push it out of the way (and above your



The Rev-A-Lock™ magnetized catch and key system from Rev-A-Shelf Inc. will confound even the most curious child. Install the catch on the inside of your drawer or cabinet door and keep the magnetic "key" out of reach.



Clumsy hanging folder hardware may become a thing of the past if Outwater Plastic/Industries' low priced styrene extrusions catch on. Instead of installing an elaborate metal frame in a desk drawer, you simply cut this "hanging file folder extrusion" to length and push it into place on the top edge of the drawer sides.

TRADITIONAL CORNER CUPBOARD

Display your finest collectibles in a cabinet that's worthy of its contents.

By Chris Inman

Sharpen your dado blade—you'll need it for this project. There are lots of grooves to cut, one for almost every piece of material in the cabinet. There are quite a few pieces, but by carefully organizing the cutting and assembly steps first, the construction of this corner cupboard will go smoothly. I spent about \$500.00 on this project, most of which was used to purchase 40 board feet of cherry and two sheets of cherry plywood.

The Plywood Shell

Rip a 12 $\frac{1}{8}$ " wide panel from a 4' x 8' sheet of cherry plywood to make the three fixed shelves (pieces 1). If you alternate the triangular shaped shelves you will get all three pieces from one panel. To insure that they are all exactly the same size, make a template for the shelves from hardboard (See Figure 1), then trace this pattern onto the plywood panel three times. Use a saber saw to cut around the outlines, leaving at least 1/2" of waste on the angled sides. Next, clamp the template to each roughly cut shelf and rout away the plywood waste with a flush cutting router bit.

Cut plywood panels slightly oversized for the back (piece 2) and sides (pieces 3), and also rip solid cherry for the fronts (pieces 6) and stiles (pieces 7). Now cut each of these pieces to their finished length as shown in the material list, and mark out the three dado locations where the pieces join the fixed shelves, as shown in figure 2. Use a radial arm saw to cut all the dados 3/4" wide and 3/8" deep, using stops to position the stock on the table for each set of cuts (See Figure 2).

You'll need to rip the back and sides to final size, so adjust your table saw blade to a 22 $\frac{1}{2}$ ° angle. Remember that the width of your panels measured at the bottoms of the dado

grooves must equal the length of the corresponding edges on the fixed shelves (See Figure 3). Rip the 22 $\frac{1}{2}$ ° angle on both edges of the back panel, and on one edge of the side panels, cutting the right edge on the left panel and the left edge on the right panel.

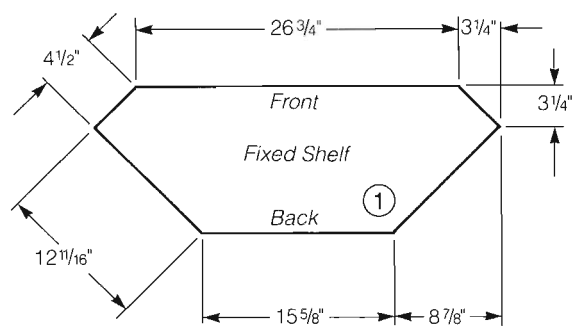
Rout spline grooves in the angled edges of the back and side panels. Splines will help align the pieces during assembly. Sandwich two panels in a bench vise, setting the angled edges flush from one panel to the

other. Use a spring clamp at each end of the sandwich to hold the pieces together. Now use your router set up with a 1/4" straight cutter and a straight edge guide to rout a 3/8" deep groove in the middle of the lower panel's edge (See Figure 4). Continue exchanging the panels in this same configuration until you've routed all four angled edges. Rip two 3/4" splines (pieces 4) to fit into these grooves. I had some 1/4" plywood laying around so I used it to make the splines.

The strong vertical lines of this piece are subtly offset by gentle curves on the doors and baseboard molding to create an inviting appearance.



1



The entire cabinet is built around the three fixed shelves, so cut out your template carefully to guarantee perfect symmetry.

Begin Assembling the Shell

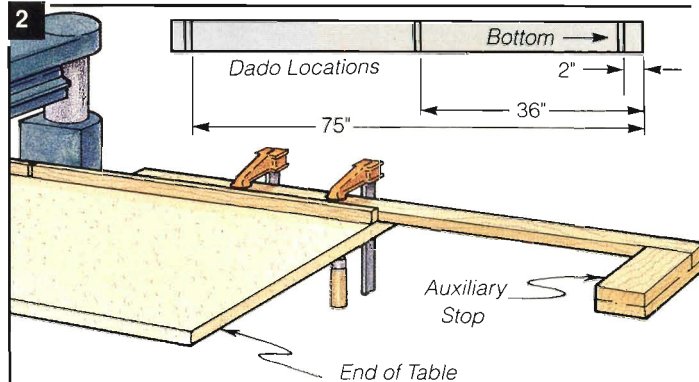
Before you start gluing up the shell, do a quick dry assembly of the back panel, one shelf, side panels and fronts to make sure everything is going to fit. Lay the back panel (pieces 2) on your workbench with the dados facing up and apply glue to each dado. Now set the three fixed shelves (pieces 1) into the dados and allow the glue to set for a half hour. Make sure the shelves stand perfectly straight to form 90° angles with the back panel. I used a couple of heavy paint cans to hold each shelf in this position (See Figure 5).

Flip the assembly over and temporarily attach a long scrap strip near the edges on the back panel to act as clamping blocks for the next gluing step. Apply glue in the spline grooves and in the side panel (pieces 3) dados, then insert the splines in the back panel grooves. Set the side panels onto the fixed shelves and draw the pieces together with bar clamps (See Figure 6).

Rabbit the fronts (pieces 6) on the edges that overlap the sides. Use the radial arm saw, making the rabbet 13/16" wide and 3/8" deep. Keep in mind that these two fronts need to be mirror images of each other. Now rip a 22 1/2° angle on the edges opposite the rabbets, but remember that the width of the fronts is based on the bottom of the shelf dado grooves. Spread glue into the dados on the front pieces and mount them onto the fixed shelves. Pull everything together and drive finishing nails through the fronts at each shelf location.

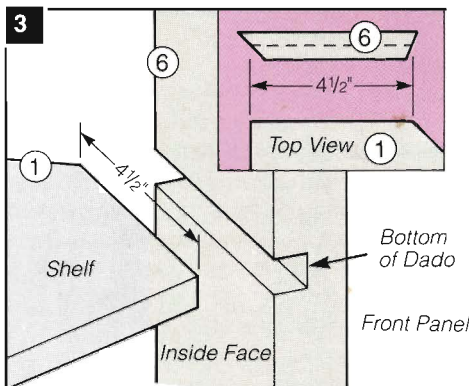
Rip the stiles (pieces 7) to size, cutting one edge at a 22 1/2° angle to mate with the fronts. The butt joint between the stiles and fronts is plenty strong for this cabinet. Apply glue to

2



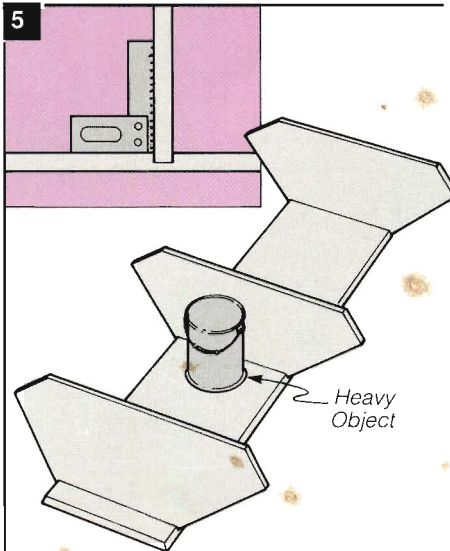
An extended stop on the radial arm saw will allow you to make repeated dado cuts into the middle of the back, sides, fronts and stiles.

3



To arrive at the right width for each panel, measure at the bottom of the dado grooves, not on the inside face. The bottom of the dado should equal the length of the mating shelf edge.

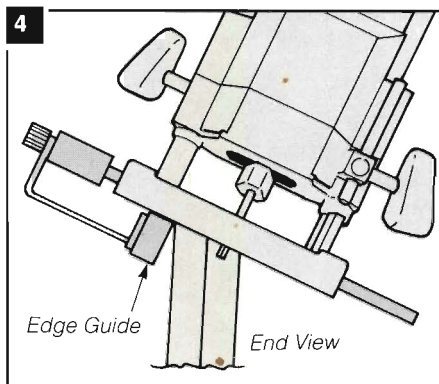
5



To keep the shelves upright while the glue sets, place a heavy object, such as a paint can, on either side of each shelf. Make sure the joints are square after the paint cans are in position.

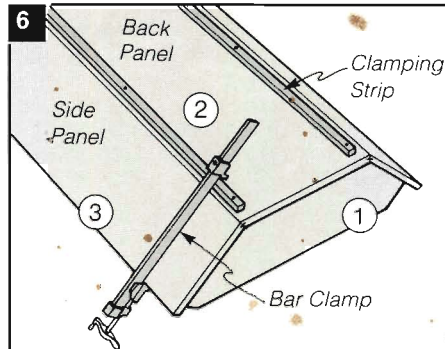
the angled edges of the stiles and fronts, and in the dados, then install the stiles. Use finishing nails at the shelf locations to draw the joint tight, and push in four spanners reaching from stile to stile to force the angled joint together (See Figure 7).

4



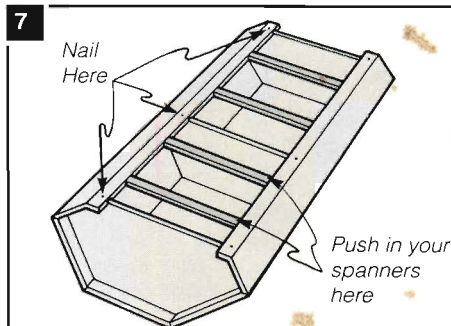
Clamp two panels together to create a stable surface for the router. Use an edge guide to rout down the middle of the lower panel edge, and keep rotating the panels.

6

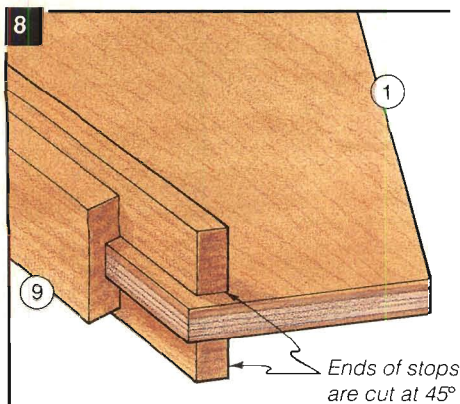


Screw a long, narrow strip near each edge on the back panel to provide a clamping platform when assembling the side panels to the shell.

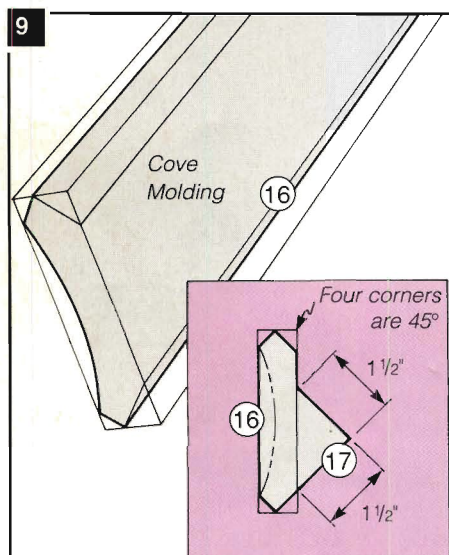
7



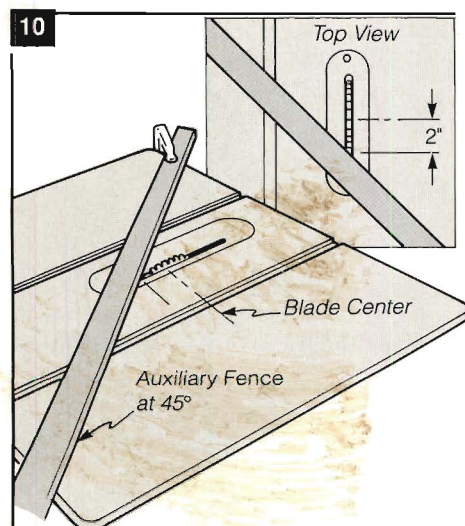
Spanners cut slightly long are forced into the face frame opening to push the stiles toward the fronts for a tight joint.



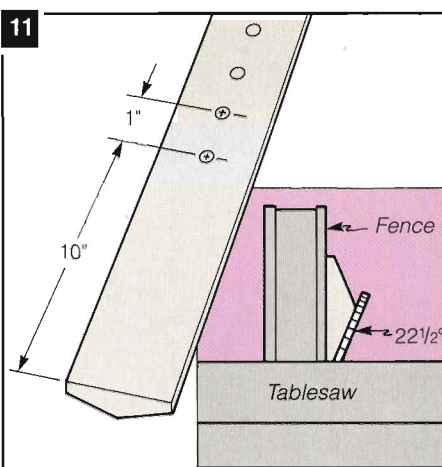
Make the stops to fit directly behind the rails, ripping them $3/8$ " wider than the height of the rail edge. Cut the ends of the stops at a 45° angle so they will fit snugly behind the front panels.



Make the angled cuts on the cove before you start molding the face. The $1\frac{1}{2}$ " x $1\frac{1}{2}$ " blocking, cut at a 45° angle, will reinforce the molding installation.



Clamp your straight edge at a 45° angle to the blade and set the edge 2" from the top of the arc of the blade. Using a push block, make a series of passes, each $1/16$ " deep, until the cove is as deep as you want.



Drill $1/4$ " shelf standard holes through the $1\frac{1}{2}$ " wide strips, then cut the strips to length. Use these pieces as templates to drill matching holes into the inside face of the front pieces. Finish up by ripping the back of the strips to fit the 45° angles where the back joins the sides.

Rails and Stops

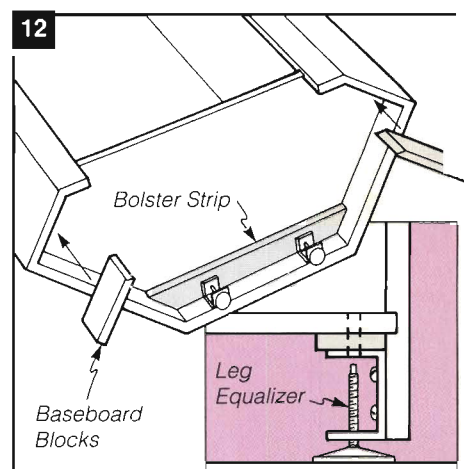
The next step is to make the rails (pieces 8, 9 and 10) to cover the front edges of the fixed shelves. The top edge of the bottom and middle rails must be $1/2$ " above the shelf surfaces, and the bottom edge of the top rail lies $1/2$ " below the surface of the top shelf. Plough $3/4$ " wide x $3/8$ " deep dadoes into these pieces, $1/2$ " from the above mentioned edges. Cut these pieces to length and glue them in place.

Next, cut the four stops (pieces 11) to fit behind the rails. Each stop must be wide enough to extend $1/4$ " above or below the rail edges. Once you've ripped them to size cut the pieces to length at 45° angles to fit behind the cabinet fronts (See Figure 8).

Making and Attaching the Trim

I used standard router bits for all the trim pieces except the cove molding. You can match these or use whatever you have on hand. The baseboard (piece 12) has a simple cove routed along the top edge, and the base cap (piece 13) was cut with a Roman ogee bit, as was the upper trim base (piece 15). Using a 3" or 4" wide board, first rout the edges with the ogee bit, then rip the strip to its final size. The middle shelf trim (piece 14) was molded with a small panel raising bit (as shown in the top right drawing on page 15), and then planed down to $1/2$ " in thickness.

The cove molding (piece 16) is made on the table saw using an easy technique that you'll find useful on



Adding baseboard blocks behind the front pieces will help to distribute the weight load. At the same time, glue the bolster strip to the underside of the lower fixed shelf to bring the leg equalizers closer to the floor. This will give the glides a little more adjustability.

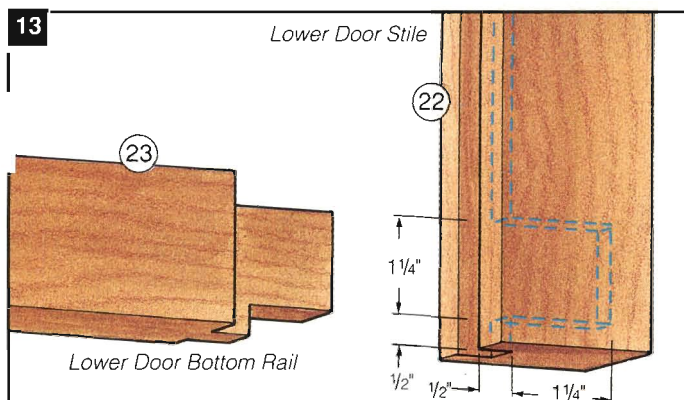
future projects as well. Before you cut the curved profile, however, you must make a few preliminary bevel cuts while the stock is still square (See Figure 9).

After completing these angled cuts, prepare the table saw to make the curved profile of the cove molding. Clamp a very straight board at a 45° angle to the saw's blade (See Figure 10). The straight edge should pass just beyond the arc of the blade's teeth. Be absolutely sure to use a scrap piece to test your set up, raising the blade from its 0 position in $1/16$ " increments. Once you're happy with the sample, reset your blade to 0 and begin cutting the cove molding, using a push block to keep this operation safe. Scrape the cove molding to remove most of the saw marks, and follow with 80 grit sandpaper. You'll get a good workout here as this step requires lots of elbow grease.

Cut all the trim pieces to fit onto the shell, noting that all the joints require $22\frac{1}{2}^\circ$ crosscuts. Simply glue these pieces onto the face frame, and use a few finishing nails to hold them in place. Make some 45° angle blocks (pieces 17) for behind the cove molding. This will strengthen the trim and make the assembly easier. Fill all the nail holes with a mixture of epoxy and cherry sanding dust.

Shelf Standards

The $1/4$ " diameter shelf standard holes are drilled at 1" increments in four $1\frac{1}{2}$ " wide strips (pieces 19 and 20). Square off the bottom end of



The traditional haunched tenon provides plenty of gluing surface and strength, and at the same time, eliminates the need for clamping the mortise checks against the tenon.

each strip and let the other end run long. Drill your first holes 10" from the bottom end and continue for 14" (See Figure 11). Cut the standards to length, two for the upper unit and two for the lower compartment, and then use them as templates to drill matching ranks of shelf support holes on the inside of the cabinet fronts.

The standards must be ripped at 22 1/2° angles in order to fit into the corner joints where the back panel meets the sides (See Figure 11). Use a push stick during this operation. Pass a block plane along the back corner of each standard a few times to eliminate any possibility of rocking when the strips are installed. Glue the standards in place, and use finishing nails to secure the strips.

A couple of final details will wrap up the carcass construction. Gluing blocks on the back of the baseboard front sections (pieces 18) will help support the cabinet's weight and adding a 7/16" thick bolster strip (piece 21) along the back edge on the underside of the bottom shelf will prepare the cabinet for the leg equalizers (See Figure 12). Finally, cut out a gentle curve in the baseboard so the endpoints are 4 1/4" from the joint corners.

Making The Door Frames

It's best to make all the door frames at the same time, so begin by ripping and milling your stock (pieces 22, 23, 25 and 26) to 2 1/4" in width, except for the top rails (pieces 24 and 27) which need to be 5" wide. Crosscut all the pieces to length as specified in the materials list, noting that the rail lengths include 1 1/2" tenons at each end. Be sure to check all the measurements against your door open-

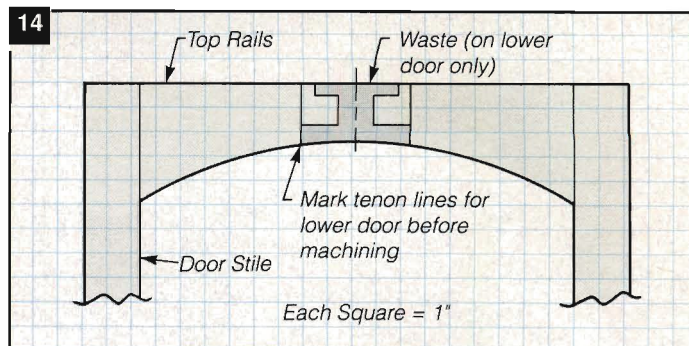
ings and make any adjustments for your cabinet. The key is to build your doors just a smidgen large and plane them to fit later.

Begin cutting the panel mortises in all the bottom rails and stiles. With a 1/4" wide slot cutter rout a 1/2" deep groove along the entire length of all the pieces, 5/16" down from the front face. Leave the top rails for now.

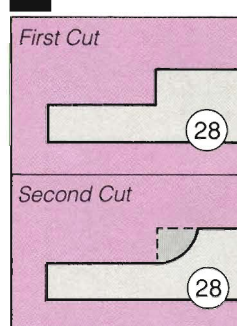
Deepen the mortise in the joint area on each stile (pieces 22 and 25) by a full 1". Since the tenons are haunched, start your deeper mortises 1/2" from the ends of the stiles, and continue to a mark 1 3/4" from the ends (See Figure 13). The one joint that's an exception is at the wide ends of the curved upper rails, where the mortise continues to a mark 4" from the top end of the stiles. Use a drill press equipped with a 1/4" bit to remove most of the material for the mortise, boring to a depth of 1 1/2" from the top edge of the stock. Shave the mortises clean with a sharp chisel.

Cut the tenons on each rail end (pieces 23, 24, 26 and 27) using the radial arm saw and a dado blade. Set up a stop to limit the cuts to 1 1/2" in length. Cut away all the front face waste down to the 1/4" wide mortise that you routed earlier. Repeat the procedure for the back face, but don't forget to raise the blade since the mortise isn't centered.

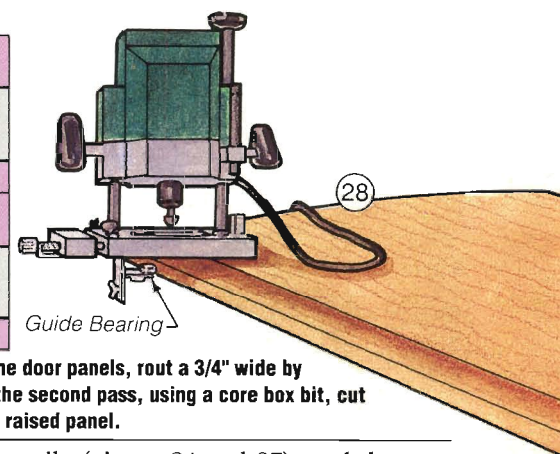
Follow the patterns in Figure 14 to cut the curved edge on the upper



Use this grid to form the curves on the top rails of the lower and upper doors. After you have the rails shaped, cut the haunched tenon waste away.



On the first pass around the door panels, rout a 3/4" wide by 1/4" deep rabbet, and on the second pass, using a core box bit, cut the curve to complete the raised panel.



rails (pieces 24 and 27), and then use the slot cutter to rout the panel mortises after sanding the edge smooth. Cut the waste to create the haunch on the tenon as shown in figure 14.

Shaping the Panels

Cut the lower door panels (pieces 28) out of 1/2" thick stock and use the curved upper rails to lay out the tops of the panels. Use a router with a 5/8" diameter straight bit and a guide bearing attachment (See Figure 15) to create a 3/4" wide by 1/4" deep rabbet all around both panels. Follow with a 5/8" core box bit set to the same depth and centered on the rabbet shoulder. You've now formed a "low tech" raised panel for a curved door.

Sand the panels, removing any routing or mill marks, and coat them once with a tung oil finish. By oiling the panels now you'll avoid the possibility of unfinished wood becoming exposed when the wood shrinks next winter, and you'll also prevent any glue from adhering to the panel when you put the door parts together. Go ahead and assemble all three doors gluing the joints, but not the panels, and when the glue dries sand everything flush.

16

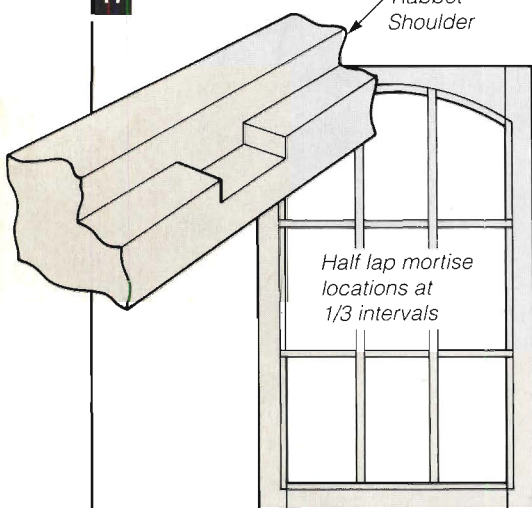
Remove back wall of dado



In order to fit the glass and the retaining strips, the back wall of the upper doors' dados must be removed. Use a bearing guide attachment and a straight cutter to rout away this material.

17

Rabbit Shoulder



The muntins are positioned at 1/3 intervals along the width and height of the upper door. Chisel out the half lap mortises up to the rabbet shoulder.

The Upper Door

The first step toward completing the upper door is to create a rabbet out of the panel dado on the stiles and rails (pieces 25, 26 and 27). Use the guide bearing attachment on your router and a 5/8" straight bit to remove the dado wall on the backside of the door (See Figure 16).

The muntin strips (pieces 29) are 3/4" wide and 5/16" thick. All the joints are half laps, and you should begin by chiseling out the half lap mortises on the back of the door frame. Lay out the joint positions and cut out the 3/4" x 1/2" x 5/32" mortises (See Figure 17). Take your time and be precise. The 1/2" length of each mortise on the upper rail is measured from the higher point on the curve. Now measure the distance between opposite mortises to establish the proper lengths of the muntins, and cut the strips to these lengths.

Go back to the radial arm saw to cut the half lap joints in the muntins. Each dado cut should be 5/32" deep

18

Front

Adjustable Shelves template

Plate Groove

To rout plate grooves, cut template on dotted line after cutting shelves.

Each Square = 1"

Back

Make a template for the adjustable shelves out of 3/4" particle board. Clamp this template to your cherry plywood and rout the pattern out with a flush cutting bit. Next, reduce the template by 2" on the back half and follow this edge with a router and guide bushing to make the plate groove.

and 3/4" wide, except for the cuts at the ends of each strip, which are 1/2" wide. Once these are cut, use a chisel to shape the half lap tenons on the top ends of the vertical muntins to conform with the curved upper rail. Glue the grid together, and then glue this assembly into the door. Sand all the doors for the cabinet.

Making the Shelves

Make a shelf template out of 3/4" particle board (See Figure 18), and use the same technique to cut three shelves (pieces 5) out of plywood as you did with the fixed shelves earlier. On two of the shelves rout a plate groove, following the dashed line in Figure 18. Use a 1/2" core box bit with a guide bushing in your router to follow the template, and make your cut 3/8" deep.

Band all the edges of the shelves with edgemat (piece 30) except for the front. Glue a 1" square strip of solid stock (piece 31) onto the front edge. Sand the edgemat flush with the shelf surfaces and use a flush cutting router bit to even the front strips with the shelf surfaces. Rout a bevel on the underside of the solid strips and then cut the lengths of the strips at a 45° angle to match the shelf ends. Sand your shelves to 150 grit.

The Upper Door Glass

Make a template for the glass cutters to follow for the upper door. I used 1/4" hardboard and had a local glass company cut my glass (piece 38) to match it exactly. Allow a 1/16" gap all around the template for fitting the glass into the door.

The retaining strips (pieces 32) are made from a very straight grained piece of 3/4" cherry. Use a 1/4" radius quarter round bit and rout all

four long edges of this board. Next, rip these edges into 1/4" x 1/4" strips. Take one strip and fit it into the curved upper rabbet —there shouldn't be any problems bending this narrow piece to conform with the curve. Fit the other strips all around, cutting miters at each corner.

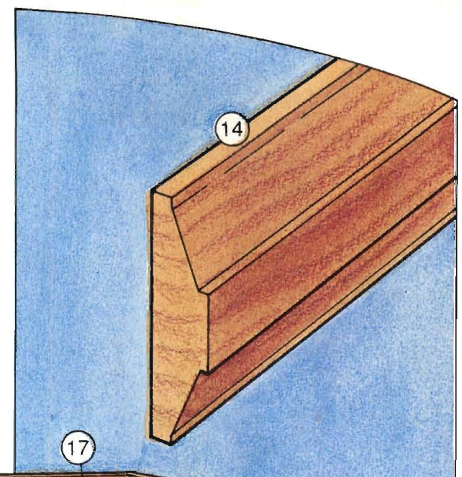
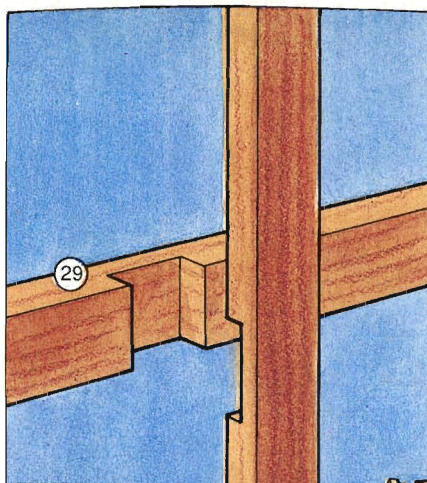
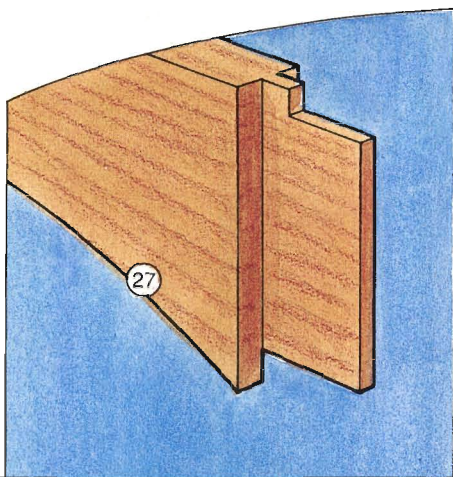
Putting Everything Together

Plane your doors to fit and attach all the hardware. The lower pair of scalloped hinges (pieces 34) are set 4 1/2" up from the base cap on the lower doors, and the upper pair is set 5" down from the midlevel trim piece. These same measurements are used for the top door too. The brass knobs (pieces 35) are positioned 20 3/4" up from the bottom on the lower doors, and 18 1/2" up on the upper door. Lay your cabinet on its back and install the leg equalizers (piece 33). Mark the position of the access hole for adjusting the equalizers, then remove the brackets and drill 3/8" diameter access holes through the bottom shelf.

Remove all of the hardware and do any final sanding to 220 grit. Apply a coat of tung oil to mellow the color of the cherry, and after three days of drying time brush on two coats of varnish. I used McCloskey's Heirloom varnish and followed that with a hand rubbed coat of paste wax.

Install the glass and nail in the retaining strips. Reattach the doors, install the bullet catches (pieces 36), one for each lower door and two for the upper door and finish up by remounting the leg equalizers. Finally, gather up your favorite collectibles—their new home is ready to fill.

Chris Inman is the associate editor of *Today's Woodworker* magazine, and a professional woodworker.



MATERIAL LIST

PLYWOOD (cherry)

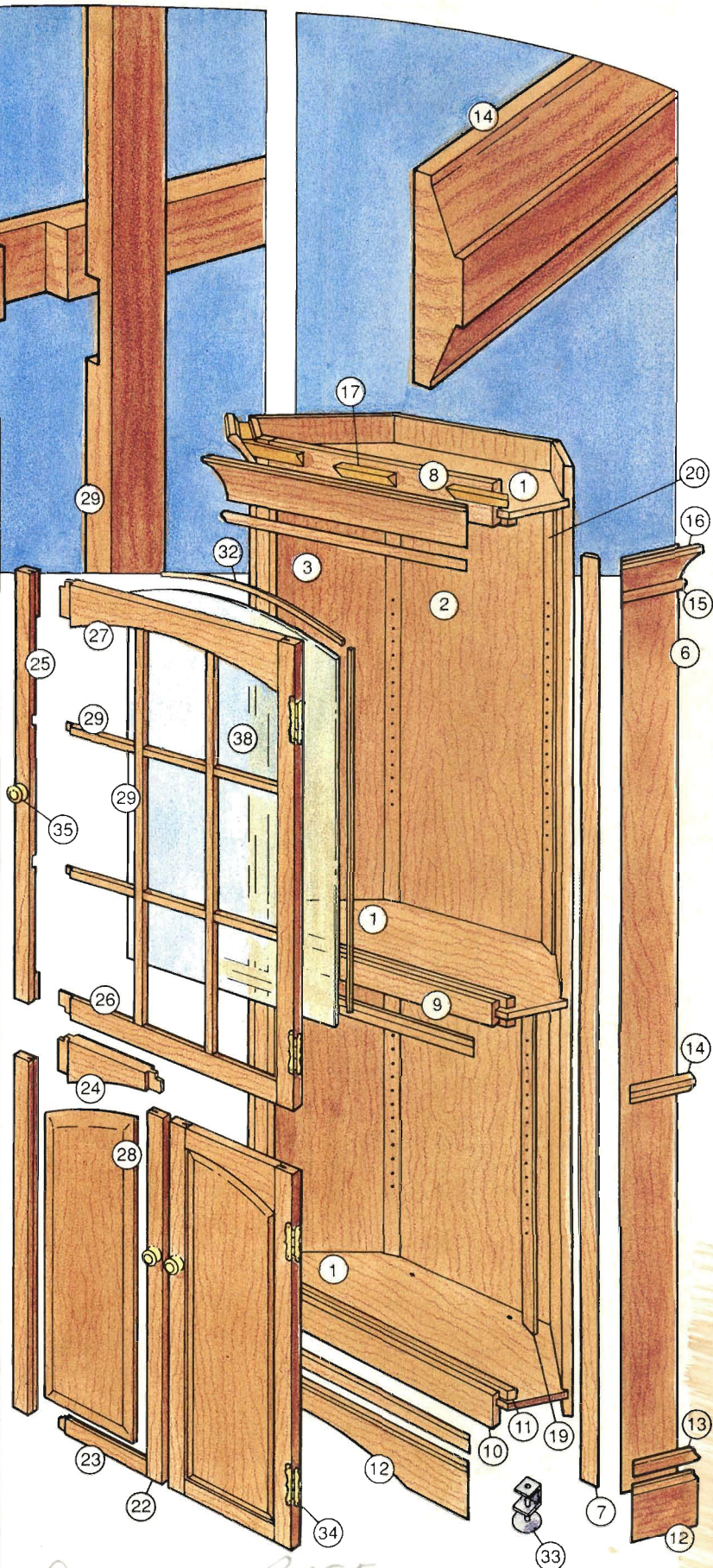
	T x W x L
1 Fixed Shelves (3)	3/4" x 12 1/8" x 33 3/8"
2 Back (1)	3/4" x 16 1/8" x 78"
3 Sides (2)	3/4" x 12 13/16" x 78"
4 Splines (2)	1/4" x 3/4" x 78" (Scrap)
5 Adjustable Shelves (3)	3/4" x 10 5/8" x 32 3/8"

HARDWOOD (cherry)

6 Fronts (2)	3/4" x 5 1/4" x 78"
7 Stiles (2)	3/4" x 2" x 78"
8 Top Rail (1)	3/4" x 3 5/8" x 23 7/16"
9 Middle Rail (1)	3/4" x 2" x 23 7/16"
10 Bottom Rail (1)	3/4" x 3 1/4" x 23 7/16"
11 Stops (4)	3/4" (Scrap)
12 Baseboard (1)	3/4" x 4" x 45"
13 Base Cap (1)	3/4" x 1" x 45"
14 Middle Shelf Trim	1/2" x 1 1/2" x 45"
15 Upper Trim Base (1)	3/4" x 3/4" x 45"
16 Cove Moulding (1)	3/4" x 3 3/4" x 45"
17 Cove Blocks (1)	1 1/4" x 1 1/2" x 45" (Pine)
18 Baseboard Blocks (2)	3/4" x 1 3/4" x 6 1/8"
19 Lower Shelf Standards (2)	3/4" x 1 1/2" x 35 1/2"
20 Upper Shelf Standards (2)	3/4" x 1 1/2" x 38 3/8"
21 Bolster Strip (1)	7/16" x 1 1/2" x 19"
22 Lower Door Stiles (4)	3/4" x 2 1/4" x 32"
23 Lower Door Bottom Rails (2)	3/4" x 2 1/4" x 10 5/16"
24 Lower Door Top Rails (2)	3/4" x 5" x 10 5/16"
25 Upper Door Stiles (2)	3/4" x 2 1/4" x 37 1/8"
26 Upper Door Bottom Rail (1)	3/4" x 2 1/4" x 21 7/8"
27 Upper Door Top Rail (1)	3/4" x 5" x 21 7/8"
28 Lower Door Panels (2)	1/2" x 8" x 28 1/2"
29 Muntins (4)	5/16" x 3/4" x 34"
30 Edgemat (2)	13/16" x 96"
31 Shelf Edge (3)	3/4" x 5/8" x 30"
32 Retaining Strips (4)	1/4" x 1/4" x 32"

HARDWARE

33 Leg Equalizer Glides (1 pr.)	
34 Hinges (3 pr.)	
35 Knobs (3)	1 1/4" Diameter
36 Brass Bullet Catches (4)	11/32" Diameter
37 Shelf Supports (12)	1/4" Pin Diameter
38 Glass (1)	3/16" x 19 13/16" x 33 3/8"



CHANGE BASE
NO 12 - To Approx 9" HIGH
ON SIDES + BACK (83 1/4)

WHITE OAK TRIVET

Here's a simple little scroll saw project that can be completed over the course of one weekend.

By Rick White

White oak isn't necessarily the first choice for this type of scroll saw project, but my plan is to create a series of trivets for my wife, each illustrating the leaf and nut of a particular tree, and each using the appropriate species. Sooner or later, I'd have to take on white oak. What I found was that the porous, straight grain of white oak tends to grab the scroll saw blade and pull it along. As a result, it's very important to move slowly and have plenty of sharp blades on hand. If you're just starting out, you may want to experiment a little with a softer, open grained wood like butternut, walnut or poplar. I've found that cherry tends to burn fairly easily, so prepare yourself for lots of sanding when you make your cherry trivet. Once you have a little practice in, find a nice clear piece of 1/2" white oak stock with straight grain and do this regal tree justice.

Photocopy and Glue Your Pattern

Get started by planing your 1/2" stock to a smooth finish. Now photocopy the pattern on the facing page. If you have access to a copier that enlarges or reduces, you can alter the size of your trivet to your own needs. I used double sided tape to adhere

the pattern to my stock. With all the holes you'll be drilling and all the fine cutting, you want to be real sure that the pattern stays firmly in place. Some woodworkers prefer spray-on glue for this process but I don't like worrying about glue penetration.

Once the pattern is firmly in place, move to the drill press and start drilling out your entry holes, using 1/8" and 1/4" bits to drill as many holes as is practical for each waste area. For the holes at each end of the leaf veins I used a 1/16" bit.

Now move to the scroll saw and begin the slow process of inserting your blade through each entry hole and removing the excess stock. The final cuts on the inside are the leaf veins. To reduce the amount of potential chipping at this stage, cut the main vein first and then come back to cut the side veins. I recommend cutting at a slower speed to reduce burning (about 1,000 strokes per minute) and using a No. 7 blade, which worked well on the white oak. When you're faced with a curve that's a little too tight to turn around in, make a series of straight-in cuts and use the set of the teeth to smooth out the shape. This applies to all outside and inside cuts, and is a very important technique on this type of project.

Once you've removed all the waste

on the inside, go ahead and cut the outside of the pattern, and the thin lines at the top and bottom. These hold the shape of the leaves and have a minimal affect on the strength of the piece.

When all the waste stock is removed, peel off the pattern and start sanding. An awl wrapped with sandpaper works nicely for the small curved areas, and you'll probably find other variously shaped tools in your shop that can serve as sanding blocks. Try and get a little bit of a bevel on the top edges when sanding, particularly for the acorns.

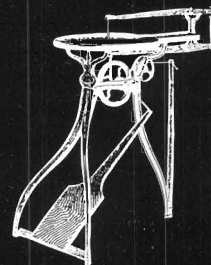
To keep your trivet 1/4" off the table top, sand down four screw hole buttons (preferably oak) and glue them in position, as shown on the next page.

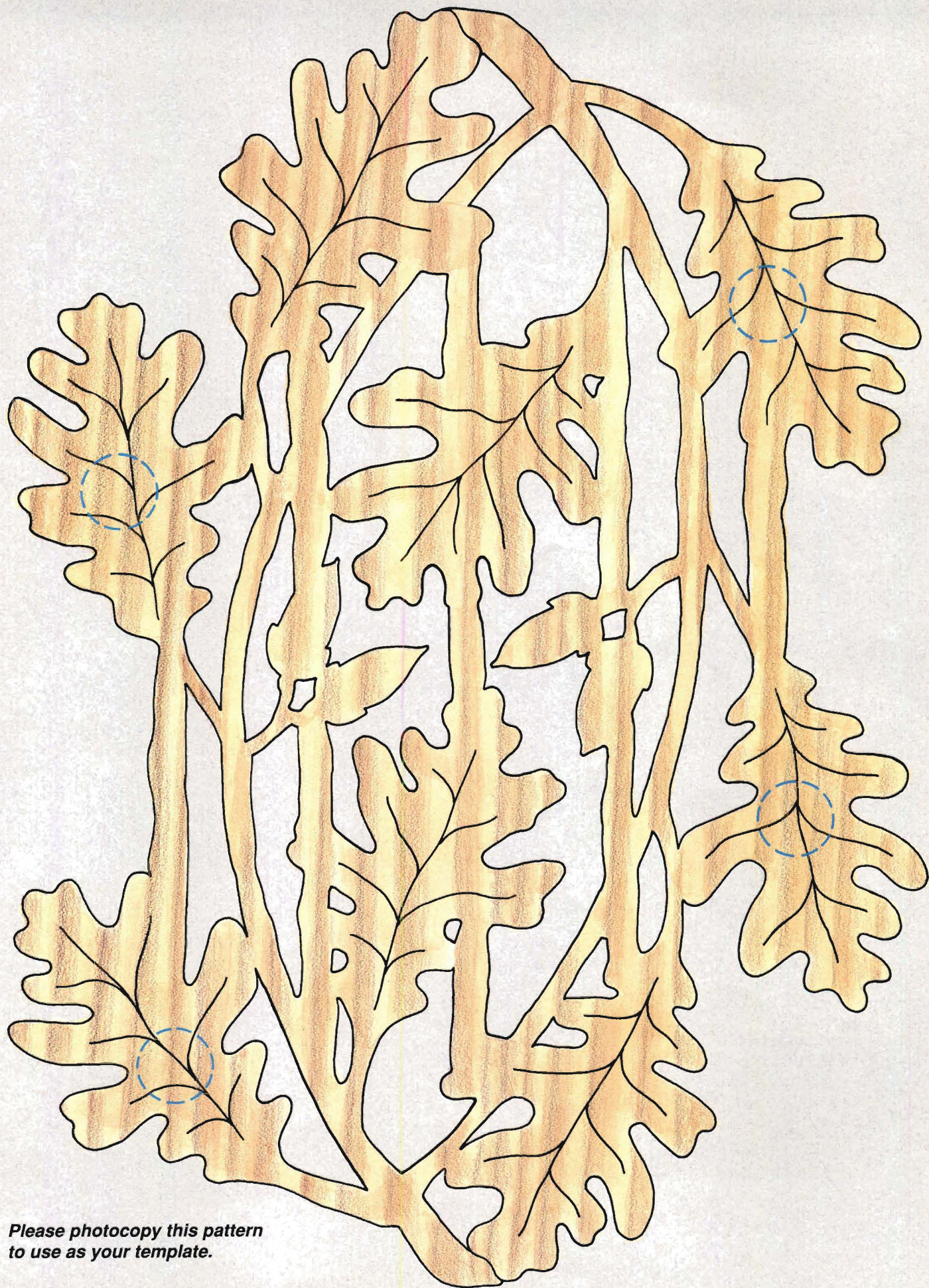
Since hot items will be placed directly on the trivet, I recommend several coats of a quality tung oil to finish this project.

Rick White, a professional woodworker, serves on the editorial advisory board of Today's Woodworker.

According to Patrick Spielman, author of the *Scroll Saw Handbook*, the scroll saw has a history dating back to the late 1500s. With modern innovations, the tool has become increasingly popular in recent years.

Originally foot powered with pedals or treadles, today's high tech machines are a far cry from the units popular at the beginning of the century.





*Please photocopy this pattern
to use as your template.*

LANDING YOUR TROPHY FISH WITH STYLE

This lesson in bent lamination techniques will yield one beautiful landing net for your next fishing trip.

By Bruce Kieffer

Bent lamination is a technique used to make very strong curved wooden shapes. The idea is a simple one. You take a wide board, cut it into narrow strips, and then glue and clamp those strips back together in a shaped mold. When the glue dries and the clamps are removed, the assembly will retain its curved shape even after removal from the mold.

We made our net's frame from ash since it's an inherently supple wood, and when cut into 1/8" thick strips it will bend to a very tight radius without breaking. If you want to laminate shapes with even tighter radii, or want to use less supple woods, you'll need to steam the strips. Steaming wood is something you may want to experiment with after you've mastered the art of bent lamination with unsteamed wood.

Amass Your Clamps and Materials

Holding the net frame in the mold requires at least fifty clamps of varying sizes. I used fifteen 6" long by 4" deep clamps, thirty 6" long by 2" deep clamps, and five 12" long by 2" deep clamps. You'll probably have to put all your woodworking friends on alert for clamping day. It's very important that you don't start laminating your pieces until you're sure you have amassed and tested all the clamps that you'll need to complete this project.

You'll need one 5/8" x 4" x 4" piece of fiberboard for the upper and base mold, and an 18" x 18" nylon replacement net with aluminum clasps joining the seam of the bag. I used a Dot Line #M-28 net bag, made by Mengo Industries Inc., which you should be

able to find at a sporting goods store.

You'll also need one 5/8" x 4" x 96" piece of straight grained ash (no knots!) for the five net frame strips (pieces 1), and a small piece of walnut for the accent strips in the handle (pieces 2).

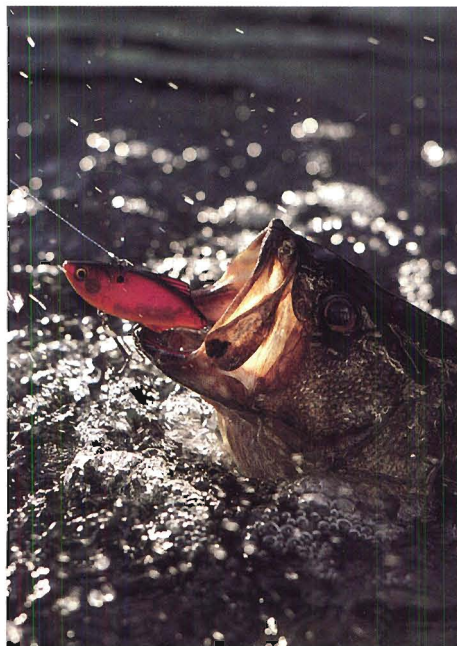
Cut the Strips and Make the Mold

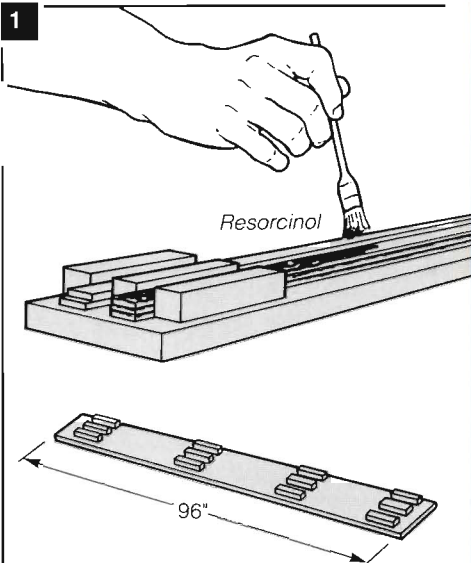
Now that you have all your material on hand, get started with the machining by planing your ash and walnut stock to 5/8" thickness and jointing one edge perfectly straight. Using a piece of scrap wood, rip a 1/8" thick test strip and cut this strip into five equal lengths. Check the combined thickness of these five pieces to make sure they're exactly 5/8". Once you're satisfied, proceed with cutting the 1/8" thick ash and walnut strips (pieces 1 and 2). Set these pieces aside for now.

Cut the fiberboard into two 4' by 2' pieces. One of these will be the mold base and the other will be the upper mold. The upper mold will be cut into six pieces, the center, two sides, two bottoms and the top.

Transfer the grid at right to one of the 5/8" pieces of fiberboard, making sure to include all the cutting lines and clamping hole locations. Now cut out the outside shape of the upper mold and drill the sixteen 1 1/4" clamping holes and the seven screw holes at the positions indicated.

Screw the upper mold to the other piece of 5/8" fiberboard and trace the shape of the upper mold onto it. Unscrew the top piece and cut out the mold base, just inside the traced line. Keeping the mold base slightly smaller than the upper mold insures





To economize on time, make yourself an 8' long two channelled jig to hold the wood strips steady as you apply the Resorcinol.

that the clamps aren't grabbing the wrong piece during final clamping.

Follow your layout lines on the upper mold to cut out the center, two sides, two bottoms and the top, making very accurate cuts. It is critical to maintain the 5/8" distance between the mold center and the top, side and bottom pieces. Sand the inside edges of all six pieces, and rescrew the mold center to the mold base.

Cut fifteen 3/4" x 3/4" x 4" pieces of scrap wood to use as clamping pads. These pads will be clamped across the upper mold to press the ash and walnut strips down to the mold base.

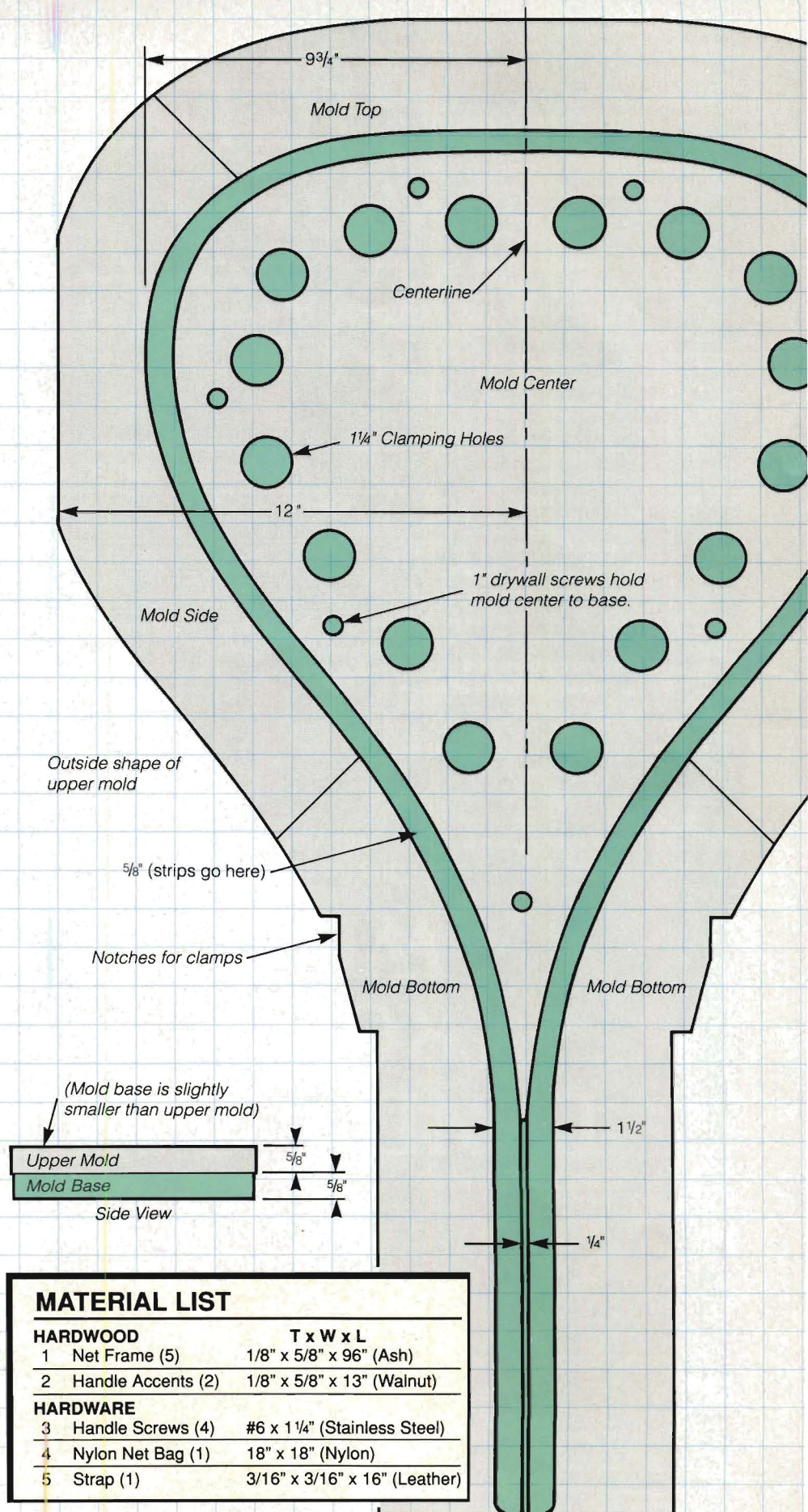
Finish up this step by applying a heavy coat of paste wax to all mold surfaces to ease the separation of the net frame after the glue has cured.

Use the Mold to Glue and Clamp

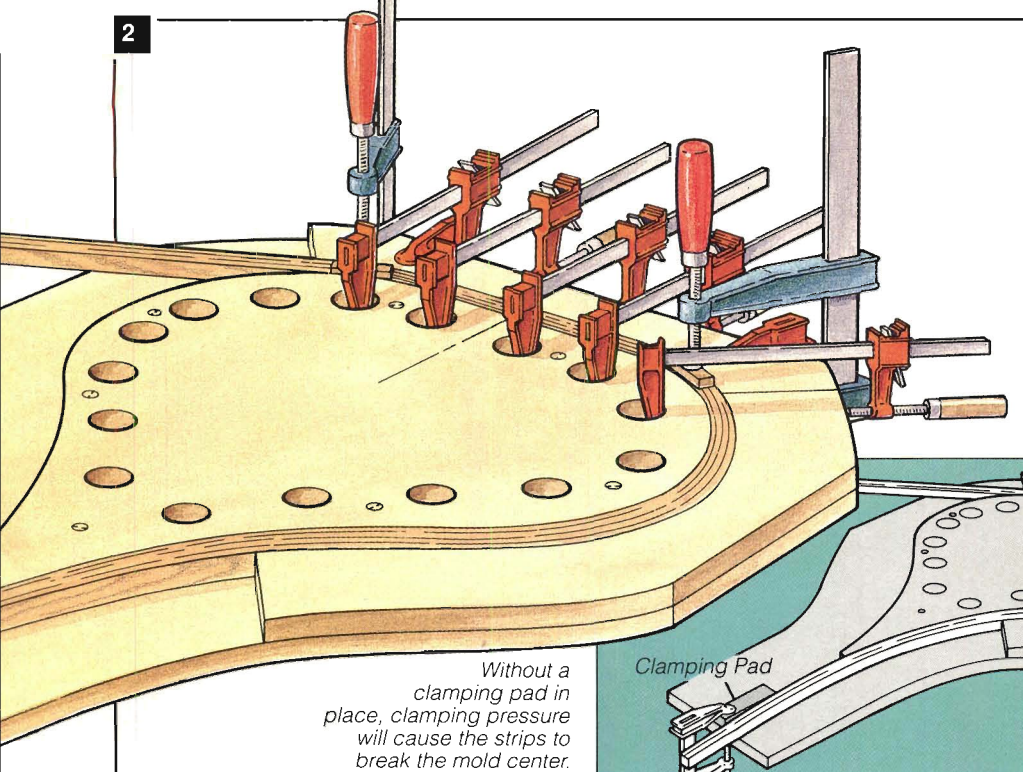
You won't have a lot of spare time once you start applying glue, so I recommend that you make an 8' long, two channelled jig to hold the wood strips steady as you apply the glue (See Figure 1).

The net frame will be exposed to water, so it's necessary to use a waterproof glue such as Resorcinol. Mix 6 ounces of glue and brush it onto the ash strips. Don't apply glue to the walnut strips or to the sides of the ash strips that will adjoin with the walnut.

Wrap a few pieces of masking tape around the five ash strips to hold them together as you bend them in the mold.



2



Start your clamping at the top, as shown above. Once the top is secured to the center, the rest of the clamping will go smoothly. Remember to temporarily clamp one of the pads to the mold base where the handle will end up to keep the strips from breaking the bottom of the center piece.

Draw a line at the halfway point of the strips to help position them across the upper part of the mold base and against the top edge of the mold center. Lightly clamp the mold top to the mold base and then clamp from the top to the center to apply pressure. It's very important to make sure that the centerlines you drew on the ash strips remain aligned with the

middle of the center mold piece at this stage. Using a few of the clamp pads you cut earlier, clamp the ash strips down to hold them tightly to the mold base.

Temporarily clamp one of the pads to the mold base where the handle will end up. This will stop the travel of the ash strips as you clamp the side mold pieces in position, and will also protect the point at the bottom of the mold center from breaking (See Figure 2). Now clamp on the mold sides, following the same sequence you did with the top.

Apply glue to one side of the walnut accents (pieces 2) and the handle area of the ash strips. Be careful to get glue only between the walnut and ash strips, and not between the two walnut pieces. Remove the temporary clamp pad and set the walnut strips in position. Clamp on the bottom mold pieces to complete the mold. After the glue has

cured for about two hours, you can remove the clamping pads, but leave the net frame clamped in the mold for at least 16 more hours as the assembly cures. When you're sure it's dry unclamp everything and carefully release the net frame from the mold.

Shape the Frame's Hoop and Handle

Scrape and sand off all the dried glue on the net frame. To keep the router level while rounding over the net, I recommend that you attach two 5/8" thick skids to the base of your router with spray adhesive (See Figure 3). Now chuck a 5/16" or 3/8" roundover bit in the router and set it to cut 5/16" deep. Clamp the net frame to your workbench to hold it steady as you round over all the edges of the hoop and the outside edges of the handle. Leave about 1" unrouted on the inside edges of the hoop where it meets the ends of the walnut accents. Be careful during this process not to let the pilot of the router bit burn or gouge the edges of the net frame.

Cut off the end of the handle so the overall length of the net frame is 36", then drill the countersinks and pilot holes for the handle screws (pieces 3). Join the handle halves with stainless steel screws, round over the handle ends and any remaining unrouted edges. Finally, drill the 3/16" hole for the leather strap (piece 4) and finish sand the net frame.

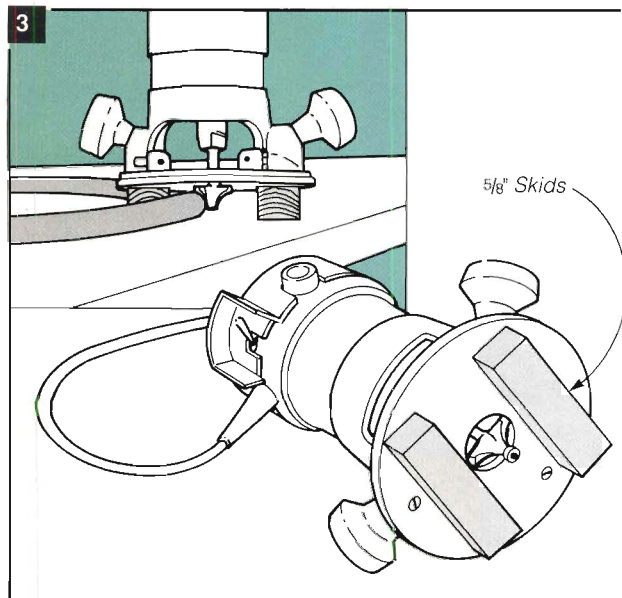
Apply the Finish and Attach the Net

When you've finished your sanding, remove the handle screws and apply an exterior finish to the net frame. I applied three coats of natural Watco Exterior Oil Finish.

Pry open the top four clasps on the net bag seam and separate the upper part of the net. Untie the top seam knot and carefully singe the frayed ends to keep them from unravelling. Starting with an open end of the net bag, slide all the loops over one side of the handle. Stretch the net bag around the hoop, retie the open knot ends and clamp the opened clasps back in place. Attach the leather strap (piece 5) so you'll have a little extra insurance that the big one won't get away. Pack up your gear, you're ready to go fishing in style.

Bruce Kieffer, a professional furniture builder, is a contributing editor with Today's Woodworker.

3



Two skids are temporarily glued to the bottom of the router base while routing the frame. With the frame clamped in position, round over all the edges of the hoop and the outside edges of the handle.

Graining In and French Patching

By Jerry TerHark

In the last issue I explained shellac burn-in techniques. We will now continue to the next step, which is coloring the burn-in. The first step involves using the burn-in knives to cut in the grain lines, removing the telltale repair spot on your furniture. Once the grain lines have been cut into the repair area you must sand lightly to evenly smooth out the surface.

The next step is french patching. I approach this process by taking a powdered stain on my finger and gently wiping over the repair area, leaving a light film of powder behind. Then I make a pad using a lint free cloth. This pad must be firm; if it is too soft it will stick to the repair area. I use a padding lacquer called Wilpro, manufactured by Star Chemical. This product is a refined lacquer that dries in a matter of seconds. I apply it to my pad, disperse the lacquer throughout and beat the repair using a very rapid pendulum-type motion. You must be careful not to stop the pad on the surface of the furniture as it will stick very easily. The amount of material you have on the pad also makes a difference. If it is too wet it will not allow the powders to stick to the surface. If it is too dry you won't get any powder to stick at all. The dampness of the pad is critical, and will require some experimentation.

When you're satisfied with the color of your patch, you can proceed to the third step, which is to draw in the grain lines. The materials needed are a fine brush, graining liquid, powdered stains and some spray lacquer. First dip your brush into the graining liquid and then pick up some powdered stain on the brush. Mix the graining liquid and powdered stain mixture into a liquid solution on a small pallet. You will have to



Step 1: Get started by using your burn-in knife to re-establish the grain lines in your repair area.



Step 2: Next, use your finger to gently wipe on the powdered stain and lightly apply the padding lacquer with a lint free cloth.



Step 3: Once the color matches, a fine brush is used to randomly draw in the fine grain lines.



Step 4: The last step is to match the sheen to the rest of the finish, using either 400 grit wet and dry compound or steel wool, depending on your piece.

experiment with your mixture to get the right match.

The main secret to drawing good grain lines is to use a soft touch to leave very fine lines. Draw your lines randomly as they would be on real wood.

When you have achieved the desired color and graining, spray on lacquer to lock it in. Remember, in case there's a reaction with the old finish, always try your new finish on some hidden part of the furniture before you try it on an exposed area.

Once the spot is blended and the grain lines drawn, you will need to adjust the sheen around the repair, which is the fourth step. On most pieces, the sheen will be a lot glossier after the proper amount of drying time. To correct this you will need 400 grit wet and dry compound. First sand the repair area to make it smooth, then use the proper materials to achieve the sheen desired. If you are matching a satin finish you will want to use steel wool and possibly wool wax to bring out the matted look. If this happens to dull the surface, follow up with a coat of carnuba wax to bring up the sheen. If you are matching a high gloss finish, use some rubbing compounds (such as pumice or rotten stone), to give the repair a higher gloss.

Furniture touch up is a thankless task, for the best jobs go completely unnoticed. So, to be happy in this work you'll have to realize that the greatest compliment is when nobody says anything at all.

Jerry TerHark, who lectures nationwide on wood finishing, studied under master finisher George Frank. Jerry is the head of Dakota County Technical College's wood finishing program in Rosemount, Minnesota.

Sharpening Basics, Part 1: (Grinding)

By Roger W. Cliffe

There is nothing quite as frustrating as working with dull tools —and nothing quite as unnecessary. Learning how to keep your cutting tools sharp is important for a number of reasons, including safety, craftsmanship and, as mentioned above, your disposition.

The basic point to remember when you're starting out with sharpening is that cutting edges generally have two cutting angles, one of these you grind, the other you hone. In this issue we'll stick with grinding. Next issue we'll discuss honing.

Some Grinding Basics

The primary cutting angle is ground with a wheel or abrasive belt. This cutting angle, usually 25 to 35 degrees, is the long angle that is most visible on the cutting edge. The ground angle provides the proper relief for the tool to enter the wood. If it was blunter, cutting would not be efficient. If the angle was steeper, there would not be enough metal at the cutting edge to support the cutting action. The cutting edge would break or bend without doing any cutting. In fact, even the 25-35° cutting angle would be too weak to work efficiently without the honed area along the front of the cutting edge.

Most chisels are sold with the primary or ground angle already cut. The buyer, however, is expected to hone and condition the cutting edge before he starts using the tool. Then, if he handles his tool carefully, grinding may not be required for some time; as the chisel gets dull, the cutting edge is simply honed again.

When the chisel is dropped, or when it hits a nail or other obstruction, the cutting angle may require grinding. This is done with an offhand grinder or with an abrasive belt machine. Grinding removes much

more metal than honing and generates much more heat, so a coolant is usually required. Water is the most common coolant, although some commercial shops prefer oil.

Grinding wheels generate quite a bit of heat during the sharpening operation. Abrasive belts, on the other hand, generate much less heat, due to their length. As the belt runs over the drums, it has a longer time to cool off than a grinding wheel does.

It's very important to remember that if the cutting edge is not kept cool during the grinding, the heat will cause the tool steel to lose its hardness, or temper. The result is a cutting tool which will not hold its edge. If you notice the cutting tool changing color during the grinding operation, it may be too late already. Remember, to prevent this, water must be used frequently and liberally.

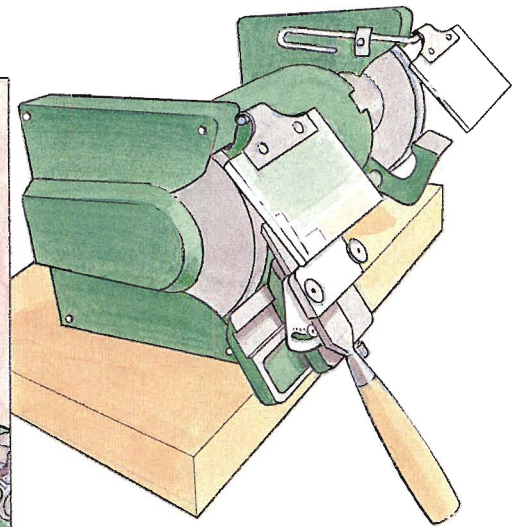
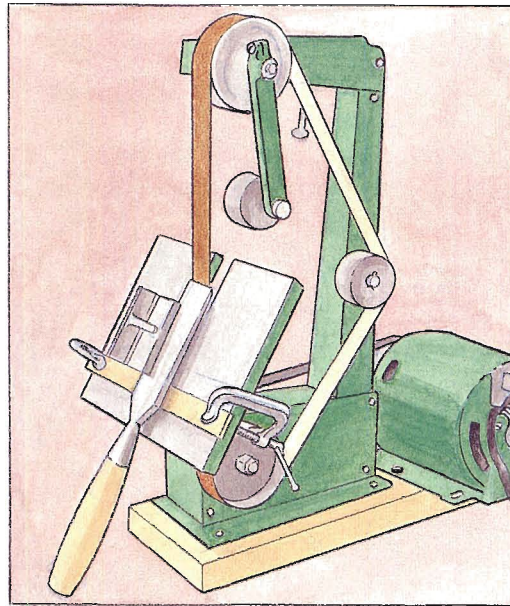
Sharpening Guides

When using an offhand grinding machine, a grinding wheel of 60 to 120 grit is commonly recommended. Some woodworkers hold the cutting tool on the tool rest while they guide it across the grinding wheel. The nar-

rower the wheel, the more difficult it is to obtain a truly straight line, and the more difficult it is to keep the cutting edge square to the edge of the tool. That is precisely why sharpening guides were developed.

The sharpening guide replaces the tool rest on the grinding machine. It features a large resting surface and may have a groove for guiding the clamping plate. The sharpening guide usually has provisions for adjusting the cutting angle and the distance from the grinding wheel, as well as a way to move the cutting edge toward the grinding wheel during the sharpening operation.

In use, the tool is clamped securely to the clamping plate so that the cutting edge can be ground square to the side of the tool. The clamping plate is then positioned on the sharpening guide with the cutting edge close to the grinding wheel. The angle of the sharpening guide is adjusted so that the cutting edge will be ground at the desired angle. Finally, the position of the cutting edge is readjusted relative to the grinding wheel, and the sharpening operation can begin. As the cutting tool is



Dull cutting tools are not only difficult to use, they can be a real safety hazard. The well equipped shop should feature either a grinding wheel (above), or an abrasive wheel (left).

moved laterally across the grinding wheel, heat begins to build up. Dip the cutting tool in water after each pass to keep it cool. If the tool gets too hot, that's an indication that you're trying to take off too much metal in a single pass.

The depth of cut is adjusted by using the elevating mechanism located on the base of the sharpening guide. Be sure to always work slowly. A heavy cut can ruin an expensive chisel or plane iron in short order.

Be sure to check the cutting angle periodically while you are sharpening the tool. You'll find that there are many angle gauges available for this process. Also check the cutting edge to be sure that it is square with the edge of the tool.

Wheel Maintenance

Even the best grinding wheel will require periodic maintenance. True the wheel as needed to keep it concentric with the arbor and clear out any particles that get embedded in the wheel. The rule of thumb is that the harder the wheel, the more likely it is to pick up particles. That's why softer wheels are generally recommended for sharpening woodworking tools. Softer wheels tend to release particles while grinding, resulting in faster, cooler sharpening.

Some woodworkers like to follow the coarse wheel with a finer grit wheel. This results in a smoother cutting edge and makes the honing process easier. While this is desirable for chisels and plane irons, it is not recommended for lathe tools. The burr and roughness on the lathe tool allows it to cut longer between sharpenings.

Water Cooled Systems

Some grinding systems allow the tool to be sharpened in a coolant bath, yielding a smoother surface and greatly reducing the chance of burning. The water cooled grinding systems usually employ a grinding wheel that is mounted horizontally, which provides a wide surface for the tool, making it easier to get a square cutting edge. The drawback with these sharpening tools is that it is very difficult to true a horizontal wheel in a water bath, so you have to be careful not to abuse the wheel. In addition, water cooled grinding is messy and can cause tools to rust. Be sure to always dry your tools immediately after sharpening.

Belt Grinding

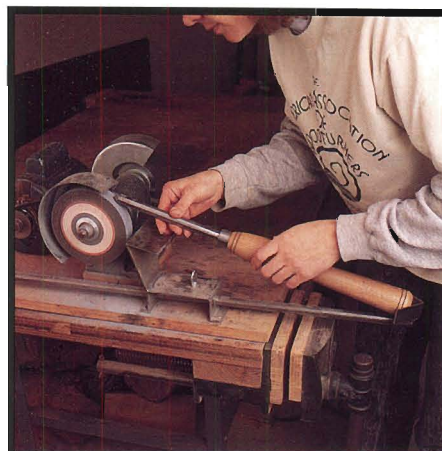
Belt grinding is another popular method for sharpening edge tools. In some cases, belt machines are actually designed for sharpening, but more often woodworkers improvise with a belt sander. Just remember that not all belts work well for sharpening. Select belts with silicon carbide or aluminum oxide abrasives and be sure that the particles are held to the belt with a resin bond. These belts do not lose their abrasives as quickly and stand up to the task much better. If you are using a standard belt sharpening system, there should be instructions for controlling the tool. This will insure that the cutting angle is correct and that the cutting edge will be square to the sides of the tool.

If you are using a belt sander, choose one with a variable speed and set it to its lowest speed. Most of these belt sanders use a 3" x 21" belt and have provisions for attaching a fence. This fence will have to be adjusted (or modified) to the desired angle setting before you can sharpen tools. Check any setting to be sure that it will hold securely during the sharpening process. If you are using a belt sharpening system, you will probably have to use a coolant periodically to keep the tool cool. Some woodworkers dip the tool in water, while others use a pump sprayer. If you are using a variable speed belt sander, you will probably not need to cool the tool as the belt is running so slowly that it doesn't heat up the tool during the grinding process.

Hand pressure should be light when using an abrasive wheel or belt sander to reduce the chance of losing the abrasive particles. As with a grinding wheel, you can progress to finer abrasives as the edge is formed, but be aware that the finer the abrasive, the more likely it is that heat will build up.

Whether you are using an abrasive belt grinder or a wheeled grinding machine, it is important to keep the tool rest or tool guide close to the belt or wheel. This gives the tool more support and reduces the chance of the abrasive belt or wheel pulling the tool out of your hands.

Dr. Roger Cliffe is the author of "Table Saw Techniques" and "Radial Arm Saw Techniques", published by Sterling Publishing Co. of New York, New York.



Ten Steps To Safe Sharpening

1) Be sure to wear protective equipment while sharpening any tool. Wear protective glasses and a dust mask. If the operation is noisy, wear hearing protection.

2) Guide the tool into the abrasive slowly and deliberately. Forcing the tool can cause damage to the abrasive or the tool.

3) Keep the tool moving while it is being sharpened. This reduces the heat build-up and spreads the wear evenly across the face of the abrasive.

4) Proceed through the sharpening operation in stages. Avoid using a very fine abrasive when the cutting edge is severely damaged. Sharpen in the same way that you sand wood, going from coarse to fine abrasive in a series of steps.

5) Keep the tool rest close to the abrasive. This will support the sharpening operation and provide you with the necessary leverage.

6) Keep your hands clear of the abrasive—they will remove skin as fast as any cutting edge. Concentrate on what you are doing and keep your eyes on the operation.

7) Remember that even a dull cutting tool can cut you. Always handle cutting tools carefully.

8) If you are using some type of tool guide, be sure that the tool is clamped securely in position before you begin.

9) If you are using a tool guide, be certain that the cutting edge is positioned to clear the abrasive before beginning the sharpening process.

10) Keep the sharpening area clean. If you are using a coolant, keep the floor and sharpening tools clean and dry.

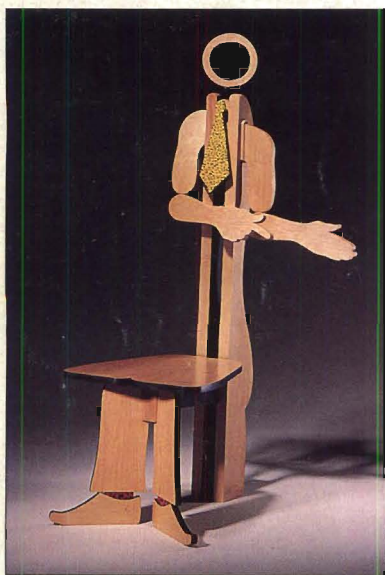
Oregon School of Arts and Crafts

The Oregon School of Arts and Crafts, (8245 SW Barnes Road, Portland, OR 97225), recently announced that it has received accreditation from the National Association of Colleges of Art and Design, making it the only independent, accredited crafts school in America.

The school's woodworking department is characterized by its emphasis on design, as the pieces on this page so readily attest. Stephen Grove, department head, has been designing

and making one-of-a-kind and limited production furniture since 1975. Steven Foley, a woodworking faculty member, has worked for sixteen years developing an original line of furniture, which is now marketed nationwide. He is the recipient of an Oregon Arts Commission Fellowship and the Governor's "Award of Excellence."

Randy Dollar and Barry Steel, whose works are also shown on this page, have both been students in the woodworking department.



"Elsewhere"; Maple, Dyes, Italian Laminate
By Stephen Grove.
(photo by David Browne)



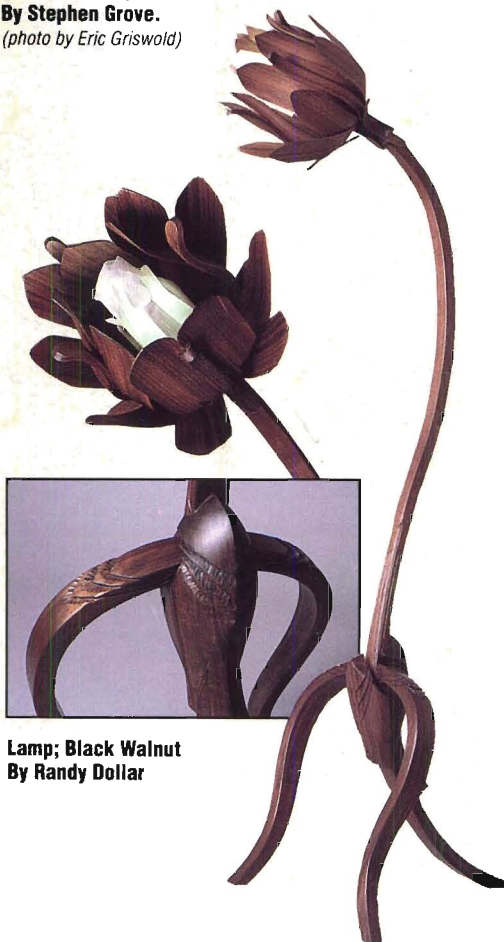
Bench for Two; Black Walnut
By Stephen Grove.
(photo by Eric Griswold)



Swing; Black Walnut
Bentwood Chair; Oregon White Oak
By Steven Foley



Chair; Laminated Cherry
By Barry Steel



Lamp; Black Walnut
By Randy Dollar

SUPPLIERS:

The mail order suppliers listed below carry the wood and hardware needed to build the projects in this issue of Today's Woodworker magazine.

Garrett Wade
Dept. TW
161 Ave. of the Americas
New York, NY 10013

Constantines
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2050 Eastchester Rd.
Bronx, NY 10461

The Woodworkers' Store
Dept. TW
21801 Industrial Blvd.
Rogers, MN 55374

Trendlines
Dept. TW,
375 Beacham St.
Chelsea, MA 02150

NEXT ISSUE:

The September/October issue of Today's Woodworker will feature a Barrister's Bookshelf and a number of simple projects that you can get started on for the holiday season.