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Your winged friends will feast at your place all winter with this two-tier feeder.

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Display your prized needlework in style.

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Safety Note

Safety is your responsibility. Manufacturers place safety devices on their equipment for a reason. In many photos you see in *Popular Woodworking*, these have been removed to provide clarity. In some cases we'll use an awkward body position so you can better see what's being demonstrated. Don't copy us. Think about each procedure you're going to perform beforehand. Think ahead. **Safety First!**

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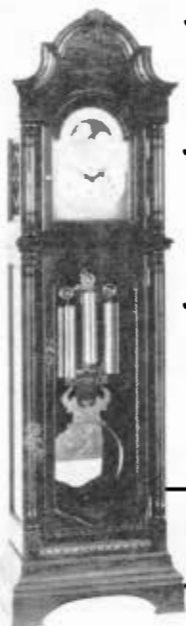
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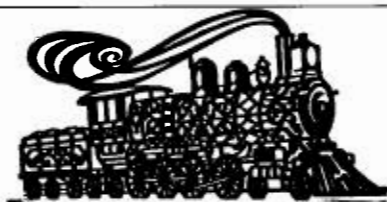


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TURNINGS

Now, it's your turn.

Most woodworkers I've met say they first started working wood with their dads. Later, they got their hands on more serious equipment in shop classes. From these modest beginnings, working with wood became a life-long pursuit for some, while others returned to the shop later in life, remembering their enjoyment of the hobby as a youth.

This common thread that has linked many of us to our hobby has been broken in modern times. It should come as no surprise that shop classes across America are nearing extinction, and the growing number of single parent families make it hard to find time in the shop with a child. My concern is how the next generation will learn about the pleasure of woodworking. How will they be introduced to the satisfaction of a finished project, the fragrant smells of freshly cut wood, the hours spent in the shop as a retreat from the routine of busy, everyday lives?

The plain truth is, it's up to us to pass on our skills and enjoyment of woodworking. I suppose there are many ways to rub the sawdust off on them. One good way is to work together on a project of interest to *them* that's appropriate for their age and skill level. A project that fits their level of patience. A project in which they can really participate. Your guidance, both in sharing skills and shop safety, may be the beginning of many happy hours in the shop for them. Remember, somebody helped you. Now isn't it your turn?

Stephen Sharkey



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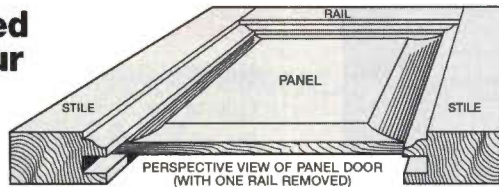


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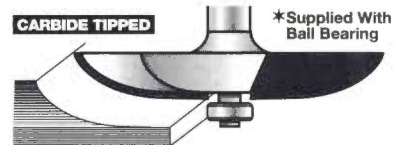
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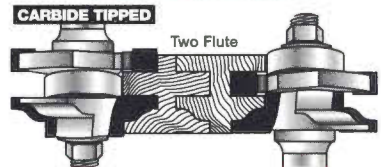


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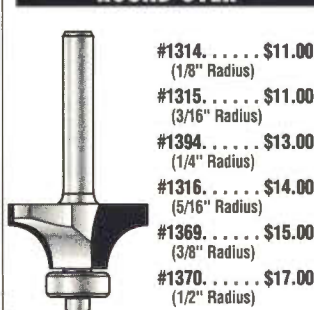
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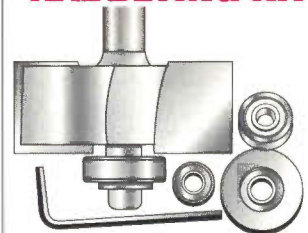
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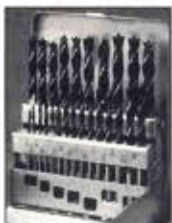
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TRICKS OF THE TRADE

BEST TIP

No-Slip Grip

One of the irritating, expensive and dangerous problems when making angled miter cuts using a miter gauge is the way the board creeps toward the blade. Clamping devices can be purchased that attach to the miter gauge, but these can be both expensive and time consuming. I use an alternative that is both effective and inexpensive. Attach a 2"-high board within 1/2" of the blade (set at 90 degrees) to the front of the miter gauge. Purchase the cheapest, smallest 80 to 100 grit belt sander belt. Then, using a good adhesive, cover the face of the miter board with sandpaper. This works very well and provides quick and positive control of the lumber to be cut.



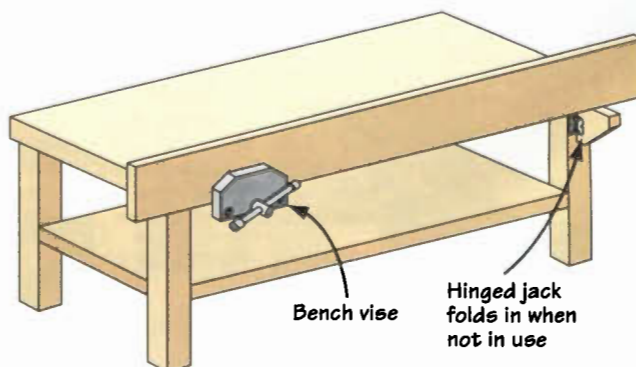
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*Kevin Hemmingsen
Wabasha, Minnesota*



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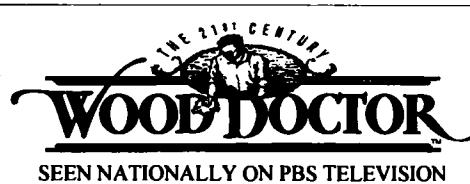
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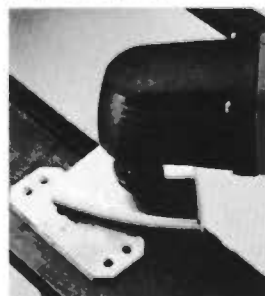
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TRICKS OF THE TRADE



Budget Bar Clamps

I drool at all the beautiful clamps that are now available. However, I can't afford them, so I use 1 x 2 pressure treated furring strips to make my own. The edges can be square or rounded at your preference. Cut the furring strips to a suitable length for general use, or to size for a particular project. Add support blocks with 1 5/8" drywall screws. Be sure to pilot drill holes to avoid splitting. The taper blocks must not exceed 6 degrees (smaller is better) or they will not stay in place. A strip of sandpaper on one face will improve the clamp's grip.

Michael Palma
Largo, Florida

Super-Duper Glue!

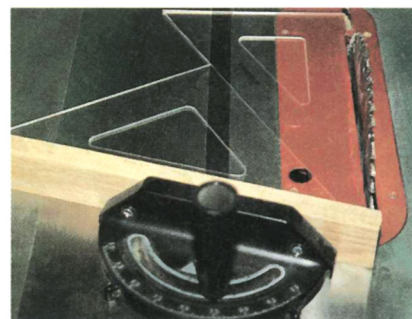
Cyanoacrylate adhesive is one of the greatest adhesives to come along in a great while, but its use on wood can be a little tricky. If you have trouble getting that immediate stick that you expect from the adhesive, try priming both surfaces to be bonded with the least viscous variety and let it dry for about ten minutes. Then apply a second coat and bring the surfaces together. You'll find the bonding occurs in seconds.

Michael Burton
Glorieta, New Mexico

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To set up the miter gauge on your table saw to exactly 15, 30, 45 and 60 degrees, first purchase two drafting triangles, one 12", 45/90 degrees, and one 14", 30/60 degrees. They're available at most large office supply stores. With one edge of the triangle against the miter gauge, and the other edge lined up along the miter gauge groove (parallel to the saw blade, of course), you can use these to double check and fine tune the desired angle. To get the 15 degrees setting, you need to use both triangles side by side at the same time. These triangles are also handy for checking blade tilt angles, including 90 degrees.

Joseph G. Zweck
Madison, Wisconsin



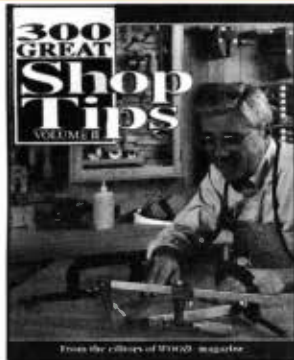
Tricks of the Trade shares readers' ideas for making woodworking tasks easier and safer. Send your original, unpublished ideas to Tricks of the Trade, *Popular Woodworking*, 1507 Dana Ave., Cincinnati, OH 45207. If needed, please illustrate with a color photo or diagram. The best submission will win a Black & Decker Versa Pak™ System, while the runners-up will receive \$35 for each trick we publish. PW

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	12"x80Tx1-1/8"K	\$212	\$181

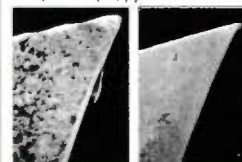
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Our forum for readers to respond to their magazine and share ideas with others.

Walnut 4-Hour Flower Press

When I received my subscription copy of the May 1996 (#90) edition, I was attracted to the picture of David Thiel's "4-Hour Flower Press." I immediately began to picture how one would look made out of the walnut that I had stored for a special project. As a result, I built one for my wife, as you can see in the photo.

It was a great project, and a most suitable gift for that special day. Mine was slightly different in several areas: (1) The dimensions were slightly altered to accommodate the walnut that I had on hand. (2) The press plate was made to be non-removable unless the press was disassembled. (3) I added brass jewelry box feet as a final touch.

*Jim Raevis
Cincinnati, OH*



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Readers Respond to Lining a Jewelry Armoire

Editor's Note: In issue #91, a reader requested a source for sticky back felt to line a jewelry armoire. I suggested using silvercloth to protect the jewelry. Now here are our readers' responses:

In the July '96 issue, a question was asked about finding felt with a sticky back for lining boxes. While you can use glue as suggested, it can be messy and uneven. Why not go to a shop that repairs lamps and purchase the sticky backed felt? It comes in rolls about 12"-wide. It is a peel and stick backing that can be applied like contact paper.

Ardis Riley
Antelope, CA

I liked your suggestion to Mr. May to use silvercloth in his jewelry armoire. It can be purchased by the yard in two forms (regular 58"-wide or adhesive-backed) from Nancy's Notions, 333 Beichl Ave., P.O. Box 683, Beavers Dam, WI 53916; (800) 833-0690. Prices are \$8.50 a yard for regular and \$12.75 a yard for adhesive back in brown or green.

Mrs. Larry Costello
Two Harbors, MN

On The Road Again

I'd like to make a suggestion to Harlan P. Connell, the truck driver who asked in the July 1996 issue (#91) about woodworking on the road. If he wants to carve on the road, he should try chip carving. All of my chip carving supplies fit into a briefcase, including drawing tools, knives and books. And many chip carving projects require minimal actual woodworking, such as plaques, butterboards and Christmas ornaments. Pre-turned plates are also readily available. Mr. Connell could do his woodworking between trips, and his carving on the road. Also, chip carving is a lot less messy than power carving.

Mark Stryker, Jersey Shore, PA

Correction

In the Garden Cart printed in the July, issue (#91), there are a couple of corrections which will prove important to construction. They are as follows.

- Part C should be 33 $\frac{1}{2}$ ".
- The four 1 $\frac{1}{2}$ " x 2" x 14 $\frac{1}{2}$ " baltic birch strips (mentioned in the last paragraph of the left column on page 50) were inadvertently left off the Schedule of Materials.

- In the diagram, N is misidentified, and is actually the top moulding on the door end of the cart. P is the bottom moulding/support and is misidentified as O in the copy. As to O... we haven't a clue where that piece came from. Sorry for the mistakes.

We welcome your comments and questions, pro or con, about the magazine or anything related to woodworking. We'd also like to see color pictures of what you're building. Send your input to: Infeed/Outfeed, Popular Woodworking, 1507 Dana Ave., Cincinnati, OH 45207. Or send e-mail to us at Wudworker@aol.com. Letters may be edited for publication. PW

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The Revival of Intarsia



Intarsia, which involves fitting together pieces of wood, marble or shell into a mosaic or inlaid design, was created by Old World artists such as Raphael. Today, Judy Gale Roberts is reviving the art form in the "New World."

INTARSIA, one of the finest art forms during Europe's Renaissance, is regaining popularity today. Much credit is due to the talent and teachings of Judy Gale Roberts. For the past 20 years, Judy has been reviving interest with her award-winning intarsia pieces and by instructing others.

"She's probably one of the best in the country," says Ed Gallenstein, president of the National Woodcarvers' Association.

Judy never imagined intarsia would take her this far. In fact, when she finished high school (where girls weren't allowed to take woodshop)

and began helping her father create "wood murals" for Houston's businesses, they had no idea they had rediscovered the art of intarsia.

Later, Judy and her husband, Jerry Booher, moved to Florida. Judy showed him how she and her father had created the "wood murals." Jerry, who has

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a machinist and woodworking background, brought craftsmanship to the works of art, which they sold at Florida craft shows.

"When I saw it, it was a gemstone in the rough," Jerry says. "Working with Judy, we refined it."

He taught Judy how to match the grains and colors, fit the pieces together, and apply a good finish. "We make a good team," Judy says. She creates the design, Jerry cuts the pieces out, Judy shapes them, then Jerry finishes them.

About 12 years ago, Jerry wanted to find out more about their craft, so he sent a letter and photographs to the National Woodcarvers' Association. He received a reply that they were recreating some of the finest intarsia the association had ever seen.

Despite the praise, at first Judy was disappointed that the "wood murals" weren't her family's discovery. "It seemed that it took something away from it," she says. "Then I realized that it really made it more official because we had a name, and people were intrigued by the name."

As the couple continued to sell their intarsia at Florida craft shows, tourists returned to their home states and spread the word. Orders came pouring in, and so did publicity. Then people interested in learning intarsia began to contact Judy, asking for instruction.

"We thought the best way to show how to make (intarsia) is to give people a pattern and then let them make one," Judy says. "It's really a hard thing to teach."

So Judy and Jerry switched their business, Roberts Studio, from making intarsia to selling patterns. Judy creates the designs and makes samples, while Jerry manages the business.

In addition to the patterns, the couple has co-written two intarsia books, *Easy to Make Wood Inlay* and *Small Intarsia: Woodworking Projects You Can Make*. To continue expanding their instruction, Judy and Jerry are relocating from Lufkin, Texas, to Gatlinburg, Tennessee, this winter. In their new 7,000 square foot facility, they'll offer seminars and classes on intarsia.

"(Gatlinburg) is a tourist oriented

and craft oriented area...people will be coming down on vacation and they'll be able to stop by and look at the finished projects," Jerry says. "We found in the past that once people look at Judy's work, that gives them a better idea of how to do their own intarsia."

Judy says learning the fundamentals of intarsia is easy. "It's basically just being able to follow a line," she says. And the only equipment that's necessary is a scroll saw or band saw and a belt sander or disc sander.

In her opinion, intarsia is a good craft for women to learn. "Women tend to spend more time and pay more attention to the grains and the smaller details on the pieces," she says. "I've seen husbands and wives come in (the studio) and the husband starts doing it, and the next thing you know, the wife's out there helping him...and starting to take over."

Eventually Judy wants to return to creating her own intarsia. "The patterns we sell are made so it's easy for other people to make. I always feel like I'm working with one hand behind my back because I'd like to get real sculptural and use real thick wood and more dimension," she says. "My goal is to have the pattern business support itself so I can go back and create whatever I want as long as I want and not worry about time and everything else."

Creating a sculpture from wood is Judy's favorite aspect of intarsia. "I used to do a lot of sculptures with clay," she says. "There's no grain and nothing really there other than the sculpture. But with wood, not only do you get to carve it and shape it, but you also get to watch the wood come to life." **PW**

Editor's Note: If you'd like more information on intarsia, call Roberts Studio at 800/316-9010.



If you have a woodworking question or concern, would like to share project ideas, or are seeking advice on anything from woodworking tools and techniques to finishing, I'd love to hear from you! Write to Dovetales,

Popular Woodworking, 1507 Dana Ave., Cincinnati, OH 45207 or send e-mail to Wudworker@aol.com. — Cristine

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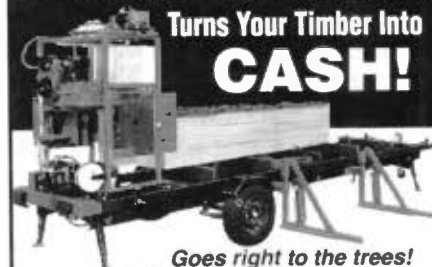
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Make Perfect Miters

An inexpensive sanding disc turns your table saw into a precision miter machine.

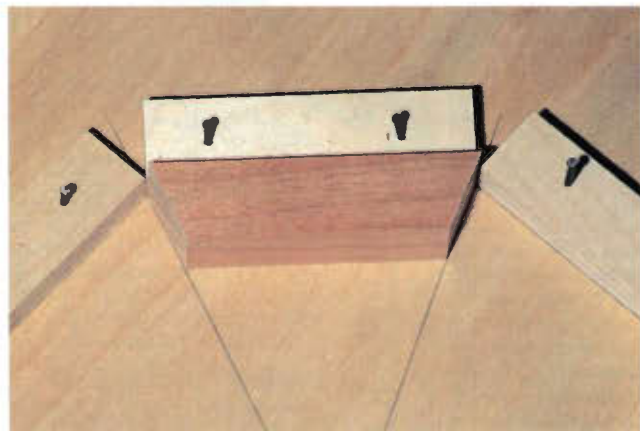
By Sal Maccarone

IFIRMLY BELIEVE in getting the most out of my equipment. It saves money and solves technical problems.

One accessory that extends the table saw's usefulness is the sanding disc. It's simply a plate which fits on your saw arbor in place of the blade. Any sandpaper grit can be glued to it for the sanding operation needed, turning it into a disc sander.

Through the years, I've had to produce frames that weren't square or rectangular, such as parallelograms, triangles, etc. These miters can be cut using many types of saws, but they all cannot correct within a hundredth of an inch. My method makes it easy to produce perfect miters of any angle. I'll demonstrate using an octagon, but remember, this process also makes a perfect 45-degree angle.

Start by making a full-size drawing, which has all the lines that will occur on the frame. Use a $\frac{3}{4}$ " piece of plywood that's larger than the frame size for the drawing. Include the lines bisecting the angles at each corner. Blocks which are slightly less in thickness and about 1"-wide can then be glued and nailed along the shape's outside perimeter (**photo 1**).



1 Framing blocks are attached to the plywood, placed precisely on the drawing's outside line or the finished frame's outside edge.

After the layout board is complete, make the moulding stock. Crosscut the pieces a few inches longer than the finished mitered length. Also make a sample piece to check angles before cutting the actual stock. By laying a short piece of sample stock in position on the board, the bisected angles can be drawn. Now the actual pieces can be rough cut, leaving them about $\frac{1}{8}$ " longer than needed.

Now apply a coarse paper (36 or 40 grit) to the table saw sanding disc. The sanding process doesn't create any tear-out at the bottom of the cut, as is typical with a saw. Use the disc with the slot miter gauge, which allows the work to move past the plate while the miter is sanded. This keeps the stock from burning.

After adjusting the miter gauge, sand the sample stock (**photo 2**) and check it on the drawing board.

After sanding all the pieces to length, assemble the frame on the board and against the blocks. The board now helps glue and clamp the

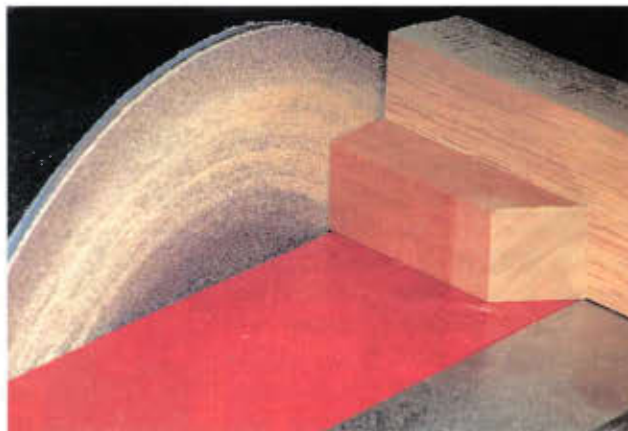


Safety Tip:

Always keep the edge being sanded on the downward travel half of the sanding disc or the piece can be tossed into the air. Wear safety glasses! And while it's safer than a saw blade, that sanding disc is spinning at 4,000 rpm, while a dedicated sanding machine will only spin about 2,500 rpm. Keep the fingers safe!

frame. If all angles fit perfect, clamps won't be necessary. If not, place bar clamps to close the miters. On this and other shapes, a band clamp may be used. To reinforce the joint, it's best to first glue, then once dry, nail, screw or reinforce it together. **PW**

Sal Maccarone is a cabinetmaker, wood sculptor, designer/craftsman and artist from Port Townsend, WA.



2 The fence on the miter gauge must be close enough to the disc to provide solid support while sanding. Moving the gauge back and forth will avoid burning the edge.

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Ponderosa Pine

(*Pinus ponderosa*)

Other common names: Western yellow pine, California white pine, British Columbia soft pine, bird's eye pine, knotty pine

Growing regions: Western Canada and the Western United States

Characteristics of tree: A medium to large tree which can reach 230 feet in height. It has a straight trunk that typically measures about 2 feet, 6 inches in diameter.

Characteristics of wood: The wood exhibits a wide, pale yellow sapwood, with a darker heartwood varying from deep yellow to reddish brown. It can be knotty, with resin ducts that show as fine dark lines on the surface of the wood.

Workability: Works well with hand and machine tools. Knots can be difficult, particularly when planing. Ponderosa pine glues well.

Common uses: Suited for pattern making, kitchen furni-



ture and doors, turnery and carving, building construction, window frames, interior trim, boxes and packing cases, and general carpentry. When treated, ponderosa pine can be used for poles and posts. Selected logs are suitable for veneer.

Availability: Sold at most lumberyards & home centers.

Wood movement: Ponderosa pine is fairly flexible and offers marginal structural strength. It provides medium bending features, but the fibers are soft and crush easily. Medium movement occurs in construction.

Finishing characteristics: It takes paint and varnish satisfactorily, but resinous wood should be treated with sealer.

Special features: This wood furnishes more timber than any other single species of American pine. It is second in terms of total annual production of lumber. **PW**



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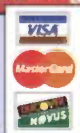
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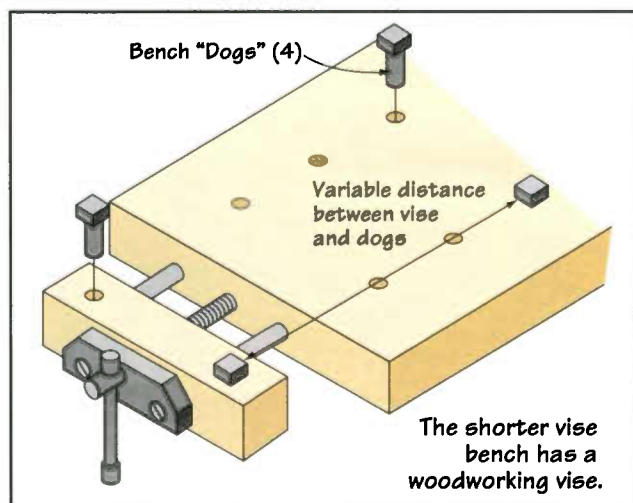
New Concept Workbench



This pre-built bench-in-a-box fills lots of shop roles.

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In a complete setup, the new "ShopBench-1" consists of a major workbench, complemented by an attached, height adjustable "power tool shelf." This shelf can accommodate any benchtop tool that doesn't weigh more than 100 pounds. Another component is a workbench in itself, equipped with a woodworker's vise that offers a four-way clamping system, a storage drawer, and shelf.



Specifications

	Width	Length	Height	Comments	Price-product number
Main bench	20"	60"	36"	Provides for user option shelf	All three units (#65505)
Extension	20"	20"	Variable	Has removable drop-in platform	are available for \$299
Pull-out bench	17"	40"	33"	Includes 11½" woodworker's vise, shelf, reversible drawer	Without the pull-out bench, (#65506) the set costs \$199

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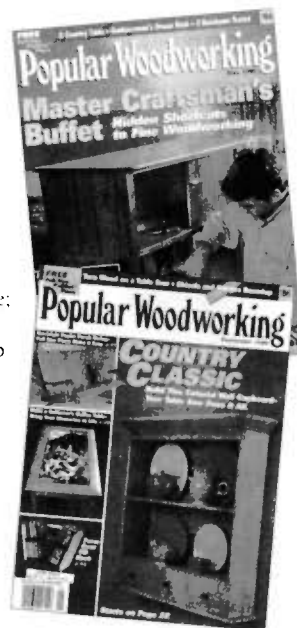
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July '95	Mission style coffee table; mortising jigs for your router; french provincial corner cupboard; kids' chairs and table set; fundamentals of spindle turning; kit furniture review.	May '94	Turned spice canister; cedar blanket chest; tambour wall desk; woodworker's V-block; contemporary desk; nail storage cabinet; nautical flower box.
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September '82	Carved nut bowl and cracker; knock down couch; oak burl jewelry box; shop caddy; peter putter; old mill wheel; roll top desk II; desktop dolphin.	November '88	Panel doors; silver chest; corner pewter hutch; country sconce; Massachusetts lowboy.
May '82	Lumber storage rack; spiral turning; belt buckles; carved corner cabinet; outdoor furniture; jointer push blocks; wooden jack plane; glass wall sconce.	January '88	Preparing stock by hand; bentwood boxes; heather's desk; medieval bookbinding; inlaid dice; build a box of dominoes; box joints on the table saw.
July '81	Chippendale mirror; biscuit-joined table; gardening stool; laminated picture frames; miter jig; Swiss-style chip carving; trastero; turn a teacup.	November '87	Antique wall cupboard; relief carving; wooden buttons; couch and chairs; handscrew clamps.
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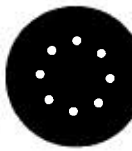
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TOOL TALK

One of the power tool shelf's advantages is that a table saw, for example, can be positioned flush with the benchtop so the workbench serves as five feet of outfeed support when ripping, even crosscutting, long stock. The top component of the extension is a removable platform that seats inside a sturdy frame. Thus, by providing extra platforms, a woodworker can mount a number of power tools for quick, drop-in, interchangeability.

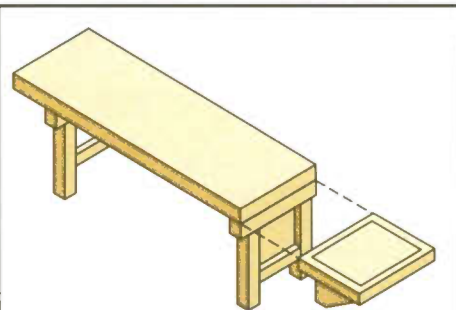
As designed, the power tool shelf workstation has three elevations. If one of these settings doesn't provide for a particular application, the worker can drill additional holes for the lock bolts that secure the shelf. A template is provided for just that purpose.

Assembly

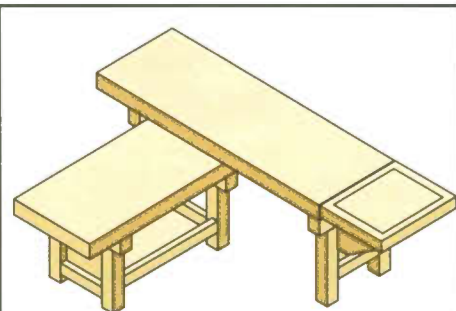
Most of the components lock together with a "TiteJoint" type fastener, shown in the **diagram** on page 24. Drop the barrel nut in a hole in one part, then thread in the bolt that passes through the mating piece. Happily, all holes were precise enough to avoid problems. Wood screws are used for some joinings and, here too, pilot holes are where they should be.

I encountered one glitch when mounting the adjustable platform. The support brackets have splines that ride in grooves formed in the bench legs. The joints were a bit too tight to allow easy up-and-down movement, but some judicious attention with fine sandpaper wrapped around a slim piece of wood set things right. That, plus several applications of paste wax, a chore that's probably wise to repeat occasionally anyway.

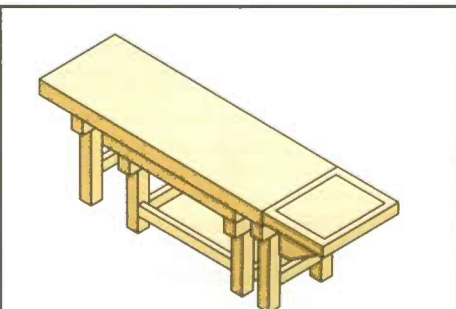
In any event, plan on one-and-a-half to two hours of assembly time. You may find the nomenclature a little strange, but if you study the parts and hardware illustrations provided, you'll be able to "translate."



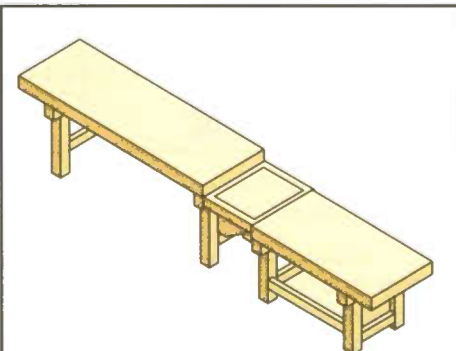
The height adjustable power tool shelf makes the main bench a long outfeed table.



An "L"-shaped arrangement provides lots of worktop space.



The shorter bench can nest under the larger one to save space.



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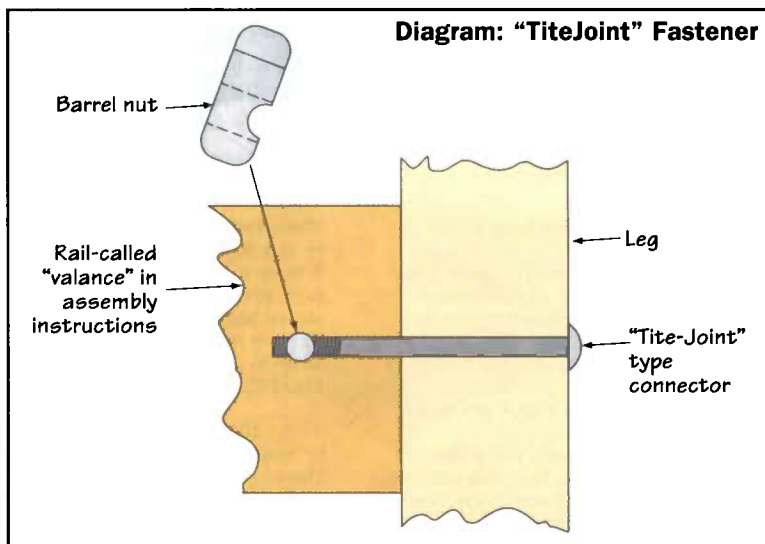
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It seems to me that the vise bench is a very important component, so it would be nice if it was offered on its own to woodworkers with limited shop space.

In either version, the ShopBench system provides useful space for the home shop at an affordable price. **PW**

R. J. DeCristoforo, a member of Popular Woodworking's editorial advisory board, has written more than 30 how-to books, including Jigs, Fixtures and Shop Accessories.



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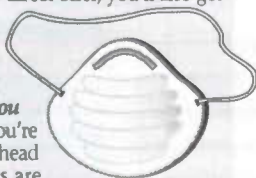
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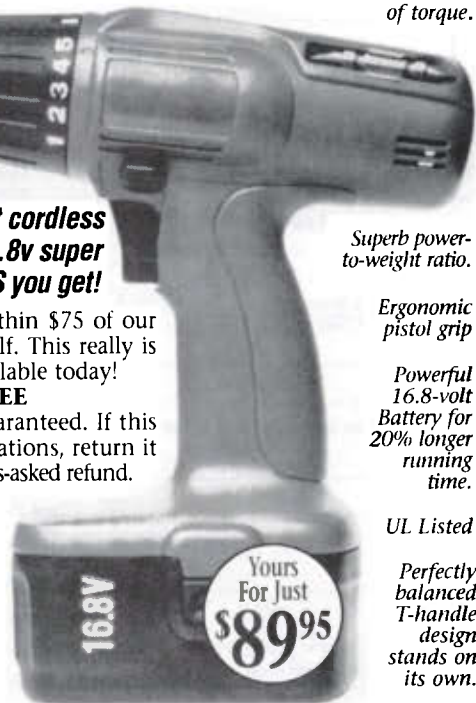
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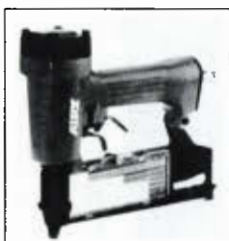
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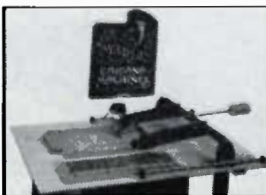
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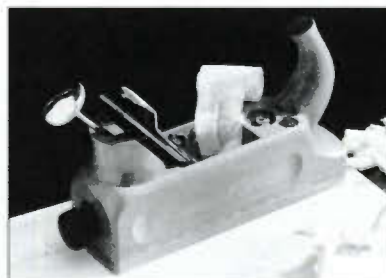


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ASK THE EXPERTS

Why Ironing Veneer Works

We've had the opportunity to show a few of our readers the process of applying veneer using aliphatic resin (carpenter's glue) during a shop visit from Franklin International, makers of Titebond® wood glue. Our readers liked the idea, but being a curious lot, they wanted to know *why* it works. Here's the answer — and if you'd like to try the technique, see the veneered display stand on the next page. — The Editors

Most wood glues are considered thermoplastic. This means they will soften or weaken as they increase in temperature, and harden and regain their strength as they cool back down.

Different types of wood glues respond differently to changes in temperature. Aliphatic resin glue, that is, ordinary yellow wood glue, has good heat resistance. Yet it can still be softened sufficiently with a normal household iron to allow it to bond veneer to a substrate without damaging the veneer.

The heating and cooling process is almost completely reversible so that most glues can be heated and cooled repeatedly with no apparent change. This characteristic allows removal and replacement of veneers (if necessary) without damaging the project or loss of adhesion strength.

It's important to know that even with the improved heat resistance available in aliphatic resin glues, the heat of the iron can scorch the wood if the iron is not kept moving continuously. A benefit to this process is that the iron's weight assures good contact is maintained as the glue forms the bond. Thus a veneer burnisher isn't required. After the glue has cooled somewhat, lightly tapping or dragging your fingers across the bonded surface will reveal any loose areas. These can be reheated and reglued until the surface is completely bonded.

Veneer can also be ironed into place while the glue is still wet, though a couple of factors keep it from being the best bond. If you don't apply uniform heat to all areas of the veneer, the moisture evaporation can differ from section to section, causing irregularities. Also, as the wet glue is applied to the wood, it can affect the substrate and veneer, causing some movement or swelling. In using the pre-dried veneering process, all moisture movement has occurred earlier during the drying process. The bonding process isn't caused by evaporation. This makes the bond with dry glue more foolproof.

The dry glue veneering process can also be performed with white or hide glues. But because of differences in heat resistance and drying times, the best bond still comes from yellow or aliphatic glues. **PW**

Dale E. Zimmerman is the technical service representative for construction adhesives and sealants for Franklin International, makers of Titebond® wood glues. He has been working with wood adhesives for more than 20 years.

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November 1996 27

Iron-On Veneer

This display stand will teach you how to apply veneer easily with a household iron — and top it off with an acrylic case.

By Jim Stacey

IF YOU LOVE beautiful wood, and I mean movie star beautiful, then you've no doubt fallen in love with more than one piece of furniture that's skinned with veneer. Now you can start making projects using beautiful veneers — applying it is about as easy as ironing a shirt.

Today, working with veneer is a breeze for two reasons. One is the advent of paper-backed veneers, already matched and assembled in large sheets. The other is the “discovery” of adhering it using a household iron and yellow woodworking glue *after the adhesive has dried*.

This display stand project walks you through the easy steps of working with veneers using this wonderfully simple process. Once you learn the technique, only your imagination will limit your use of burls, crotches and other gorgeous figured woods.

Getting Started

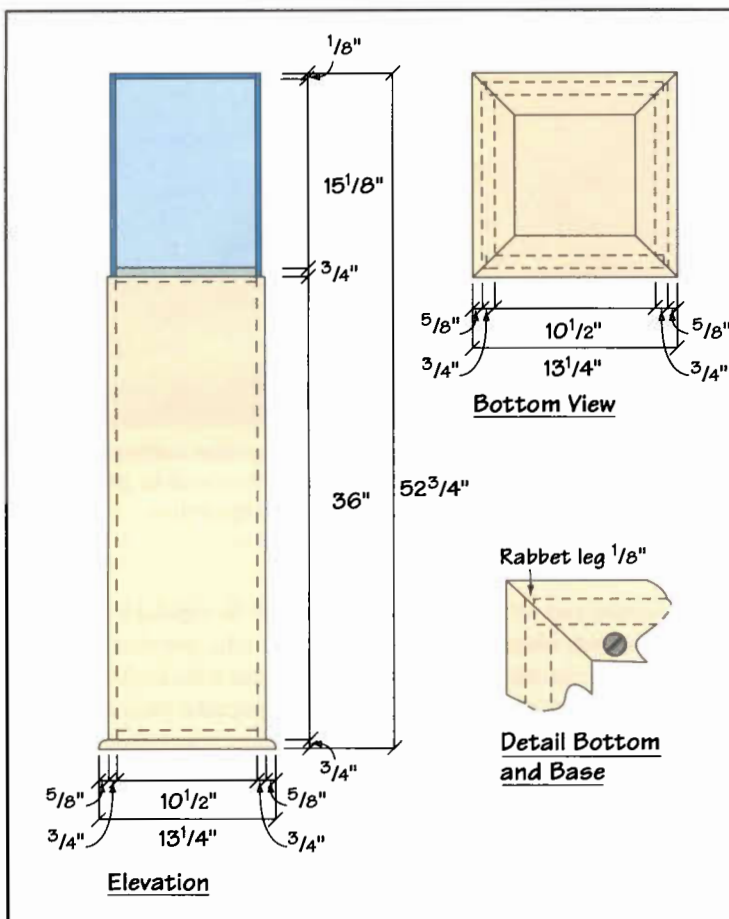
Before detailing the project, keep in mind some important veneering principles. Remember that paper-backed veneer



1 To help prevent telegraphing the rabbet joint, whose parts are not flush, make the leg of the rabbet extra thin (in this case, just $\frac{1}{8}$ "). Cut the leg slightly longer than needed so it can be planed or sanded flush after glue-up.



2 Set the box on the veneer with a $\frac{1}{4}$ " overhang on two edges. Now draw a pencil line on the veneer at the opposing edges, creating an equal amount of $\frac{1}{8}$ " overhang. This is all the overhang needed for trimming after it's glued in place. Don't be tempted to increase the overhang. You don't need it and it will have a tendency to curl when heated, making it more difficult to bond.



Schedule of Materials: Display Stand

No.	Item	Dimensions T W L	Material
2	Sides	3/4" x 12" x 36"	MDF
2	Sides	3/4" x 11 3/4" x 36"	MDF
2	Top & bottom	3/4" x 10 1/2" x 10 1/2"	MDF
1	Top plate	3/4" x 10 1/2" x 10 1/2"	Birch ply
4	Base plate pieces	3/4" x 2" x 13 1/4"	Poplar
2	Case sides	1/8" x 11" x 16"	Acrylic
2	Case sides	1/8" x 10 3/4" x 16"	Acrylic
1	Case top	1/8" x 10 3/4" x 10 3/4"	Acrylic
4	Side veneers	1/64" x 12 1/4" x 36 1/4"	Mahogany
4	Top edge veneers	1/64" x 1 1/2" x 12 1/2"	Mahogany
	Veneer tape	1/64" x 1" x 48"	Birch

Aliphatic resin (yellow glue)

Acrylic glue

it isn't likely to cause expansion/contraction problems due to its inherent stability.

Cut out the parts following the Schedule of Materials, then cut the four rabbets on two sides (**diagram**). When you glue and clamp the assembly, include the top and bottom, which are merely butt jointed inside the four sides (**photo 1**). Position them so they're flush all around. Make sure you get a flat, square corner.

Cutting the Veneer And Applying the Glue

Lay the assembled box on the sheet of paper-backed veneer, allowing a 1/4" total overhang or 1/8" on each edge (**photo 2**). Repeat the process for each side. You don't need veneer for the bottom, and you'll only need four short cross grain veneer strips from scraps for the top. Cut all the veneer using a sharp utility knife and straightedge (**photo 3**).

Now it's time to apply glue to the paper side of the veneer and the MDF box. Aliphatic wood glue (typically yellow woodworking glue) is a fine glue to use because of its thermoplastic qualities. (See "Ask the Experts" on page

is just a little more than 1/64"-thick, so you must adhere it to a substrate that's smooth, flat and free of any defects. The reason is these will "telegraph" or show through the veneer and/or prevent a good bond. Also, don't plan on heavy sanding since a sand-through is an unsightly blemish that will ruin your project's appearance. Paper-backed veneer is pre-sanded, so it only requires a light touch-up.

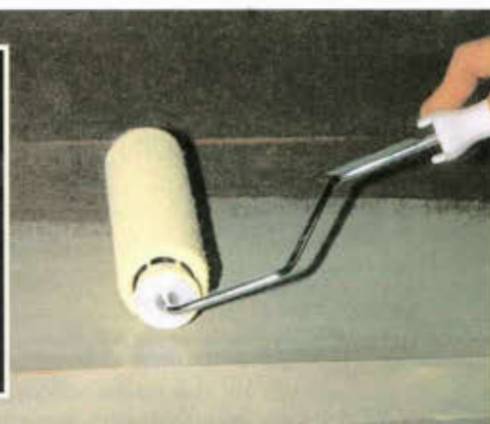
For this project, I decided to glue the veneer to medium density fiberboard (MDF). It meets the criteria above, plus



3 Carefully cut the paper-backed veneer using a straightedge and a sharp utility or razor knife. Cut on the pencil lines previously marked.



4 To help assure even glue coverage, use a short napped roller cover with a roller and tray. Apply the aliphatic glue full strength much the same way as you would paint.



5 Apply the glue to the paper side of the veneer and then on the MDF box. Coat all glue surfaces before cleaning up. Don't forget to coat the top of the box and the veneer strips to cover it. Let the glue dry completely, at least an hour.

IRON-ON VENEER

27.) It's very important the surfaces are clean. Don't allow sawdust, dirt or debris to be glued to the surfaces because they'll telegraph through. Apply the glue evenly by rolling on a smooth coat (**photo 4**).

After pouring the glue into the tray, coat the veneer's back side (**photo 5**) and the MDF box. Don't forget to apply glue to the box top coating about 2" around the edges. Cut 1½"-wide strips of veneer across the grain that are slightly longer than the width of the box, and coat them as well.

While the glue dries, make the base and top plate. I used poplar for the base, but any tight-grained hardwood will work well. Cut the four pieces, miter the ends, and assemble the frame. Then add the base profile — a ⅜" roundover on the top edge. For the top plate, I used a scrap piece of birch plywood and edged it with hot melt glue backed veneer tape.

Ready, Set, Iron

Once the glue has dried, heat your iron to the cotton setting. At this temperature, the heat will "melt" the dried glue without scorching the veneer as long as you keep the iron moving, even slowly. To begin, place the veneer on the surface, making certain it overhangs on all edges. Commence ironing near the center (**photo 6**), applying a little pressure on the iron. When ironing edges, which are especially susceptible to damage, make sure they're tight.

To check your bond, drag the tips of your fingernails over the surface and listen for changes in sound, indicating an air pocket below. If you find one, simply reheat with the iron. Part of the beauty of this ironing process is you can reheat the glue to bond or remove the veneer if needed.

Once you have a piece ironed down, trim the edges. While some folks suggest you need a router with a flush trim bit to do this, I can tell you that a flat bastard file will do the job quick-



6 Begin ironing each side, working from the center out. Move the iron very slowly, allowing the heat to penetrate through the veneer and glue coatings below.

ly, neatly and accurately (**photo 7**). Just be careful of two things. One, when you get to an end, be careful you don't tear off a piece at the corner. (This can happen with a router as well.) Two, don't abrade the surface (especially the veneer) below the work you're trimming. Trim all four edges, then proceed with ironing and trimming the remaining three sides.

Cross-grain Veneering the Top

Cross-grain veneering an edge always adds class to a project. By adding it on the top of this piece, I can also demonstrate how to easily butt join veneer seams. (In this case, the mitered corners of the cross-grain veneer.) Start by drawing a 45-degree line on one end of the veneer material. Draw the other 45-degree angle on the veneer strip at a distance that's about ½" longer than the box's width. Cut the angles with a utility knife and straightedge. Before ironing, mark the 45-degree angle that bisects each corner of the top.

Working With Acrylic Plastics

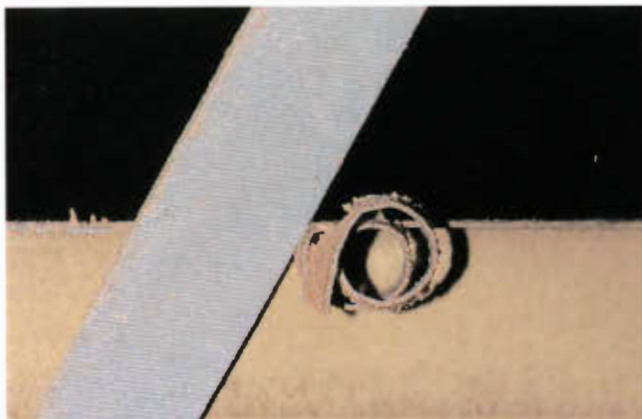
Acrylics have many advantages, including the ability to be machined with standard tools, their durability, and being able to make a frameless display case. They also can replace glass in many applications for safety and ease of use.



A For this project, cut the acrylic sides on the table saw to the sizes specified in the Schedule of Materials. Use a 60-tooth alternate bevel carbide blade. Remember that the slower the cut, the less chipping is likely on the underside of the material.



B All edges should be pre-sanded to remove any saw marks at the joints. Also, the exposed edges should be sanded prior to assembly to avoid scratching the surface during after-assembly sanding. Moistened wet-dry sandpaper wrapped around a wooden block works well for sanding the edges without causing any rounding. The moistened wet-dry sandpaper produces a finer finish because of decreased frictional heat and retards sandpaper clogging. Sand the edges until the acrylic is smooth and clear.



7 Use the edge of a bastard file and a sawing action to trim the veneer overhang. Add multiple layers of masking tape to the file's business end to prevent its flat surface from scratching the surface below.

Make the angle of the veneer ends align to the angles drawn on the corners and iron it in place. Repeat this process for each edge, each time butting the next piece to the last one. When complete, you should have tight, mitered joints. Trim the overhanging veneer from the edges, and your veneering chores are done. It's really that simple.

Sand And Finish

This especially thin veneer requires extra careful sanding. If you've taken care while working with it, only a little sanding will be required. Use either a flat block and hand sand or use a random orbit sander with 180 grit paper, 220 if you don't trust yourself. *Be very careful at the edges.* This is where you're most likely to sand through. **Photo 8** illustrates the misfortunes of oversanding. Fortunately, re-applying heat removed the damaged piece and it can be easily replaced.

To finish, brush on four coats of shellac, sanding light-



8 It's easy to sand through the veneer, especially at the edges, as above. Since the veneer is pre-sanded, only a light sanding is necessary. The damaged piece was easily removed, then replaced, using the iron technique.

ly between coats with 360 grit paper. If you haven't used shellac, I recommend that you give it a try. Since it's dissolved in denatured alcohol, it dries fast — tack-free in 15 to 20 minutes. It also has a nice sheen and has much less potential harmfulness than any other finish material, except for water-based finishes.

For contrast, I painted the top plate and base black, which I think nicely sets off the natural mahogany. **PW**

Jim Stacey hosts The 21st Century Wood Doctor television show on PBS. His love of wood and growing knowledge of restoring it led to his recognition as an expert furniture repair and restoration woodworker.

Editor's Note — Applying veneer with a household iron has been aired on The 21st Century Wood Doctor television show. The episode was taped at the Popular Woodworking workshop.



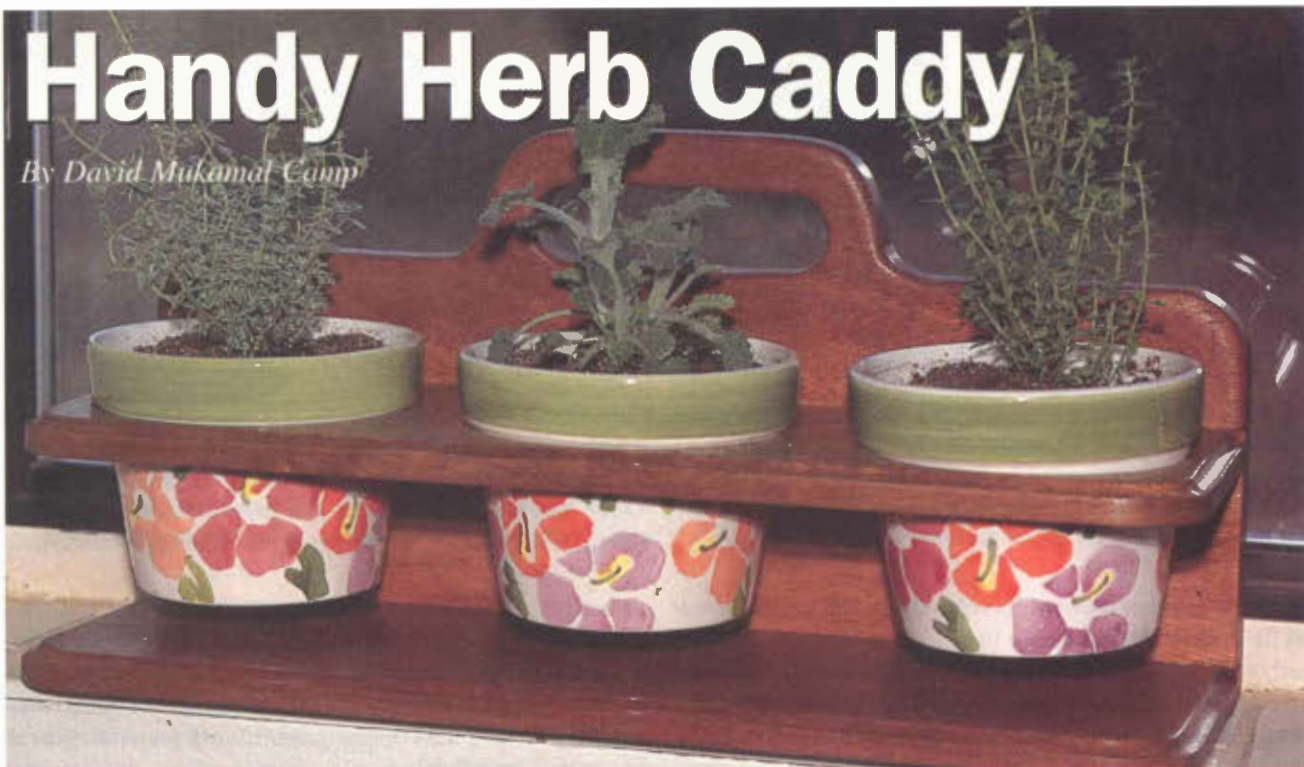
C Clamp wooden strips to a workbench, spaced apart so you can set two sides of the acrylic upright with one laying flat between. Use enough pressure to make a snug fit. After gluing these joints, rotate the work and glue the other two edges. Cement the top in place last.



D To glue, use the acrylic cement sparingly, applying it to the interior corners. Capillary action will draw the cement into the joint, and the cement will set in seconds. If too much cement is used and seeps through to the other side, it will disfigure the surface. This problem can be fixed by sanding with very fine wet-dry sandpaper, but it's better to prevent this problem in the first place.

Handy Herb Caddy

By David Mukamal Camp



1 You might want to make a test piece using scrap plywood to determine the diameter of the holes to support the pots. When you've got a fit you like, set your compass and draw the circles on the shelf piece.



2 Drill a starter hole in the shelf, then use a scroll saw to cut out the circles. Cut inside the line and clean up the cut by sanding.



MY WIFE AND I LOVE OUR CATS, but they sure can get into mischief. We were worried they might knock over our herb pots while sunning themselves in the kitchen window. This simple caddy gives the pots more stability and makes them easy to carry outside for more sun. We can also use the caddy to hang the pots on a wall, just in case they still get in the cats' paths.

The 4"-diameter cutouts work well, not only for the short decorative pots we used, but also for standard 4" terra cotta pots, which are tall enough to rest on the base instead of being suspended.

Material Prep

The back is 7"-wide, so if you'll need to glue-up some material to make a board this size, start with this step. While the glue is drying, you can start making the other pieces. I used $\frac{3}{4}$ " Philippine mahogany for the back, and planed it down to $\frac{1}{2}$ " for the shelf and base. Cut these two pieces to size as given in the Schedule of Materials.

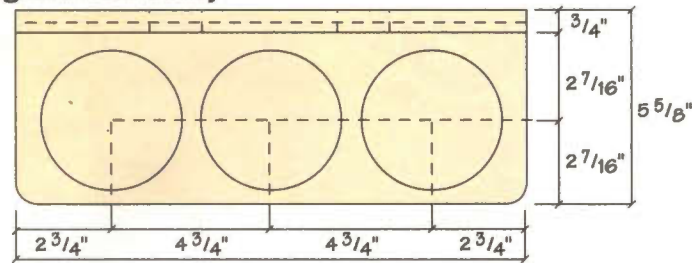
Cutting

Lay out the circles for the 4" cutouts in the shelf as shown in the **diagram** and **photo 1**. If you have a fly-cutter for your drill press, use it to cut out the holes. Otherwise, drill a starter hole and cut them out with a saber saw or a scroll saw (**photo 2**), staying about $\frac{1}{8}$ " inside the line. Use a drum sander to dress the inside of the holes, checking the fit of your flower pots as you go.

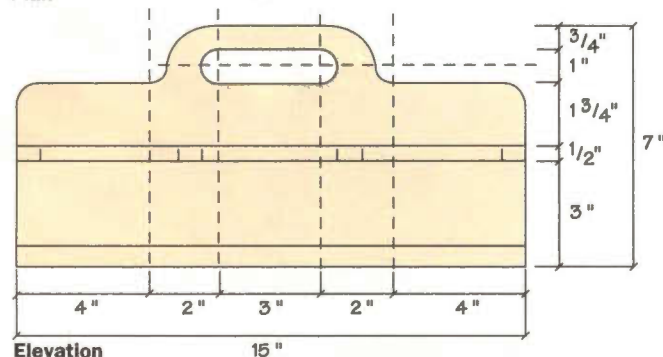
By now the back panel should be dry enough, so unclamp it and clean it up with a few quick passes of the belt sander. Set up the table saw with a $\frac{1}{2}$ " dado blade and test the cut in some scrap wood until it's $\frac{3}{8}$ "-deep. Position the fence at 3" from the blade and run the bottom edge against it to cut the groove for the shelf. Now add an auxiliary fence to your rip fence and reset it to cut the rabbet for the base (**photo 3**).

Lay out the top portion of the back as shown in the **diagram**, locating the centers of the four 1" holes that define the shape of the handle. Use a Forstner bit to drill these

Diagram: Herb Caddy



Plan

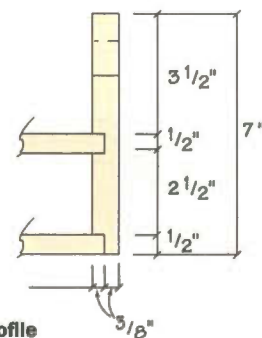


Elevation

HERB CADDY

Schedule of Materials: Herb Caddy

No.	Item	Dimensions T W L
1	Back	3/4" x 7" x 15"
1	Shelf	1/2" x 5 1/4" x 15"
1	Base	1/2" x 5 1/4" x 15"



Profile

3 With an auxiliary fence in place, put the groove for the shelf and the rabbet for the base in the back.

4 Use a 1" Forstner bit in the drill press to make uniform holes.

5 Rip the back to width, stopping at the holes that define the end of the handle. Cut the inside of the handle on the scroll saw.



holes (**photo 4**), then finish cutting out the back.

I set the table saw fence at 5 1/4" and referenced the bottom edge against it to cut the flat section on either side of the handle, stopping short of the 1" holes (**photo 5**). Then I completed the cuts on the scroll saw, rounding the corners at the top of the handle as well. Thread the scroll saw blade through one of the remaining holes to cut out the center of the handle. Use a spindle sander to clean up this area. Then radius the upper corners of the back and the front corners of the shelf and base on a disc sander. (Note: Be sure you're rounding the front corners of these two pieces. Remember that their back edges extend 3/8" further so the cutouts will be centered in the width of the shelf.)

I used a small radius bit in the router to round over the front edges of the back above the groove and the inside of the handle. With a small cove bit, detail the front and side edges of the shelf and base, stopping the cut. After a little more light sanding, it's ready for assembly.

Construction

Drill four pilot holes in the shelf groove, evenly spaced along the length of the back. Turn the piece over and countersink these holes to accept the heads of 1" flathead wood screws. Also drill five holes through the underside of the base for finishing nails, angling the holes slightly in the direction of the rabbet in the back. Run a bead of glue in the rabbet and nail the base in place. Then put some glue in the groove, insert the shelf and drive in the screws.

Finishing

Finally, apply a finish. We used a brown paste wax. Now all that's left is to pot your favorite herbs, scoot the cat over and set your herb caddy on a sunny window sill. **PW**

David Mukamal Camp, a former editor of Popular Woodworking, is a custom furniture maker and freelance writer residing in Santa Fe, New Mexico.



Recycling, Country Style

*Eliminate recycling clutter
with a little time and not much expense.*

By Steve Shanesy



Editor's Note: In the July '96 PW, I outfitted a basic woodshop with \$498 in tools and equipment. I then built a portable workstation that folds in half for out-of-the-way storage. Reckoning many of you work under crowded circum-

stances, I wanted you to know that at *Popular Woodworking*, we can work that way, too. "The Little Shop That Could" shows how you can produce good results on a tight budget. This is project number two.

I'VE ALWAYS BEEN a fan of recycling, but I suspect my house had the same problem others do — a weekly accumulation of unsightly trash. Now the mud room next to my kitchen no longer looks like a landfill in the making. The newspapers, plastic bags, bottles and cans are neatly out of sight in a cupboard that also hides those 12-packs of soda and six-packs of beer.

Building the Project

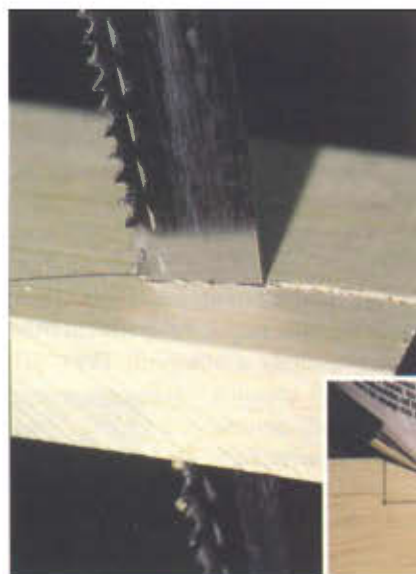
Despite the "Little Shop's" limited equipment, the project was a snap. And if you're wondering how I produced the bead and board detail, I didn't! It's readily available in pine at home center stores and lumberyards.

A word of caution — use the Schedule of Materials primarily as a sizing guideline. The bead and board detail you



buy may be a slightly different width (mine is $3\frac{3}{8}$ ", including a $\frac{1}{4}$ " tongue).

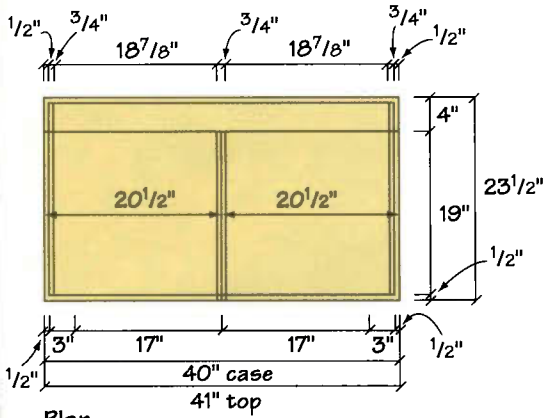
First familiarize yourself with the diagrams and cutting list. Start construction by selecting as many pieces of bead and board material as you'll need to rough cut to length the parts for the sides, lids and doors. Next rip and cut to actual length the pine for the legs, battens, top back rail and bottom. Cut the profile for the "feet" on the bottoms of the legs (**photo 1**). Slip the bead and board pieces together, then



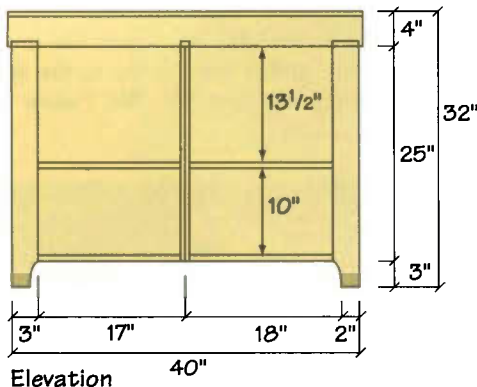
1 I used a five-gallon pail to establish the shape of the foot (**below**). Mark a line 3" up and 1" in from the bottom, then set the bucket to the marks. Cut to the line using a compass saw.



2 Nail the bottom batten in place, but use screws for the top batten. Before fastening the battens to the sides, be sure the bottom edge of the side pieces that are between the legs are square to the legs' front edge.



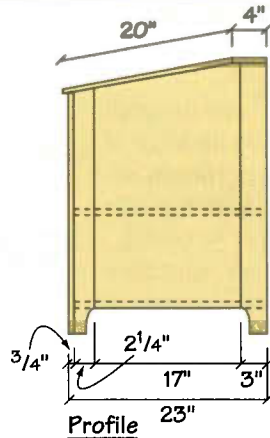
Plan



Elevation

Schedule of Materials: Recycling Cupboard

No.	Item	Dimensions T W L	Material	Notes
2	Side legs	3/4" x 2 1/4" x 28 7/16"	Pine	Shape foot before assembly
2	Sides	3/4" x 22 1/4" x 31 1/4"	Pine	Includes side and back legs
2	Front Legs	3/4" x 3" x 28"	Pine	Shape foot before assembly
2	Back Legs	3/4" x 3" x 31 1/4"	Pine	Shape foot, rabbet for back
1	Bottom	3/4" x 21 7/8" x 38 1/2"	Pine	
1	Top Rail	3/4" x 4" x 41"	Pine	Rabbet for back
1	Partition	3/4" x 21 7/8" x 27 1/2"	Pine	
1	Back	1/4" x 28 5/8" x 39 1/4"	Birch ply	
2	Lids	3/4" x 20" x 20 7/16"	Pine	Bevel hinged edge
2	Doors	3/4" x 16 7/8" x 24 3/4"	Pine	



Profile

Assemble the Sides

Put all the pieces for the sides together to determine how much material you should remove to make up the desired width. Remove the material, including the groove, from the bead and board piece opposite the side of the assembly where you milled the groove in the leg.

To assemble the sides, simply lay all the parts together face down (**photo 2**). Square the front edge of the front leg with the bottom of the bead and board parts so they make a straight edge 3" up from the bottom of the leg. Place the bottom batten 3/4" up from that straight edge and hold it in just slightly from the front and back edges. Nail it in place, being

sure to put a nail in each connecting piece. Now do the same for the upper batten, but use screws instead of nails. Place it 6" down from the top edge.

Finally, cut the angle on the top edge. I used my straightedge guide and a hand-held circular saw (**photo 3**).

Assemble the Case

Begin the case assembly by nailing the top back rail on to the sides. Carefully measure the rail ends for the 1/2" over-

*Given design fits two plastic recycling bins measuring up to 12 1/2" x 15 1/2" x 21". The bins go on the top shelf with storage below to accommodate bottles, newspapers and cans, plus cartons of 12-ounce beverages.

place the side portion of the front and back legs in their positions to make up the sides.

Set up the table saw to cut the groove on the leg part to accept the tongue on its mating bead and board piece. Remember, you'll only need a groove on either the front or back leg for each side. While you're at the saw, cut the 3/8" x 3/8" rabbet in the back legs and top back rail to accept the back. Cut the rabbets through, then glue in a filler piece later.



3 Cut the angle on the top edge of the side. Use a straightedge to guide the circular saw. Cut from the inside to avoid tear-out on the exterior. The cut should start 4" in from the side's top back edge and run to a point that's 28 7/16" up from the bottom of the front leg.



4 With the case turned upside down, place a clamp across to pull the assembly together while fastening. Then screw the bottom in place, securing it to the battens inside.

RECYCLING BIN



5 Nail through the front leg and sides into the end of the bottom inside. Then set the nails and fill the holes. Sand away any excess filler before finishing.

hang. After nailing, roll the partial assembly over to install the bottom. Set it on the lower battens flush to the front of the side legs. Then screw it to the lower batten (**photo 4**). With the bottom in place, glue and nail the front legs and nail the bottom through the sides (**photo 5**).

Now install the center partition. It, of course, must have the top angle to match the sides. Make sure you place it dead center between the sides and flush to the front edge. Screw it from the bottom and nail it through the top rear rail. Complete the case assembly by nailing the back in place. Before moving on to the lids and doors, change the flat top edge of the front legs to an angle that matches the slope of the sides (**photo 6**). Before removing any material, establish pencil lines to indicate where to stop taking material off. One line establishes the continuation of the slope of the sides; the other shows the depth across the face of the leg. Since the “Little Shop” doesn’t feature a plethora of tools, I removed the material using a medium coarse, then fine, file followed by sanding.

Doors And Lids

Make up the top lids and front doors using the bead and board material you rough cut to length earlier. Before assembling the lids, however, cut a 10 degree bevel on the back piece that butts to the top rear rail. Otherwise it will bind when hinged together. Assemble just as you did for the sides, using two battens each (**photo 7**). Because the doors don’t have the advantage of all the fastenings and the box structure that the sides do, I made a point of gluing the tongue and groove detail of the bead and board material to ensure they retain their shape. Since this piece makes up the overhang for lifting the lid, the batten below couldn’t extend forward enough. I also glued the front piece of the bead and board material on each top lid. For both the lids and doors, make them a bit oversized to allow for trimming and fitting because of the somewhat unpredictable sizing of the multiple pieces.

To hang the lids, simply set them in place, align the ends with the back rail overhang and attach the hinges. Before hanging the doors, put the shelves in place. For shelf supports, simply use short lengths of 1/4" dowel. Rely on the shelves to hold the sides square and to keep the doors from sagging. Make sure the shelf fits tight. After laying the case on its back



6 Continue the angle on the side to include the top edge of the front leg. Match the leg top to the side angle using a medium coarse, then fine, file. Follow with sanding until smooth.



7 Fasten battens to the backs of the doors and lids. Use the tongue and groove detail to glue the door parts together. Also glue the front lid piece since the batten must start behind it due to the doors below. Don’t forget to cut a 10-degree bevel on the back edge of the lid piece so it doesn’t bind when hinged.

to hang the doors, I found that shaving 1/16" off the shelf width aligned the doors just fine when the cupboard was set upright. I never really thought I’d use a shelf width to fit a door, but, as the saying goes, “Whatever floats your boat....”

The final chores beside sanding and painting are attaching the door pulls and catches. Finally, use a little water putty to fill the set nail holes and give the bin a good 120 grit sanding. Then the recycling cupboard is ready for a coat of paint. **PW**

Steve Shanesy is editor of Popular Woodworking.

If you have a project idea that you’d like to see produced by “The Little Shop That Could,” send your suggestion to Editor Steve Shanesy (*Popular Woodworking*, 1507 Dana Ave., Cincinnati, OH 45207), along with enough information to help get it started, such as a photo, general dimensions, particular function, etc. Include your name, address and daytime phone number.

Laminate Hall Table

PHOTO BY ERIK VON FISCHER/BLINK



Laminate gives this piece a granite appearance. Also learn how to work with cylinders.

By David Thiel

IF YOU'VE NEVER WORKED WITH LAMINATES (Formica™ to the uninitiated), there are two good reasons to give it a try — you already own most of the tools you need, and there's no finishing involved — when you're done, you're done.

Laminates are so simple to use, I decided to make this hall table project more interesting by adding half-round ends. But if you're feeling faint of heart, try it with rectangular ends instead. Just replace the half-cylinder ends with 3" x 20" slabs of equal height.

WOOD WORDS (wood'wurds) n.

MDF: Medium density fiberboard. Used extensively as a substrate for laminate and veneer work.

triple chip grind: Saw blade where one flat-top tooth is followed by a taller, narrower, trapezoidal-shaped tooth. This tooth reduces chipping on the kerf line in brittle material by removing the bulk of the waste, leaving the flat-top tooth to make the full width kerf.

The Cylinders

You can form your own half-round ends using a rib system (not unlike the hull of a boat), then cover that with 1/8" plywood, but it's easier to order them ready to work. Sizes range in diameters of 4" to 43" in 2" increments and in heights from 20" to 62" (see Schedule of Materials) (**photo 1**).

After squaring one end, reset your saw for 23 1/2" and cut from the other end of the tube. Repeat this process on the fall-off piece to create the 3" bases. Then draw two lines (squared to the ends) down the cylinders, starting at points exactly opposite on the rim edge. I then used a Japanese pullsaw to cut them into equal-sized half-cylinders. With a little patience, a utility knife will also do the job.

The Legs

Now that the tubes are separated, the rest is just like working wood. Use two half-discs for support with each half-cylinder. Mark the four cylinder cap pieces (**E**) as shown in **diagram 2**, then make your cuts. Attach them to the half-cylinders (**photo 2**). Fasten the sides (**D & F**) between the caps, then

LAMINATE HALL TABLE



1 Starting with a full cylinder, cut your tube to length. Set the table saw's rip fence for $25\frac{1}{2}$ ", and clamp a two-by-six to the saw 10" from the center of the blade. With the blade below the table's surface, place the tube against the fence and the two-by-six. Slowly raise the spinning blade into the tube until it clears the thickness of the tube's wall. Slowly rotate the tube while maintaining pressure against both fences until it is separated.



2 Use one solid and one D-shaped half-disc per cylinder. Make them flush to the ends of the cylinders, and split the difference from left to right. If for some reason your cardboard cylinder doesn't extend beyond the half-disc, take a couple more joiner passes to give yourself a little trim room. I used a pneumatic air stapler to attach the tube, but glue, nails, clamps or any other fastening option will work. Repeat the process with the base pieces (using two D-shaped half-discs per base).

Diagram 1

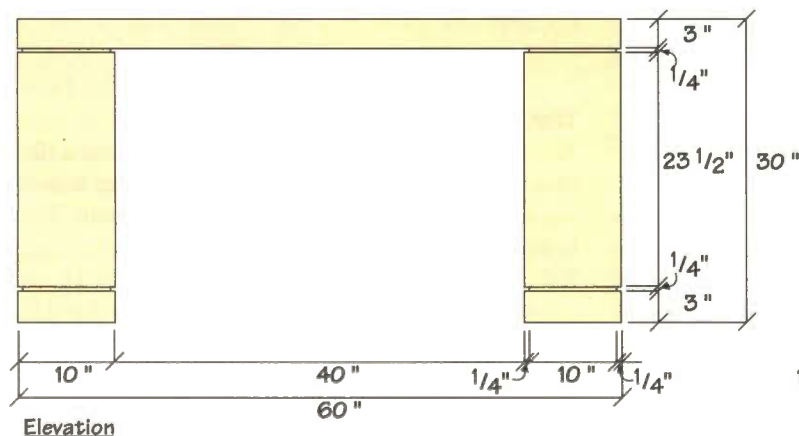
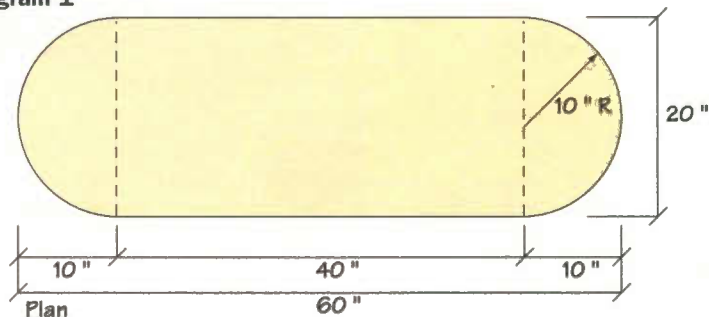
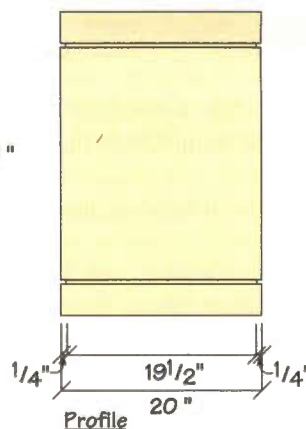
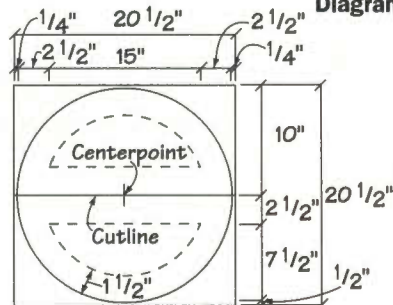


Diagram 2



Schedule of Materials: Laminate Hall Table

No.	Item	Dimensions T W L	Material	No.	Item	Dimensions T W L
2	Top pieces	$\frac{3}{4}$ " x 20" x 60"	MDF	2	Laminate sheets**	48" x 96"
4	Top end-fillers	$\frac{3}{4}$ " x $10\frac{1}{2}$ " x $20\frac{1}{2}$ "	MDF	1	Brass edging***	$\frac{3}{16}$ " x 25'
4	Top side-fillers	$\frac{3}{4}$ " x 2" x 40"	MDF	Laminate adhesive and cleaner (contact laminate supplier).		
2	Cylinder sides	$\frac{3}{4}$ " x $19\frac{3}{4}$ " x 22"	MDF	*Geometric Forms, 302 12th St., Lorain, OH 44052-3406; (800) 331-7689 (\$42 plus shipping).		
4	Cylinder/Base caps	$\frac{3}{4}$ " x $20\frac{1}{2}$ " x $20\frac{1}{2}$ "	MDF	**Pressure sensitive edging available from The Woodworkers' Store, Item #91588 — \$10.95 plus shipping; (800) 279-4441.		
2	Base sides	$\frac{3}{4}$ " x $1\frac{1}{2}$ " x $19\frac{3}{4}$ "	MDF	***Wilsonart, 4623-60 Graphite Nebula, vertical grade laminate (\$65 per sheet).		
1	Cylinder*	20"-diameter x 30"	MDF			
2	Accent discs	$\frac{1}{4}$ " x $19\frac{1}{2}$ " x $19\frac{1}{2}$ "	Plywood			



3 Sand both the cardboard edge and the MDF edges flush to the side. Using two clamps to stabilize the piece for sanding makes it a lot easier.

sand the flat surfaces to make the cardboard tube's edges flush to the surface (**photo 3**).

You're now ready to start using laminate. Each piece of laminate should be cut $\frac{1}{2}$ " to 1" oversize to give yourself overhang to trim. Start by figuring out the sizes you need and sketch out how each sheet of laminate will produce the best yield. Laminate has a grain direction which causes the sheet to curve across the 48" width. Take advantage of this curve for extra flexibility when cutting the laminate pieces for the curved ends and bases.

The best saw blade for laminate is a carbide 60 to 80 tooth, triple chip grind. Other blades will work but will cause more tear-out. Also, because laminate is brittle, the tear-out can reach up to $\frac{1}{4}$ " in from the edge. Be aware that laminate is thin enough that it will frequently slip underneath a rip fence, dramatically affecting your safety and your cut. A simple J-shaped piece of $\frac{1}{4}$ " hardboard or plywood slipped around the rip fence's base will solve this problem.

Circles On The Band Saw

Multiple, exact circles are simple to make on a band saw by first locating the center of the piece, as indicated in **diagram 2**. Then make a pilot hole at the intersection of the two lines about $\frac{1}{2}$ "-deep. Next attach a larger auxiliary table to your band saw and measure (at a right angle from the flat of the blade) the distance of your circle's radius. Drive a finishing nail into the auxiliary table and clip the head off about $\frac{3}{8}$ " from the table's surface. The hole in your finished material will slip over the nail and the piece will rotate through the blade, forming a perfect circle. If you don't want to mess with making an auxiliary table, many circle-making jigs are available for routers, jigsaws and band saws.



LAMINATE HALL TABLE

4 Both pieces, the laminate and the wood, need to be coated with glue. You'll notice that the ends of the MDF and cardboard will absorb the glue quickly, so it's best to coat those edges first with a brush, then coat the entire piece again with a roller.



5 The laminate is ready to apply when you can touch the glued surfaces and they feel tacky, but no glue comes off on your hand. This should take about 15 minutes, or longer if you're using a water-based product (a good idea for lots of reasons).

Glue the laminate to the flat sides of the cylinders and bases as shown in **photos 4 & 5**. (See the "Special Tools" section in the preceding article on laminates.) Glue all four pieces simultaneously so you don't wait all weekend for the glue to dry.

The solvent-based laminate glue requires good ventilation while being used. It is very flammable (and harmful), so even if you think you're tough, take precautions and follow label warnings.

These first pieces should be easy enough to apply, allowing overhang on all sides. Once in place, push the laminate against the cylinder, and smooth the laminate, working from the inside out toward the edges. Then use a laminate roller to apply even pressure to the surface.

Use a router to trim the laminate nearly flush to the edge of the cylinder (within $\frac{1}{32}$ "). (See the article on laminates.) Then use a block plane or sander to make the laminate flush to the cylinder edges.

The next step is to put the laminate on the rounded sur-

Tip For Laminating Radii:

A helpful trick in attaching laminate to curved surfaces is to draw a dark line down the center of the laminate and another down the center length of the curved surface — the cylinder in our case. These lines will help you place the laminate so it will evenly cover the cylinder when pressed in place. Lay the laminate glue-side up. Then slowly lower the cylinder onto the laminate, aligning the two lines.



6 Always file against the laminate's surface, pushing with the file, not pulling, or the laminate will chip or come loose.

faces of the ends and bases. (See the "Tip For Laminating Radii" above to make this easier.) Once these pieces are in place, again use a router to trim the excess laminate. Where the two pieces of laminate meet, finish the joint with a fine cut file to bevel the edge smooth (**photos 6 & 7**). Then use 120 grit sandpaper to break the sharp edge.

The final laminate work on the end and base pieces is the top surface of each piece. On the ends, the top surface is the solid end, while either works for the bases. Glue, trim and file the top pieces of laminate. Take it slow when filing the rounded edge. It's very easy to cut too deep and leave an unattractive joint.



9 Cut the laminate for the edging 5"-wide to allow an inch overhang on top and bottom. This can be very helpful when wrapping a round edge. Locate the center of the top, and use a try-square to make lines where the front and back joints will be located.

10 To get a square end on the edge, clamp one strip to a square corner of a piece of MDF. Use a flush cut router bit to square the end. Mark the opposite end to length, then repeat the router cut. Repeat the process on the other strip, leaving the edge 1/4"-long for trim.

The Top

The MDF top is formed by sandwiching the half-round and side fillers (**parts B & C**) between the two top pieces (**A**). First cut the end radii using a jigsaw, then prepare. Use a rasp to shape one of the pieces to an accurate and smooth radius. Then use a flush-cutting bit with a bearing guide to match the second piece to the first. Attach the rest of the top assembly, matching the other pieces (**photo 8**).

When cutting the laminate edge for the top, two joints will be necessary, as the laminate sheets are only 96"-long. As joints hold better on flat surfaces, they will fall in the center of the front and back top's edges (**photos 9 & 10**).

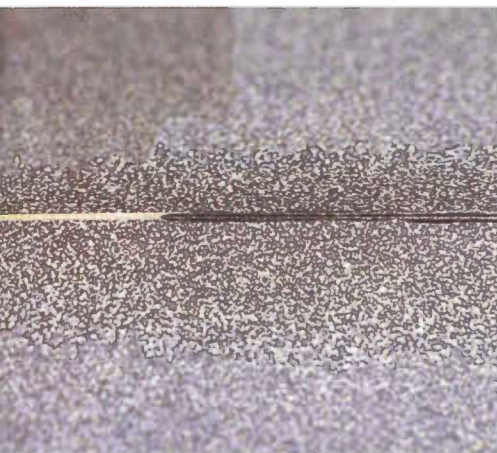
Now apply glue (remember to double coat the MDF edges) and attach the edging. Start with the shorter of the pieces, laying one end exactly along the pencil line at the center of the top. Split the overhang top to bottom.

Use the laminate roller on this first edge, then take the second edge and place one end against the "front" edge seam of the attached laminate edge. Press the edge the rest of the way around the top, stopping a few inches short of the final joint. Again use the roller to firmly attach the

edge, but stop short of the joint. Fitting the joint is a good test of your planing skills (**photo 11**).

The rest is a repeat performance. Rout, sand and get ready to glue again. Since the top piece of laminate is fairly large, use dowel rods to keep the laminate off the top's surface until you have it in the right place. Again, when pressing the laminate into place, work from the center out toward the edges. Rout and file the laminate edges, and use sandpaper to break the bottom edge.

The last step before assembly is to cut and edge the brass accent pieces (see Schedule of Materials). The half discs are cut as before, but 1/2" smaller to form a 1/4"



7 With this laminate pattern, the finished edge is light in color. A trick is to run a black permanent marker along the edge, then immediately wipe the edge with adhesive solvent, removing the marker from the laminate surface. The marker stays on the exposed backer helping to blend the edge.

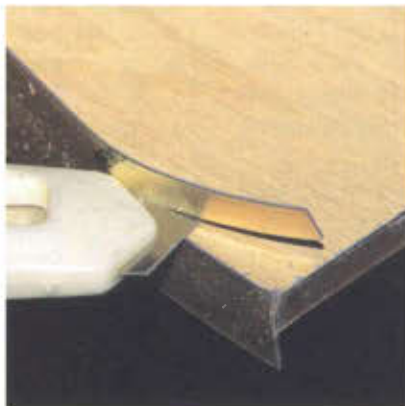


LAMINATE HALL TABLE

8 Cut the half-disc filler pieces using the same method as with the cylinder caps, then attach them to the original shaped top piece. Use the flush cutting bit again to match the fillers to the first top. Next attach the second layer of filler pieces and then the bottom piece, flushing up each layer with the router. You can then use a rasp or sander to smooth out the edge of the finished top, but don't round the edge or the laminate will form a poor bond.



11 Use a block plane to take thin passes off the edge until the joint appears seamless. Then press the laminate into place and roll the edge. Don't allow laminate shavings to get under the laminate at the edge. This will adversely affect the adhesive bond.



12 Starting with the flat edges, apply the edging. Then carefully trim one side with a utility knife, applying pressure toward the plywood edge.



13 Next use the file to flush that edge to the plywood before trimming the other side. Use the file to flush the ends of the edge as well, then repeat the process on the radiused edges.

reveal. The pressure sensitive adhesive edging seemed to work best with a utility knife and a file (**photos 12 & 13**).

Assembly

Lay the top upside down on a protective surface, then attach two of the brass-edged accent pieces to the underside of the top, $\frac{1}{4}$ " in from the edge. You'll want to square up the accent pieces against the straight edge of the top to make sure they're properly located.

Next drill $\frac{3}{16}$ " clearance holes in the tops of the ends, approximately $1\frac{1}{2}$ " in from the edges. Then turn the ends over and place them, top down, on the top over the accent pieces. Reach through the D-shaped opening in the bottom

of the ends to attach them to the top with screws.

Lastly, attach the final accent pieces to the top of the bases. Turn the assembled base piece over and use a $1\frac{1}{2}$ " spade bit in a drill to make five clearance holes in the bottom cap of the base. Then follow the center of each clearance hole and make a smaller $\frac{3}{16}$ " hole through the top of the base and accent piece. Attach the bases to the ends.

You're all done. No staining, no shellac — just go put it in your hall for everyone to admire. **PW**

David Thiel is associate editor of Popular Woodworking and has worked professionally with laminates for 15 years.

Oil Pumping Rig

This project recreates the movement of an oil pumping rig. When the handle turns, the crank revolves, with the effect that the beam oscillates and the loose-pivoted donkey head slowly nods up and down.

Begin by shaping all pieces according to the **diagram**. Now take your $\frac{7}{8}$ "-thick wood and establish the positions of the baseline and center lines. Then fix the positions of the centerpoints for the holes and curves. After marking the base slab, beam and derrick, cut out the three primary profiles. Next drill the pivot and fixing holes for the derrick and beam.

Make the pivot plates and donkey head, then tack together the two $\frac{1}{4}$ "-thick pieces for the tail and center plates. Tap a length of dowel in the center plate pivot hole to ensure that the holes are identically placed, then scroll saw. Next set the two sets of plates on the beam and trial fit. To make the donkey head, rerun the layering and cutting procedures, but cut through three layers of wood instead of two. Now carefully saw away the waste from the middle layer and check the head for size.

The connecting rod, crank plate and handle are next. Establish the positions of the pivot holes for the crank and handle plates, drill them, then scroll saw the profiles. Now cut out the connecting rod's shape and run the pivot holes through with a $\frac{1}{4}$ " bit. Then sink the blind holes at regular step-offs along the center line.

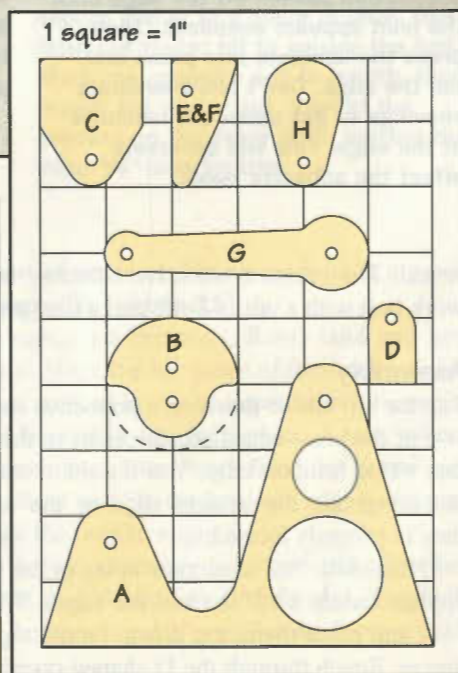
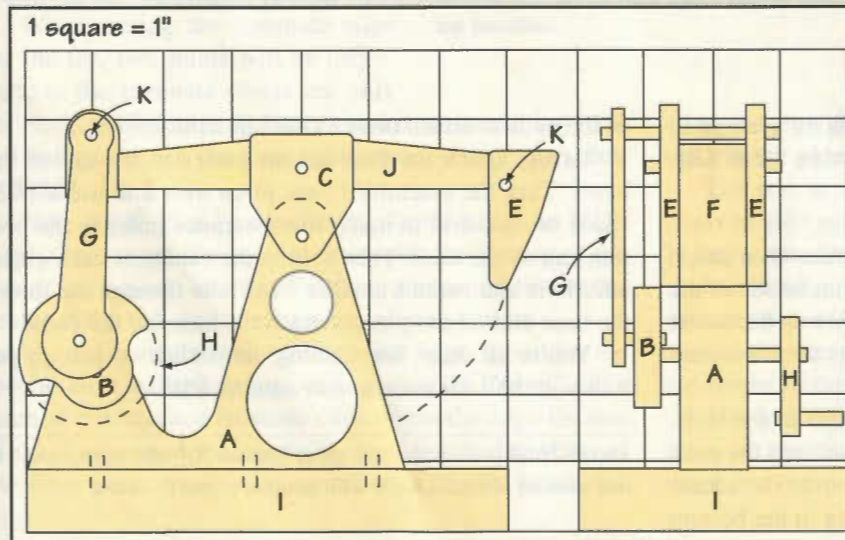
Drill, peg, glue and clamp the derrick to the base. Trial fit, then glue and clamp the donkey head and beam plates, followed by the connecting rod bearing plates at the tail end of the beam. Now set the donkey head on the beam and fit with a pivot rod. Make sure the head is a loose-nodding fit. Finally, glue the two rods in place in the crank plate, set all the pins in place, and have a trial run to test out movement.

From Making Wooden Mechanical Models, ©1995, by Alan and Gill Bridgewater. Used with the permission of Betterway Books, a division of F&W Publications.



Schedule of Materials: Oil Pumping Rig

No.	Letter	Item	Dimensions T W L	Material
1	A	Derrick tower	$\frac{7}{8}$ " x 6" x 7"	Cedar
1	B	Crank plate	2" x $\frac{3}{8}$ " x 2"	Plum
2	C	Center pivot plates	$\frac{1}{4}$ " x $1\frac{1}{2}$ " x 2"	Beech
2	D	End pivot plates	$\frac{1}{4}$ " x $\frac{3}{4}$ " x $1\frac{1}{4}$ "	Beech
2	E	Donkey head sides	$\frac{1}{4}$ " x 1" x 2"	Cedar
1	F	Donkey head center	$\frac{7}{8}$ " x 1" x 2"	Cedar
1	G	Connecting rod	$\frac{1}{4}$ " x $1\frac{1}{4}$ " x 4"	Beech
1	H	Handle	$\frac{1}{4}$ " x $1\frac{1}{4}$ " x 2"	Beech
1	I	Base	$\frac{7}{8}$ " x 4" x 7"	Cedar
1	J	Beam	$\frac{7}{8}$ " x 1" x 8"	Cedar
5	K	Pivot rods	$\frac{1}{4}$ " dowel	
		Fixing pins	Round toothpicks	



Fireplace Bellows

First enlarge the plans in **Diagram 1** by 400 percent, and cut the two sides from your choice of wood. Sand to match the sides and to smooth the edges. Mark the air intake holes on one side only. Then use a scroll saw to cut out the shape. Cut 2" off the tip of the opposite piece, and glue the tip to the first side.

Check the outside diameter of the $\frac{1}{2}$ " rigid copper pipe, and drill a snug clearance hole through the center of the nose to the inside. Drill deep enough or chisel out an extended slot on both sides to allow interior space for air to move through the nozzle. Now sand and finish the pieces.

Leather was used on the cherry bellows, but a good piece of naugahyde™ (as was used on the alder bellows) offers an economical alternative. Cut the leather to match **Diagram 2**. Another 4" x 4" piece of leather (not shown) covers the air intake hole from the inside (smooth side against the wood). Four tacks in the corners hold the leather taut, but not stretched.

Attach the leather to the sides, folding the edge under to hide the rough edge. Start at the center of the leather and $10\frac{1}{2}$ " from the tip of the glued together side. Place the upholstery tacks every $1\frac{1}{2}$ " or so, continuing to fold the leather edge under. Pull the leather taut, but don't pucker it. Leave the ends long at the tip until the hinge leather is attached. Now insert the copper tube and pilot drill through the wood and the tube. Then hammer two finish nails through the center of the tube to hold it flush to the inside of the hinge.

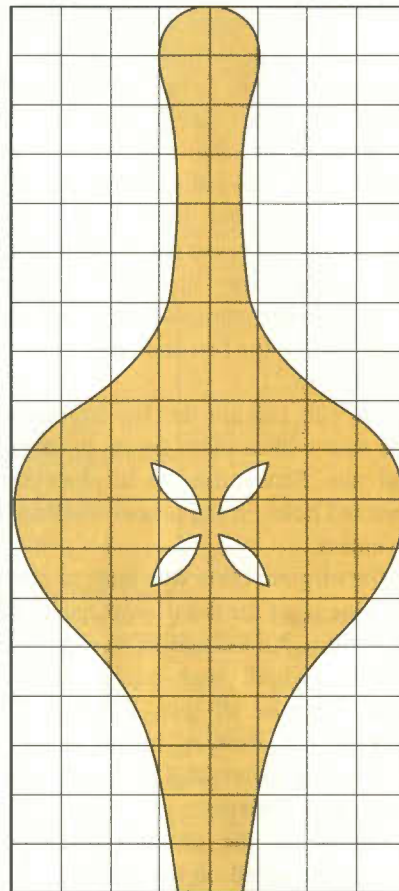
The leading edge of the hinge leather is not rolled under, but all other edges are. Trim and roll under the side leather pieces. Then use the same tack to attach the side and hinge leather pieces. Place the second side in position and continue to tack.

A braid made from three leather bootlaces is knotted through a $\frac{3}{8}$ " hole on the unhinged side. It slips through a $\frac{5}{8}$ " hole in the other side to form the handle to hang the bellows by the fireplace.



Diagram 1

1 block = 1"

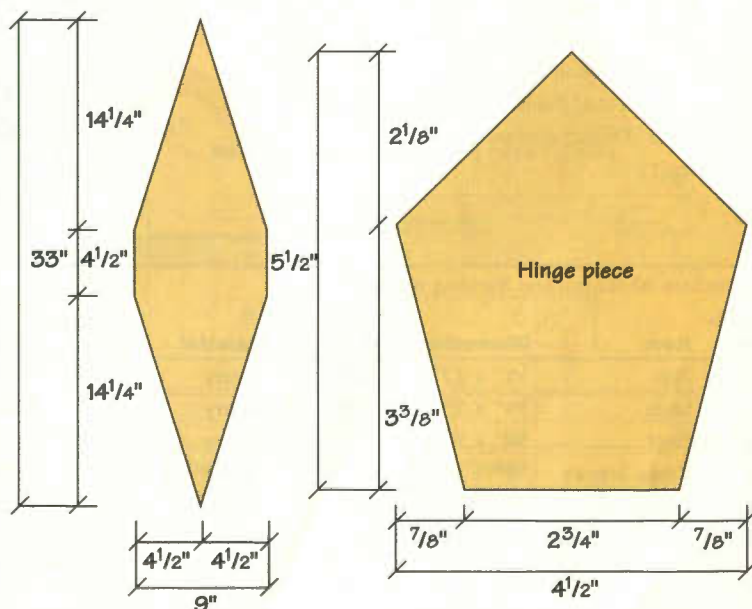


Enlarge 400%

Schedule of Materials: Bellows

No.	Item	Dimensions T W L
2	Sides	$\frac{5}{8}$ " x 8" x 18"
1	Nozzle	$\frac{5}{8}$ " outside dia x $4\frac{1}{2}$ "

Diagram 2: Leather or Naugahyde™ Patterns



Walnut Sewing Stand

The original design of this table, drawn by John Kassay in *The Book of Shaker Furniture*, was built in the Harvard community of Shakers during the first half of the 19th century. Although constructed with sound joinery, it's a delicate piece that can't be put to heavy use.

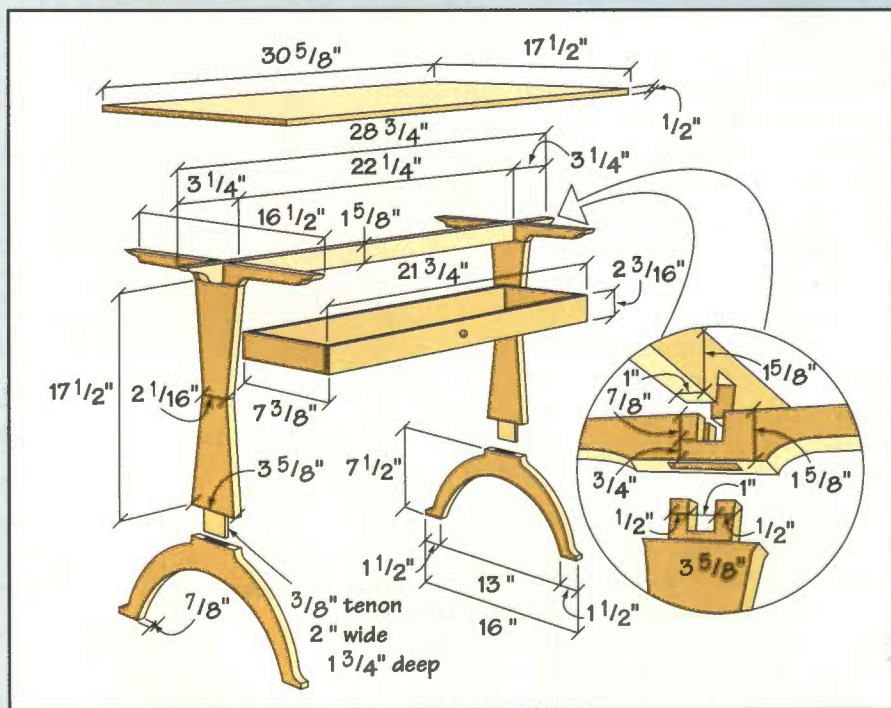
After laying out the feet, but before band sawing them, cut the 2"-deep mortises that receive the leg tenons. Similarly, cut the through mortises in the two cross braces. Profile the feet and cross braces on the band saw.

You can fashion the leg tenons on a table saw with a dado set or by using a hand saw. Screw the top in place using oversized holes in the braces to allow for movement.

The original table was built of cherry, with pine used for the drawer back, sides and bottom. An exception was the drawer front, which was made of maple. Because of this, Kassay suggests the drawer might've been added after the original table was complete.

Except for the grooves that must be ploughed on the outside faces of the drawer sides, the drawer construction is conventional. Through dovetails are at the rear and half-blind dovetails are at the front. Of course, you can make the drawers any way you prefer.

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Schedule of Materials: Sewing Stand

Table				Drawer			
No.	Item	Dimensions T W L	Material	No.	Item	Dimensions T W L	Material
1	Top	1/2" x 17 1/2" x 30 5/8"	Cherry	1	Front*	1/2" x 2 3/16" x 21 3/4"	Maple
2	Legs	7/8" x 3 5/8" x 17 1/2"	Cherry	2	Sides*	3/8" x 2 3/16" x 7 1/8"	Pine
2	Feet	7/8" x 7 1/2" x 16"	Cherry	1	Back	3/8" x 1 3/4" x 21 3/8"	Pine
2	Cross braces	7/8" x 1 5/8" x 16 1/2"	Cherry	1	Bottom	1/4" x 7" x 21 3/8"	Pine
1	Stretcher	1" x 1 5/8" x 28 3/4"	Cherry	1	Pull**	1/2" x 1/2"	Pine
2	Drawer runners	1/4" x 3/8" x 7"	Cherry				

* These are net measurements. A surplus should be added to dovetailed parts to allow them to be sanded flush.

** Pull was ordered from Constantine's Hardware.

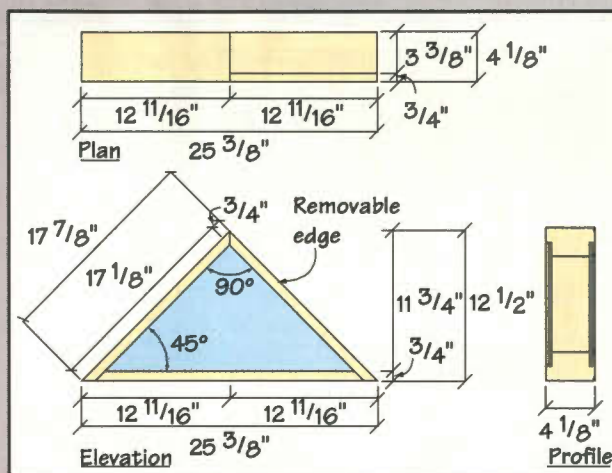
Flag Case

Of course our flag deserves respect, especially a ceremonial flag. This display case does a fine job of showing your patriotism, serving as a handsome decoration when your banner isn't being flown.

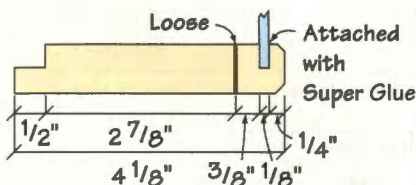


One setup on the table saw allows you to cut the groove for the clear acrylic front as well as the rabbet for the back. The handle for the acrylic is simply cut from the $4\frac{1}{4}$ "-wide side, the $\frac{1}{8}$ " saw-kerf making all pieces the same width. Cyanoacrylate glue (Super Glue) holds the acrylic in place in the handle, and a coat of natural Danish oil finishes the project.

(Note: This case was designed for a 5' x 9' flag.)



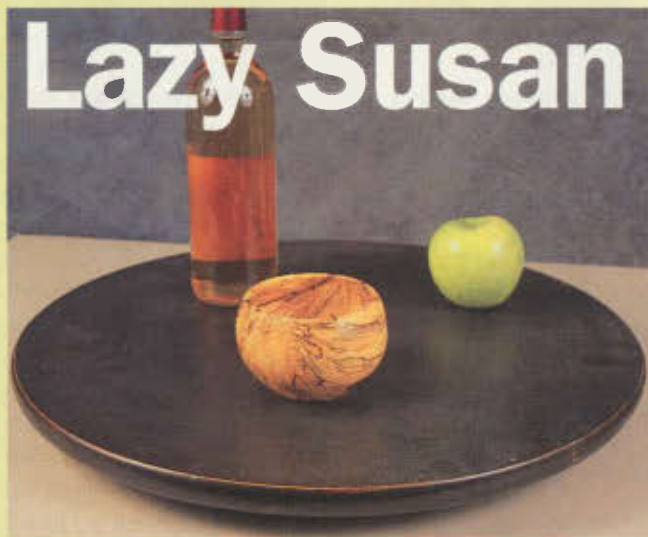
Removable right side only



Schedule of Materials: Flag Case

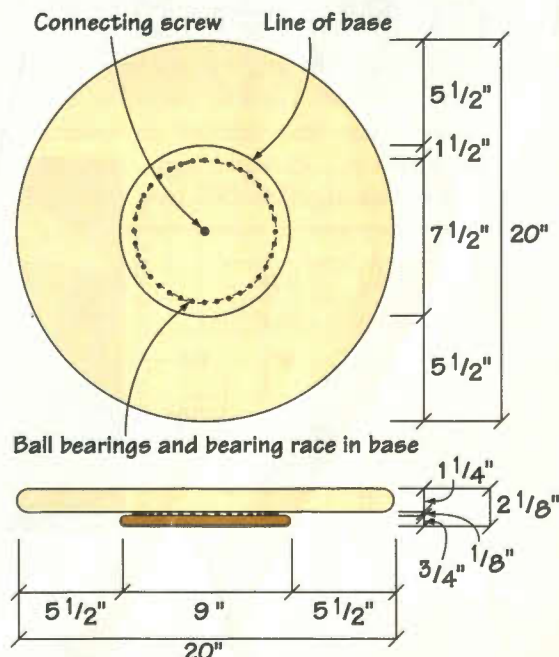
No.	Item	Dimensions T W L	Material
1	Bottom	$\frac{3}{4}$ " x $4\frac{1}{8}$ " x $23\frac{5}{16}$ "	Alder
1	Side	$\frac{3}{4}$ " x $4\frac{1}{8}$ " x $17\frac{7}{8}$ "	Alder
1	Side	$\frac{3}{4}$ " x $4\frac{1}{4}$ " x $17\frac{7}{8}$ "	Alder
1	Back	$\frac{1}{4}$ " x $23\frac{1}{2}$ " x $16\frac{1}{2}$ "	Maple ply
1	Door	$\frac{1}{8}$ " x $23\frac{1}{2}$ " x $16\frac{1}{2}$ "	Acrylic

Lazy Susan



Passing the salt becomes as easy as a flick of the wrist with this practical dining table accessory.

Cut the top and bottom to diameter, then cut a bullnose profile on the edge. A simple routed groove (preferably rounded) in the base provides the race for the ball bearings. The race should be $\frac{3}{16}$ "-deep and $\frac{5}{16}$ "-wide using $\frac{1}{4}$ " ball bearings. You'll need enough ball bearings to fill 80 percent of the track. One screw through the clearance hole in the base's center assembles the two pieces. For an antiqued appearance, use a crackle painted finish. Or apply a finish that compliments your dining table.



Schedule of Materials: Lazy Susan

No.	Item	Dimensions T D	Material
1	Top	$1\frac{1}{4}$ " x 20"	Pine
1	Base	$\frac{3}{4}$ " x 9"	Maple
	Ball Bearings	$\frac{1}{4}$ "	

Pen & Pencil Set

Keep your writing utensils on hand with this professional-looking pen and pencil holder. We chose Corian® to give this project a twist, but you can also use wood. Cut the Corian to size on the table saw with a 60-tooth alternate bevel blade. Then use a router to make the 45-degree bevel details on both pieces as shown.

Cut a piece of 1/8" scrap wood to be sandwiched between the Corian. The scrap's edges are covered with a strip of adhesive-backed faux brass. Drill and countersink holes for the pen holders from the underside of the top piece and attach. Corian bonds very quickly with cyanoacrylate glue (Super Glue), so be extra careful assembling the pieces because they will bond instantly. If you set the pieces a little off, sand the edges flush on a disc sander. Sand all the rough edges with 200 or finer grit. Then give the piece a high gloss finish with paste wax or a clear finish. Felt pads will protect your desk. Now set it out for your co-workers to admire.



Schedule of Materials: Pen & Pencil Set

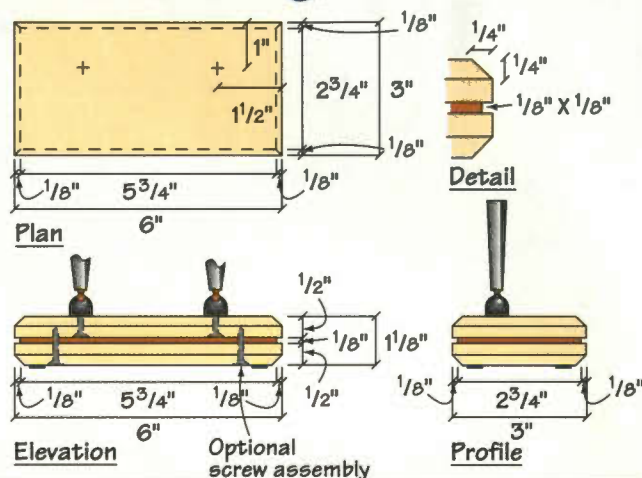
No.	Item	Dimensions T W L
2	Top & Bottom	1/2" x 3" x 6"
1	Center reveal	1/8" x 2 3/4" x 5 3/4"

Source List

Adhesive-backed faux brass: Corian® (available to public in 1/4"- or 1/2"-thicknesses):
The Woodworkers' Store
 (800) 279-4441
Art Specialties Int'l Inc.
 (800) 724-1002

Pen and pencil holders:

Constantine: (800) 223-8087
Klockit: (800) KLOCKIT

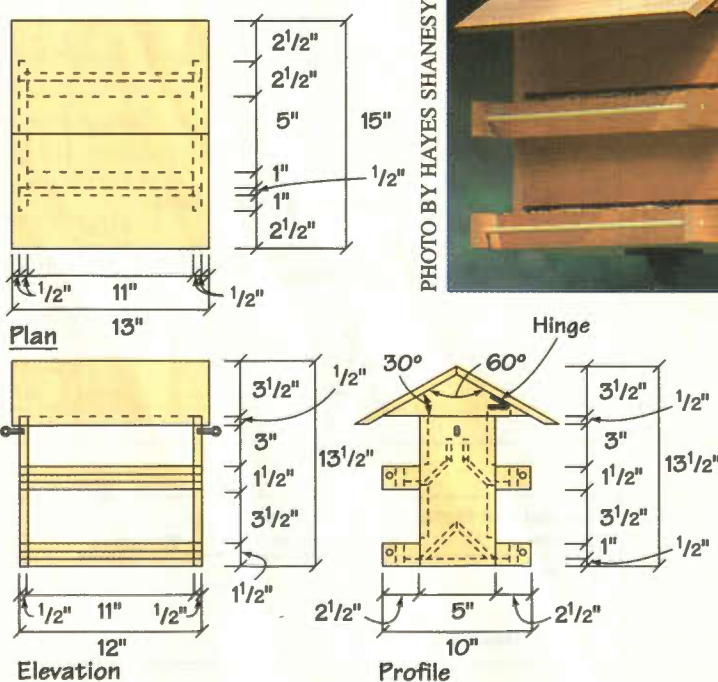


Birdfeeder Buffet

There's plenty of room for all your winged friends at this two-story birdfeeder. Start by cutting all the pieces to size, then re-cut both long sides of the lower and upper angled feed chutes at a 45-degree angle. Tack the lower chute together. Then tack

the upper angled chute piece to one of the tray pieces and to the vertical feed chute pieces. Tack the sides and the bottom, lower and upper chute sections between the ends (diagram). Now attach the other four tray pieces to the outsides. Drill holes for the dowels in the dowel end pieces, then attach to the trays. Secure the dowels with a dab of glue. The roof is attached by a piano hinge to the hinge plate as shown. The feeder can be mounted on a pole or hung from two eye bolts screwed through the ends. A bead of silicone on the inside of the roof peak will keep the seed dry. Come and get it!

PHOTO BY HAYES SHANESY



Schedule of Materials: Birdfeeder

No.	Item	Dimensions T W L	Material
2	Ends	1/2" x 5" x 10"	Redwood
1	Bottom	1/2" x 7" x 11"	Redwood
2	Lower chute	1/2" x 3 1/2" x 11"	Redwood
2	Upper chute	1/2" x 1 3/4" x 11"	Redwood
6	Chute pieces	1/2" x 1 1/2" x 11"	Redwood
2	Vertical chutes	1/2" x 2" x 11"	Redwood
4	Sides	1/2" x 3" x 11"	Redwood
8	Dowel ends	1/2" x 2 1/2" x 3"	Redwood
2	Roofs	1/2" x 7 7/8" x 12 1/2"	Redwood
2	Roof peaks	1/2" x 2 7/8" x 10"	Redwood
1	Hinge plate	1/2" x 2" x 10 3/8"	Redwood
4	Dowels	1/4" x 12"	

Wall-hung Quilt Rack

By David Camp

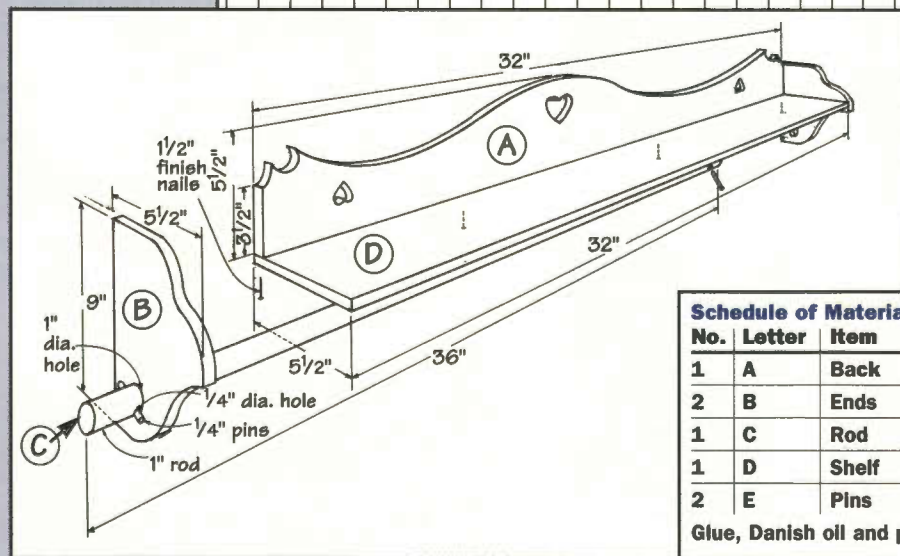
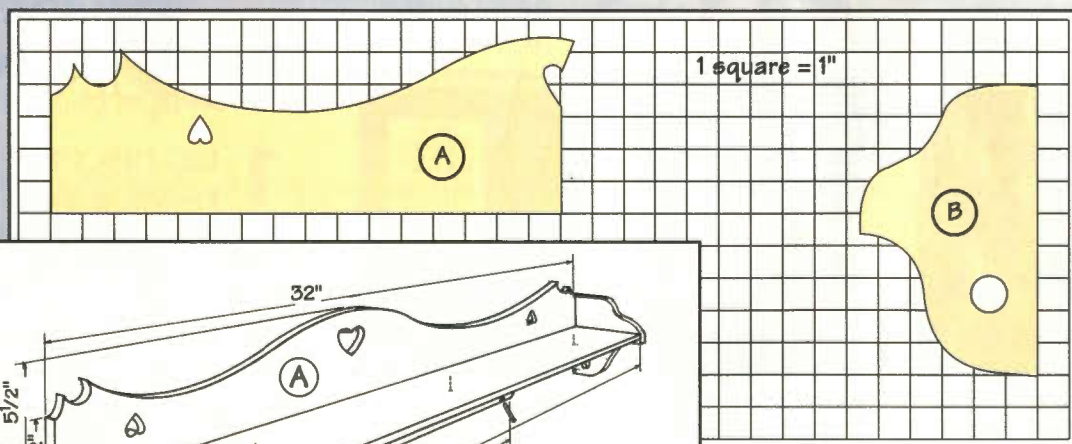
If there's a quilt maker or collector in your family, this project is sure to please. It's an ideal size for displaying a baby quilt or a small wall hanging. If your quilter likes to make these heirlooms as gifts, building this rack allows you to participate.

Enlarge and transfer the pattern for the back (**diagram**) onto your material. Use Forstner bits to drill the lobes in the hearts. With a scroll saw, complete the cutouts.

Now tape together the two end pieces. Transfer the pattern provided, and cut it out with a scroll saw. Drill a 1" hole for the rod. Be sure to back up the wood to avoid tear-out.

To assemble, run a bead of glue along the back's bottom edge, then position the shelf and nail. Put glue on the ends, position the shelf ends so that their top edges are flush with the top edge of the back, then clamp.

Now slip the rod in place and mark to drill $\frac{1}{4}$ " holes for the dowel cotter pins. Then finish the project with two coats of Danish oil and paste wax. Use the upside down hearts to hang the rack from nails.



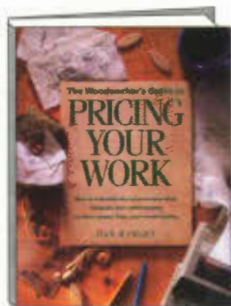
Schedule of Materials: Quilt Rack

No.	Letter	Item	Dimensions T W L	Material
1	A	Back	$\frac{1}{2}$ " x $5\frac{1}{2}$ " x 32"	Walnut
2	B	Ends	$\frac{1}{2}$ " x $5\frac{1}{2}$ " x 9"	Walnut
1	C	Rod	1"-diameter x 36"	Walnut
1	D	Shelf	$\frac{1}{2}$ " x $5\frac{1}{2}$ " x 32"	Walnut
2	E	Pins	$\frac{1}{4}$ "-diameter x $1\frac{1}{2}$ "	Walnut

Glue, Danish oil and paste wax



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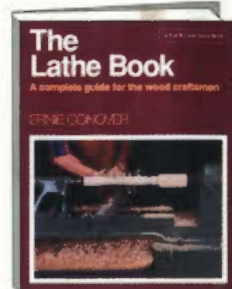
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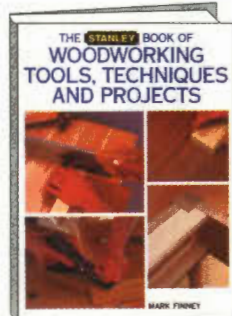
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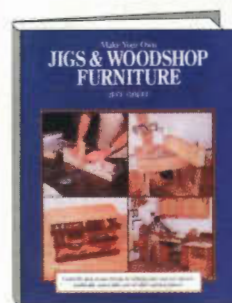


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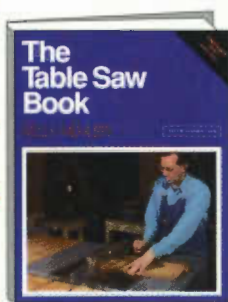
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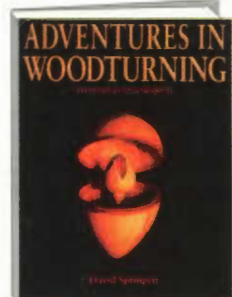
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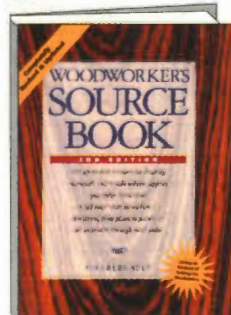
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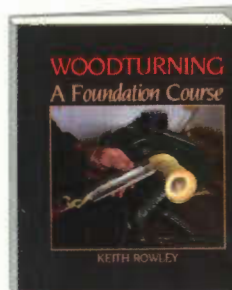
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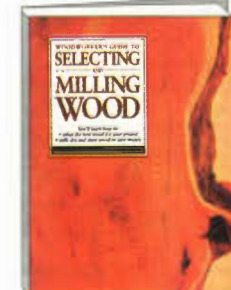
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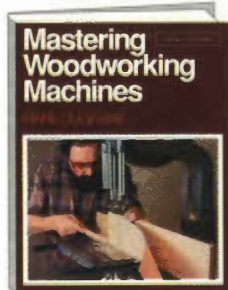
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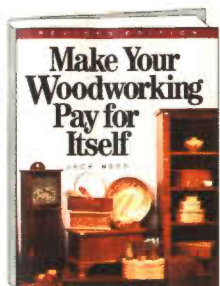
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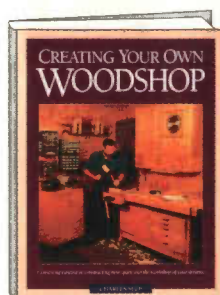
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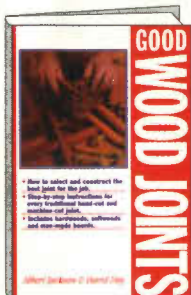
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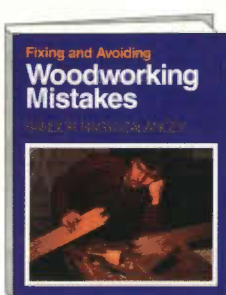
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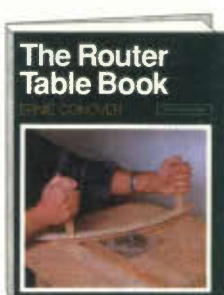
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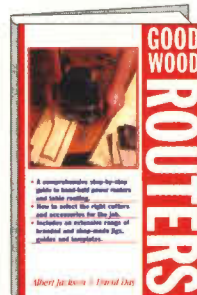
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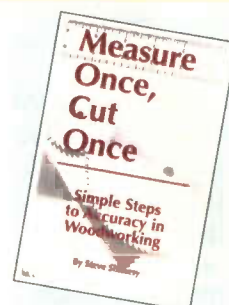
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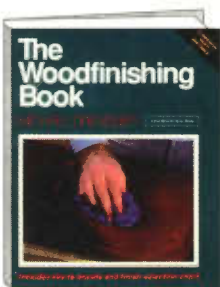
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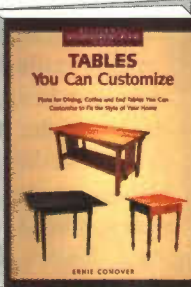
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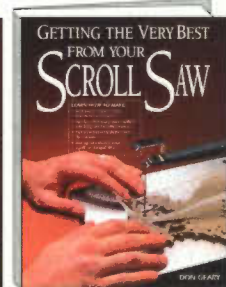
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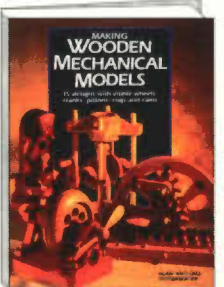
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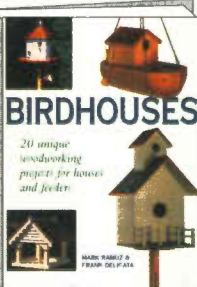
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Sanding Secrets

Open coat or closed?

Garnet or silicon carbide?

What sandpaper to use when, and why!

By Michel Theriault

SANDING IS FREQUENTLY DESCRIBED as the most tedious and disliked task in woodworking. Because of this, it's often the most neglected step, which can prove disastrous to your project. No matter how good a finisher you are, a poor sanding job will result in a bad finish.

Choosing a Grit

A well done sanding process doesn't mean you should polish the wood until it's completely smooth. It's important to maintain some tooth in the surface so the finish can adhere to it. For example, sanding hard maple to 400 grit may give you a smooth, shiny surface that is silky to the touch, but that much sanding burnishes the wood and seals the pores. This prevents penetration of the stain or oil and may cause the finished job to look blotchy.

Choosing the most suitable final grit depends on several factors. For harder woods, you will seldom need to exceed 220 grit. For softer wood, you could go up to 320 grit, but this probably won't be necessary.

Consider the Finish

Other important factors in deciding what grit to use include your choice of finish and the effects you want. For staining, the sanding job greatly affects how well the wood accepts the stain. The finer you sand, the less penetration you will get. If you are looking for a deeper penetration (more bite), sand to one less grit size than normal. If the texture isn't as fine as you like after the stain is applied, put some extra effort into rubbing out your finishing coats.

Like stain, an oil finish relies on penetration to do its job and get the right effect. Don Opalka of Mohawk Finishing Products suggests you'll get better penetration with a coarser grit and doesn't recommend ever exceeding 220 grit. For the deepest penetration and best results, apply the first coat of oil over a relatively coarse surface that has been sanded to no more than 150 grit. Then lightly sand with progressively finer grits between coats of oil until you achieve the effect you want.

Varnish, polyurethane, shellac and lacquer (the so-called skin or film forming finishes) don't rely on penetration as oil or wax finishes do, yet your surface still needs some tooth for the finish to adhere. Don't sand past 320 grit for any of these finishes, and generally 220 grit is fine. So to apply these finishes properly, apply more than one coat with a fine scuff sanding between coats. This produces a final finish that is much smoother than the sanded wood you started with.

What Is Sandpaper?

Good results don't just come from the tools you use, but from the cutting edges on those tools. Sandpaper provides one of those cutting edges, and knowing its capabilities, its limitations and how to use it properly will give you the best possible results. Sandpaper has four basic features: mineral type, grit size, backing and grit coverage.

Minerals

The predominant types of minerals used as a coating for sandpaper are aluminum oxide, garnet and silicon carbide. Two factors influence the performance of these minerals: their ability to fracture and hardness.



Silicon Carbide

As the hardest sandpaper mineral, it's quite brittle and fractures readily during use. This breakage introduces new cutting surfaces to the wood, yet wears down quickly, especially with power sanding. This feature makes silicon carbide attractive

for fine work or sanding hard finishes, but it isn't the best choice as a general use sandpaper.



Aluminum Oxide

Aluminum oxide is almost as hard as silicon carbide, but it's much tougher, and wears down more slowly without constantly fracturing into fresh cutting edges. Aluminum oxide's durability makes it the best choice for power sanding. The speed and

power of today's sanders compensate for aluminum oxide's duller cutting edges.



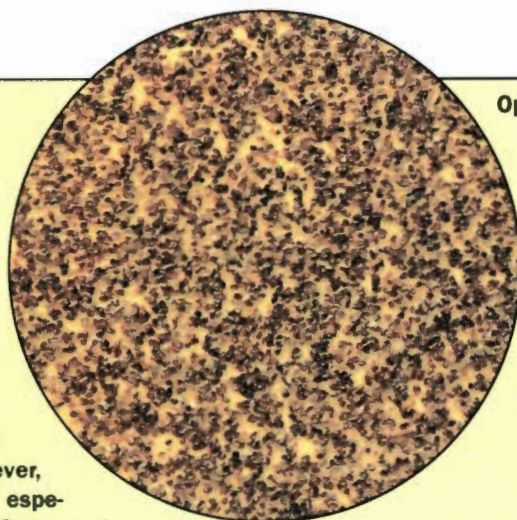
Garnet

The softest of the three materials, garnet also fractures as it wears, creating fresh cutting edges. For power sanding, garnet is less durable than aluminum oxide but more durable than silicon carbide. It works well for hand sanding, but is used more often for power sanding.

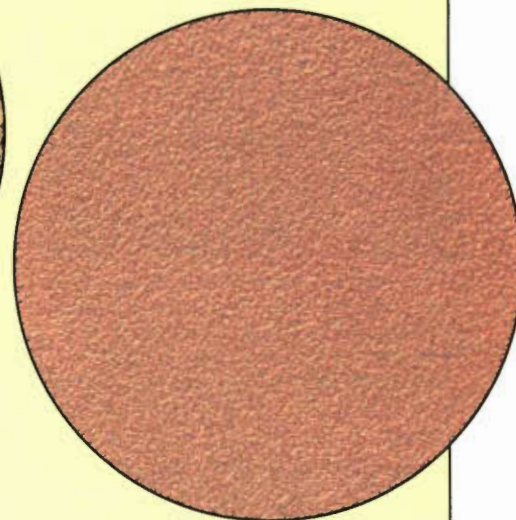
Grit Coverage

There are only two designations for grit coverage: open coat or closed coat. Closed coat paper holds a 90 to 100 percent grit coverage on the backing. Open coat usually ranges between 40 and 70 percent coverage.

Closed coat sandpapers cut more aggressively. However, they will also clog up easily, especially with finer grit papers. Open coat paper reduces clogging and extends the sandpaper's life.



Open Coat



Closed Coat

Grit

Sandpaper is sold in fairly standard grit sizes of 50, 80, 100, 120, 150, 180, 220, and even 360. Some manufacturers package their sandpaper for the consumer woodworking market using a less precise designation like this:

Extra coarse	36-40 grit
Coarse	50-60 grit
Medium	80-100 grit
Fine	120-150 grit
Extra fine	180-220 grit

If you're buying your sandpaper packaged this way, it may be worthwhile to peek inside and read the print on the back of the sandpaper to see exactly what grit you're buying.

For properly surfaced wood, you'll probably start sanding with 100 grit and end with 220, stepping through the grit sizes for the best results. Many of the papers above 220 grit are sold for specialty applications such as wet sanding or as finishing paper, and are seldom used on bare wood.

Backing

Sandpaper backing comes in weights from a light paper (A) (often used for hand and contour sanding) to an industrial paper (D) used for large industrial sanding equipment. The heavier paper will be more durable, but won't be as flexible for curved surfaces. Logically, the heavier backed paper isn't necessary if your grit becomes dull long before your backing wears out.

Different weight papers usually correspond to a particular grit size in sheet papers. In general, they are as follows:

	A Weight	C Weight	D Weight
Aluminum oxide . . .	80-220	100-150	36-80
Garnet paper	80-220	100-150	50-80
Silicon carbide	80-500	100-180	N/A

WOOD WORDS (wood words) n.

bite: Related to "tooth," the ability of stains, dyes and oils to penetrate the sanded surface, leaving more color or oil behind when wiped off.

loading: The filling or clogging of the spaces between the grit in sandpaper, usually by sanding dust, preventing the grit's sharp edges from cutting.

pig tail: The small, round-shaped scratch made by the orbital sanding action of the orbital or random orbit sander. Also known as donuts or swirl marks.

tooth: The porosity remaining in the sanded wood surface makes it more or less accepting of stains, dyes and oils. Less tooth results in diminished capacity to accept stain color.

Power Sanding

Power sanding tools are basically very efficient labor saving devices. If you approach them this way and apply good sanding techniques, you're sure to get the best results out of your equipment.

Currently, four types of hand-held power sanders are on the market: detail sanders, orbital (pad or finish) sanders, random orbital sanders and belt sanders.

Detail sanders are the latest addition to the market. As a specialty sander, detail sanders reach places that standard power sanders can't by using specially formed sanding pads.

Orbital sanders (so named because the sanding pads move in a repeating orbital motion in a single horizontal plane) are reasonably inexpensive and were the most common sanders used for finish work until the introduction of the random orbit sander.

The random orbit sander combines orbital action with a random motion and a more powerful motor. This combina-

SANDING SECRETS



White ash prepared using a random orbit sander. A light stain was applied to show sanding marks left behind. The left side was sanded to 120 grit and the right side to 150 grit.



White ash prepared using an orbital sander. The right side has been sanded to 150 grit and the left side to 120 grit. The light stain highlights sanding marks that look like long spirals. The random orbit sander would break up this pattern.



To more clearly illustrate sanding abrasion left behind, we sanded the above piece of ash with an orbital sander and 60 grit open coat paper. The deep spirals resulted from a worn-out pad on the sander.

tion is aggressive while also having enough finesse for finish sanding. A random orbit sander can give you a better finish than an orbital sander using the same grit. In actual use, Dave Sutton of DeWalt suggests that where you may have sanded up to 220 grit with an orbital sander, you could get away with stopping at 150 grit with a random orbit sander, saving both sandpaper and time. George Hunter of Ryobi adds that a random orbit sander equipped with a coarser grit will produce the same finish as an orbital sander with a finer grit.

In practice, you will almost always get a better finish power sanding than you will hand sanding. The simple reason for this is the relative speed of the abrasive. The rapid, repetitive motions of the power sander makes a much shorter scratch pattern. The random orbit sander improves upon this by making the pattern random and the scratches even shorter.

These short strokes are harder to see than long, straight parallel scratches produced by hand sanding, even when you view the board held at an angle to the light. A representative from 3M verified this relationship by performing measurements on uniform surfaces. This manufacturer acknowledges that the difference is difficult to see in normal applications, but would be more apparent after staining and finishing.

"Good results don't just come from the tools you use, but from the cutting edges on those tools. Sandpaper (grit) is one of those cutting edges, and knowing its capabilities, its limitations and how to use it properly will give you the best possible results."

— George Hunter, Ryobi

One problem found with orbital sanders is the small concentric scratch patterns called "pig tails" that are left on your work. The coarser the grit, the more noticeable the pig tails. Keeping the sander moving will reduce these. However, if they're

too noticeable, hand sanding using a fine grit, following the direction of the grain, will eliminate them. The random orbit sander reduces this effect by breaking the pig tails up with overlapping orbits in different directions.

The Action of 5 Hand-Held Sanders

- 1 Detail sander:** Either oscillates or vibrates left and right. It approximately produces 7,000 strokes per minute with a 3.5mm arc. Fits into tight corner spaces and won't bounce off inside corners.
- 2 Orbital sander (pad or palm sander):** Sandpaper moves in fixed orbits of 10 to 15,000 orbits per minute with anywhere from $\frac{1}{16}$ " to $\frac{1}{8}$ " diameter orbits.
- 3 Belt sander:** Linear motion in the direction of the belt range from 775 to 1,150 surface feet per minute.
- 4 Random orbit sander:** Combines the action of an orbital sander with a random freewheeling action to create orbits which are random in their size and direction.
- 5 Dual action (DA) sander:** Ostensibly designed for the auto body shop, this machine has been used and misused in the woodshop. More aggressive than an orbital or random orbit sander, it combines the action of a pad that spins and rotates simultaneously.



Belt sanders quickly remove material in an effort to prepare the surface for an orbital sander. Used with coarse grit belts, they are considered taboo in some shops because they're too aggressive for finished work. However, they do offer a fast alternative to planing uneven surfaces.

With any power sander, it's important to use proper pressure. Both DeWalt and Ryobi experts advise letting the machine do the work; you should use only enough pressure to be in control of the tool. Excessive pressure will overload the motor, which shortens its life. Pressure will also load the sandpaper faster and slow down the orbital action. In fact, DeWalt literature advises that with a random orbit sander, too much pressure will also reduce the free rotating random action.

Sanding

Sanding requires planning and paying careful attention to the process. Finish sanding will rarely start with less than 100 grit. If your work has been properly dressed by power or hand planing, you should be able to start at 120 grit. When choosing a final grit, consider whether you will be staining, the final finish you will use, and of course, the type of wood.

Begin by examining all surfaces. Make a note of areas that may require special attention or a coarser grit. Deal with these before beginning the sanding process. Depending on your project, you may want to do most of the sanding before assembly. If you do so, stop short of your final grit, say at 150 or 180. Then complete the sanding with the final grit once you've assembled the project.

Be sure to sand all the components to the same grit, especially if you intend to use stain. This will ensure an even coloration. At Star Finishing Products, Larry Smith recommends sanding a scrap piece along with your project and doing a test with your stain on the scrap before tackling the main project. This will give you the most accurate preview of the final results of your sanding and staining job.

Whether you use a power sander or sand by hand, maintain an even pressure with constant motion uniformly across the surface. Do not put pressure on the edges of the sanding pad to deal with a trouble spot. Your efforts may take care of the trouble spot, but will "dish-out" your surface, leaving it visibly uneven, and quite conspicuous after finishing. Spend a little more time and effort and "feather out" the trouble spot to include a gradually larger area. If this is done right, the trouble spot will be barely noticeable after the finish is applied.

To avoid rounding the edges of your work, stop when the pad is less than half-way over the edge and either lift off or reverse your direction.

Don't forget to sand the end grain, particularly if you're

"During the sanding process, a mineral has to break down, so it must be harder than the wood being sanded. However, many of the minerals used are too hard. Aluminum zinc and some of the ceramic coating sandpapers are designed for the metal and steel industry. Sure, it will dimension wood quickly, but the sharpness disappears quickly while a lot of grit will still be on the paper. The full life of that paper isn't utilized, and you won't get your money's worth out of the paper."

—Greg Bleggie, owner of Econobrasives

staining or finishing with oil. The end grain will darken more than necessary if you haven't flattened the fibers by sanding. If using a power sander, make sure your hand remains steady to avoid rounding over the edges. Many pads used on power sanders have a soft subsurface, which can increase the likelihood of rounding end grain. A flat sanding block without any padding may take a little more time, but will reduce the risk of rounding. To help reduce the porosity of the end grains, sand in only one direction.

Run right through the grits without skipping, and check the surface with a sidelight each time to make sure you've removed all scratches from the previous grit. Carefully brush or blow off all the dust between grits. Broken, stray grit from the previous sandpaper can become lodged between the work and your sandpaper, causing deep scratches. Do the same before applying your finish.

"Where you may have sanded up to 220 grit with an orbital sander, you could get away with stopping at 150 grit with a random orbit sander, saving both sandpaper and time."

— Dave Sutton, DeWalt

Using your sandpaper beyond its functional life is self-defeating. Knowing when to change your paper and taking the time to do it will not only produce better results, but will do so in less time, with less effort than would applying more pressure. Both DeWalt and 3M identify loading as the typical endpoint of sandpaper life. Loading is the clogging of the spaces between the particles of grit. This loading often appears as hills or pills, lifting the paper (and the grit) above the work and bur-nishing the wood. Periodically brushing or blowing away the dust while you are sanding will help reduce this unwanted effect.

Proper sanding will help make the finishing part of your projects more rewarding. Like all aspects of woodworking, care and attention must be given to this important step to achieve superior results. While few will dispute sanding is a thankless chore, knowing your abrasives will help make the job easier. **PW**

Michel Theriault specializes in carving, turning and cabinetry. He is based in Ontario, Canada.

Plastic Laminates

Now much more than an inexpensive second best, many laminates are the first choice for furniture designers.

By James Barrett

IN THE EARLY '50s, plastic laminates were just coming into their own as a popular material for furniture and architectural surfaces. Modest tract homes sported bathroom and kitchen countertops in the "marbleized" or infamous boomerang pattern. Many living rooms featured a boxy, dark red coffee table with a slightly mismatched "fake" wood grain top.

Thanks to more sophisticated printing and texturing processes, today's laminates are a far cry from the limited selection of solid colors and obviously fake wood grains and marbleized patterns. In fact, four major U.S. laminate manufacturers (Formica, Nevamar, Pioneer Plastics and Wilsonart) now offer hundreds of color and pattern combinations, including many realistic wood, granite, slate, onyx, marble and leather patterns (**photo 1**).

It's commonly misconceived that laminates are only used in cheap particleboard furniture. However, many custom designers now specify laminates due to their durability, economy and wide range of design opportunities.

Generally, plastic laminates will outlast a finished wood or wood veneered surface many times over without need of repair or refinishing. On the down side, when the surface does eventually become chipped, scratched, stained or abraded, there's no easy fix, so you'll have to replace it. But, as one of my sources quipped, "You'll probably get tired of the pattern before the stuff wears out."

What Is Laminate?

The manufacturing process for making most plastic laminates hasn't changed much over the years. The material consists of a melamine (plastic) coated decorative paper placed over a phenolic-resin impregnated kraft paper backing. The layers are then bonded under high heat (about 300 degrees) and pressure (about 1,000 psi) to produce an extremely dense, abrasion-resistant, homogeneous material. Surfaces include matte, glossy or textured to simulate wood grain, slate, leather, etc.

Grades: General-purpose laminates come in two basic grades. The horizontal grade is designed for countertops,



PHOTO COURTESY OF WILSONART INTERNATIONAL INC.

Laminates serve lots of purposes, including tops, cabinet sides and drawer panels. Solid surfacing materials, sold by most laminate dealers, even serve as architectural rosettes on the window frame above.

tabletops, and other horizontal surfaces subject to wear and general abuse. About .048"-thick (slightly less than 1/16"), horizontal grade laminates resist heavy impact better than thinner vertical grades, which run about .030" (or 1/32") thick. The less expensive vertical grades, as the name implies, are suitable for vertical, low-wear surfaces such as walls, extended backsplashes, cabinet doors and carcasses. Also available is a "post-forming" grade — a thin, pliable laminate used primarily for factory-made post-formed countertops. You might consider a post-forming grade if you need to bend the laminate to a tight radius, such as for a pedestal or waterfall table. But for all but the most extreme curves, vertical grades usually work well.

Other general-purpose laminates include thin (.020")



1 Wood, leather and slate are some of the laminate patterns and textures that are available today.



2 Also on the market are metals for accents, as well as granite and marble for cabinets and furniture.



3 The color-through laminate shows no dark edge line as does the standard phenolic-backed laminate.

backing or “balancing” sheets. They’re applied to the back side of panels to prevent the substrate from warping due to changes in temperature and humidity. As a rule, use backing sheets on the non-visible side of large panels or tabletops that aren’t fully supported around their edges by a cabinet or base.

Roughly the same thickness as backing sheets, cabinet liner laminates are used to cover cabinet and drawer interiors to provide a mar-resistant, easy-to-clean surface. These usually come in white, beige or brown.

All four companies also offer “real metal” laminates and/or thin solid metal surfacing sheets. The metal laminates are similar to conventional plastic laminates, with a layer of thin metal (typically anodized aluminum) bonded to kraft paper (**photo 2**).

Specialty Laminates: Though all laminate manufacturers offer specialty chemical-resistant, abrasion-resistant or fire-retardant laminates, they’re generally restricted to commercial or industrial applications.

Another specialty option is color-through laminates (**photo 3**). No matter how realistically a laminate may simulate other materials, one dead giveaway is the dark edge where two pieces meet at an outside corner. To avoid this, several companies offer a line of “color through” laminates.



4 The Ligna line from Formica uses wood veneer, giving a genuine wood appearance.

Each consists of many layers of colored paper sandwiched together with a melamine or polyester binding material, surfaced with a melamine wear layer. This gives laminated panels and furniture a “solid surface” appearance. The color-throughs cost two to three times more than conventional dark-core laminates, and are limited to solid colors.

While all four companies offer a healthy range of simulated wood grain laminates, Formica’s Ligna series uses real wood veneer instead of decorative papers (**photo 4**). You can specify each of these with a melamine coating (for high durability), a polyurethane coating (for better clarity and a more realistic wood look) or unfinished (to apply a matching stain and/or topcoat of your choice). Overall, these veneers are less expensive and more durable than most exotic wood veneers, and easier to apply.

All About Substrates

For all practical purposes, you have two basic choices in substrates or core materials for plastic laminates — plywood or particleboard. However, all fiberboard and plywood aren’t created equal.

Laminate manufacturers recommend 45-pound density fiberboard or hardwood plywood (birch or luan) for most DIY projects, such as cabinets, countertops, desktops, bookcases and the like. Lower grade particleboard (such as the type sold at lumberyards and home centers) or fir plywood aren’t as desirable because their rougher, irregular sur-

faces tend to telegraph through the thinner laminates and don’t offer as good of an adhesive bond. For most furniture, cabinet and countertop applications, the substrate should be at least 3/4"-thick. If you’re building a project in which the horizontal surface is only partially supported, such as a pedestal table, or a surface that will take heavy abuse or support weight, such as a workbench or machine table, move up to a 1"-thick, high-density (50-55 pound) fiberboard. While you usually won’t find the latter in lumber-



Many different edge treatments are available to bring more variety to the laminate design world.

yards and home centers, you can probably buy a piece and have it cut to size at a local countertop fabricator or cabinet shop specializing in laminate fabrication work.

PLASTIC LAMINATES

Special Tools

Chances are you own most of the tools required to apply plastic laminates.

Large sheets can be cut to rough size on a table saw or with a portable circular saw and straight-edge. On a table saw, place the laminate decorative side up; with a circular saw, cut with the decorative side down to minimize chip-out. In both cases, fit the saw with a fine-tooth plywood blade for a clean cut. You also can cut laminates to size with a router and straight bit, again using a straightedge or guide. Preferably, you'll use the router and fixed pilot straight bit (**lower left photo**) to trim overhanging edges once the laminate has been applied. I like to put a slight bevel on the outside edges with a beveled laminate trim bit and a bearing-mounted pilot jig to protect the adjacent laminate (**lower right photo**), or a laminate trimmer with an angle adjust-



Adhesives

For most applications, manufacturers recommend contact-type adhesives for applying laminates. Each company offers their own brands in brush, roller and spray grades. (Most home woodworkers choose a brush or roller grade. Spray grades are typically used only in high volume production shops.)

In the past, all of these cements were extremely flammable and toxic. But the companies now offer nonflammable, water-based cements, which I highly recommend for health, safety and environmental reasons. In fact, California and some other states have recently passed strict laws that limit or outright pro-

hibit the use of highly volatile solvent-based cements. Other states will probably soon follow suit.

During gluing, both surfaces must be completely coated and allowed to partially dry, or "tack up." Before making contact, follow label instructions carefully, especially regarding drying times. Also, before buying any general-purpose cement, carefully read the labels for appropriate surfaces and application techniques. While water-based cements work well for all of the substrates mentioned, you may need to use a solvent-based adhesive for non-porous surfaces, such as metals, ceramic tile or over existing plastic laminates.

hibit the use of highly volatile solvent-based cements. Other states will probably soon follow suit.

ment base and small straight bit. "Specialty" tools include a rubber J-roller (**top left photo**) to apply pressure to the laminate surface to ensure a good bond after contact. Apply contact adhesives with a brush, short-napped paint roller or nubbed roller (**top left photo**). For all but the smallest projects, I recommend a roller for more even coverage. Also plan on discarding the roller cover after use, it's more of a hassle to clean than it's worth.

Wood spacers or dowels come in handy for aligning the cemented laminate and substrate before the pieces make contact. Another specialty tool is a flameless heat gun to bend laminate edge strips around tight radiused corners, if your project calls for this — but that's fairly advanced laminate work worthy of its own article.

New to the laminate market is a "thin" (1/8") solid surface product from Wilsonart called Solid Surfacing Veneer, or "SSV." It has the same working properties as the thicker solid materials, such as Corian, but is applied to a substrate as you'd apply a conventional plastic laminate. SSV eliminates the dark seam at outside edges, and glue joints can be made nearly invisible. Available in whites and several simulated "granite" patterns, the surface is repairable and resurfaceable. (Scratches can be sanded or polished out.)

Now take a look at the laminate entry table on the next page. It will give you the basic techniques of applying plastic laminates. **PW**

James Barrett has 26 years of hands-on experience in DIY work, from home improvement to woodworking, and has spent 19 of those years writing about it.

Sources

Formica Corp.
1504 Sadler Circle South
Indianapolis, IN 46239
(513) 786-3400 (general info.)
For samples and literature: (800) 367-6422

Nevamar Decorative Surfaces
International Paper
Decorative Products
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Northwoods Mousetrap

By Keith Davis

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This sage advice has brought to the public domain a hundred or more ingenious ways to eliminate those little beasts from our attics and pantries. But the mice keep coming, and it sometimes seems that they're ahead.

We feel that way each Autumn here in the North country, when the first chilly nights drive the mice and shrews into our homes and cabins from the surrounding forests. The rodents sometimes come in such numbers that common spring traps are impractical to keep baiting and resetting. And some of us nature lovers believe that such a permanent form of elimination just isn't right.

There is a better alternative, however, that's interesting and satisfying to make. Use of this device, what I call the Northwoods Mousetrap, will give you, the owner of your trapline, the option of setting the little fellows free further afield or sending them for their last swim. Also, those interested in a simple but unique project for selling in gift shops or craft shows should find this to be a profitable venture.

To begin, select a pine or fir two-by-two (nominal) about 2"-long. Following the **diagram**, saw and drill the block to allow the gangplank to fit easily between the uprights. The

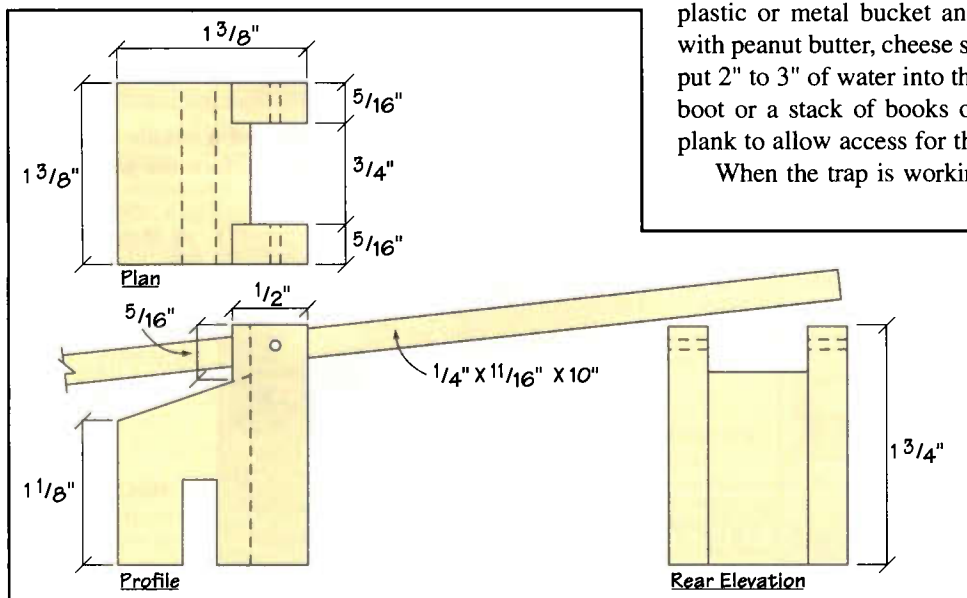


$\frac{1}{4}$ " slot across the bottom fits my buckets here. You should try one on your own buckets before making many of these. (Multiple base units can be made easily in strip form using a table saw with only a little planning, then simply chopped off and drilled.) The gangplank is simply a $\frac{1}{4}$ "-thick strip ripped off a common #2 pine board. The length is 10" and the pivot point will be about $4\frac{3}{8}$ " from the bait end. Actual pivot location may vary due to the wood density used and the type of bait selected. Fasten the gangplank to the base block with a #3 finishing nail and clip off any extra length. Note that the gangplank *must* pivot without any binding since mice really don't weigh that much.

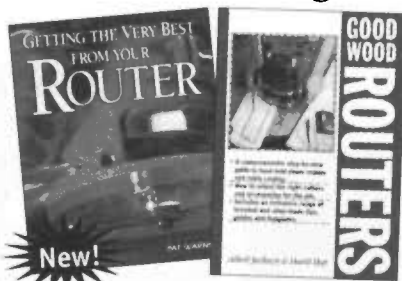
To use this trap, slip the base block over the edge of a plastic or metal bucket and bait the inside or higher end with peanut butter, cheese spread or bacon grease. You may put 2" to 3" of water into the bucket if you wish. Set an old boot or a stack of books on the outside end of the gangplank to allow access for the mice.

When the trap is working without any appreciable friction, the furry creatures will climb up to investigate the bait and be dumped into the bucket. The trap automatically resets and welcomes the next unwary diner — until you decide to put it away or you run out of mice. **PW**

Keith Davis makes and repairs violins in Stambaugh, Michigan.



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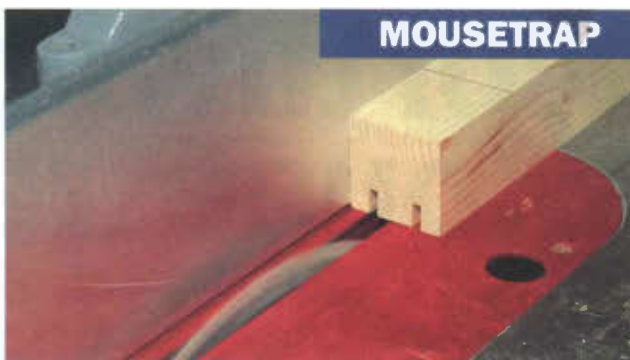
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3 After making the angle cuts and a couple straight saw passes to clear the waste, turn the piece over and part the individual traps.



4 Make the last cut between the ramp pivot points using a band saw.

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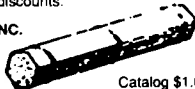
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Reader Service #145

CAPTION the CARTOON



#21

PORTER-CABLE

illustrated by Bob Rech

Submit your caption(s) for this issue's cartoon on a postcard to **Popular Woodworking**, Cartoon Caption #21, 1507 Dana Ave., Cincinnati, OH 45207 by October 10, 1996. Winning entries will be chosen by the editorial staff.

The winner receives a Porter-Cable Profile Sander Kit with in-line sanding motion for use in corners, on details and on profiles. The kit includes a mounting plate for flat sanding using standard hook and loop paper and another plate for mounting 17 different sanding profile pads which use standard adhesive-backed sanding paper. Also included is a dust wand attachment for use with a vacuum for dust-free sanding applications.

The two runners-up will each win a one-year subscription to **Popular Woodworking**.



WIN ME!

The winner of our "Caption the Cartoon Contest #19" from the May Issue and recipient of the Bosch Electronic Variable Speed Plunge Router is:

John I. Britton, from Pittsford, NY.

The runners-up receive a one-year subscription to **Popular Woodworking**:

John W. Hennika, from Canton, MI, for:

"All right, today's lesson is the putty knife and paint brush!"

Paul & Nancy Todys, from Milford, OH, for:

"I said, 'Practice on some boards in the garage!'"



#19

"Great content, good execution, let's work on material selection."

Share My Shop? Never!

Good fences make good marriages.



ILLUSTRATION BY JIM BENTON

MY HUSBAND AND I have happily shared everything, from our love, home and children to the vacuum cleaner — everything, that is, except for our shop space.

I learned the basics of woodcarving from a German woodcarver while my husband served in the U.S. Army. Also while in Germany, I rescued a derelict portable clamp-on workbench from a rubbish heap. After retiring from the Army, my husband and I settled into a nice home with a two-car garage. He immediately put a workbench up across one wall and neatly arranged all of his auto repair tools on it. Soon after, I clamped my workbench onto one end of his workbench.

Have you ever known a woodcarver who kept track of every chip? I haven't, either. So what if one or two of my chips managed to fall into his crankcase, valve covers, or whatever. That was nothing compared to the axle grease smudges and motor oil splashes which ended up on my nearly finished masterpieces. Not to mention the countless hours I spent sharpening a 50-dollar chisel, which he claimed to have mistaken for a screwdriver. Clearly, it was not a peaceful co-existence.

When I insisted upon breaking in my new band saw at the same time he wanted to play with his tappets, it became evident that the only solution was divorce — for our shop.

He moved *my* car out, walled in that corner of the garage, and moved me in. My car might have been out on the street, but *I* was in, in my very own space — until he decided that he needed an office, and his desk would just fit behind my band saw.

It wasn't long until the sawdust in his drawers became intolerable, so he suggested that we have a garage sale. Well, at that point I was about ready to sell the garage, the house and everything else, and split the take. But he explained, "Let's sell all that junk in the storage shed, then you can have it for a shop." I agreed after he pointed out that there would be space in the shed for a table saw, router and a few other little things I wanted to expand my woodworking. Once again we had a happy separation.

Then my husband hit the California Lottery. Perfect, now we could buy that dream acreage in the country and build a real shop. A house, too, of course. When the woodshop/garage was ready, it seemed like a dream — plenty of room for both cars, and even more for my shop. My husband didn't intend on mechanizing any more, so he didn't need his own shop space — or so I thought.

Few good things last forever, including having my very own personal shop. My husband soon grew tired of the long commute to work, so he retired again and took up woodworking — in *my* shop!

From the beginning, he simply would not adhere to my shop rules. Clearly we were headed for another split. Once again my car was relegated to the mercy of the elements, and he set up shop in its place. But all too soon he began to complain about his space being too small and slowly moved into my space.

In exasperation, I suggested, "Build a carport onto the house for the cars, then you can have that whole space for your shop." He agreed after I pointed out that he'd have space for a scroll saw, painting table and a few other little things which he wanted so he could expand into yard ornaments and puzzles.

The carport is now built. The cars are housed. We have our separate shops. The door between us is closed but not locked. We visit back and forth, exchanging ideas, suggestions and encouragement when a project just doesn't seem to be going right. He shares his paint and screws. I share my wood rack and glue. I think our golden years are going to be golden after all. **PW**

Martha Dawson has enjoyed woodworking for 20 years, and has recently discovered that writing about it can be equally rewarding.



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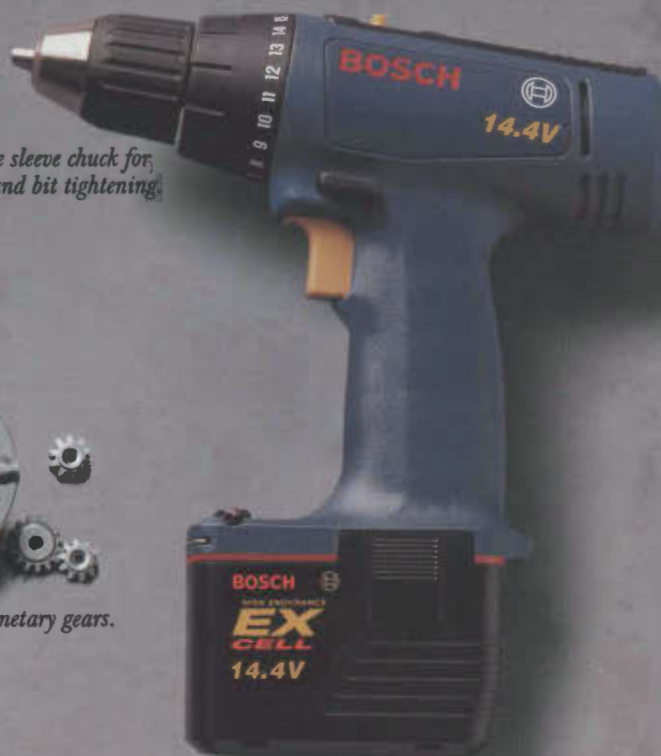


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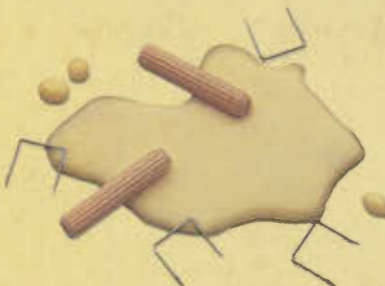
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