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See page 58

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ALL MACHINES ABOVE ARE F.O.B. BELLINGHAM, WA OR WILLIAMSPORT, PA
In our September 1992 issue, we introduced you to the WOOD® magazine IDEA SHOP™, a project that took us well over a year to plan and build. And although it was one heck of an undertaking, we're glad we did it.

The IDEA SHOP gave us our first-ever opportunity to design a woodworking space from scratch. (Boy, did we ever learn a lot!) And it allowed us to share with you quite a few ideas for making your shop a better, more organized place to enjoy your all-time favorite hobby.

For these reasons, and because of the positive response we received from many of you about our first effort, we've decided to go back to the drawing board and do the sequel—IDEA SHOP 2. This time, though, the design parameters will be different. First off, because many of you do your woodworking in your garage, we're designing the shop to fit in a standard two-car garage. (You'll still be able to park two cars in there when not building projects.)

Second, because of the double-duty nature of the shop's location, the emphasis will be on portability and mobility. When not in use, your tools and equipment will store conveniently out of the way against the walls of the garage.

And third, we're designing IDEA SHOP 2 with an eye toward keeping the cost of the project down to a reasonable level. IDEA SHOP 2 probably won't look as fancy as its predecessor, but I can guarantee you that every square inch of it will perform equally well.

As you can see from the photograph above, we're still a long way from being done with our project. But with a little luck, and if Des Moines' rivers don't rise, we'll have the shop done and ready to show you in the September issue.

P.S. Here's hoping that you have a great summer.
Better Homes and Gardens®
WOOD
THE WORLD’S LEADING WOODWORKING MAGAZINE
APRIL 1994 ISSUE NO. 69

WOOD PROFILE
Eastern red cedar: the fragrant survivor

Pinkish heartwood and a pleasingly sweet aroma make this wood the first choice for lining closets and chests.

CRAFTSMAN CLOSEUP
Cases to catch a craftsman’s fancy

When Illinois woodworker George Goatey builds the basic box, he’s only just begun. See how he then adorns his boxes with straps and hinges, leafy plants, sunflowers, carpenter’s tools, and other relief-carved designs.

The cover-up specialists: wood putties

Hide nail holes, splintered edges, and other flaws in wood with one of the hardworking products tested here.

SHOP-TESTED TECHNIQUES
Router-table turning

Make tapered spindles for table legs, and then add flutes, beads, or coves to them using our special, multi-purpose jig and a table-mounted router. Your friends will swear you’ve done it all on a lathe.

Stylish storage

Keep CDs, cassettes, and videocassettes organized and in easy reach with this attractive cabinet, complete with pull-out shelves.

Boy, do they ever know their wood!

Travel with our own Pete Stephano as he pays a visit to the U.S. Forest Service Forest Products Laboratory in Madison, Wisconsin.

TOOL BUYSMENSHIP
Bring in the air force

Find out how today’s air compressors (and the woodworking tools and accessories available for them) can improve your shop, as we review nine different models priced under $400.
WHAT WOODWORKERS NEED TO KNOW

The nuts and bolts of threaded fasteners

Give your outdoor furniture and other heavy-duty projects the needed strength and durability using the hardware choices found here.

TURNING

Restaurant in the round

Combine the plastic cylinder of a pop bottle with a few shapely turnings and create a feeder for both you and the birds to enjoy.

CRAFT SHOP

All-star cookie jar

Put our router-table turning jig (featured earlier) to good use by making this lidded container. It will look great in the kitchen.

Scrollsawed safari

Cut out and paint a jungleful of friendly animals with this exciting puzzle. Plans include a full-sized pattern.

Comfy country chair

Looking for just the right outdoor furniture for your porch, deck, or patio? We've got it! Start with the chair plans inside, and then consider building the two companion pieces—a settee and a handsome table—from our mail-order plans.

CARVING

Eek! Eek! mice

No need to shy away from these amiable rodents. They're fun to shape, and they look right at home perched on a bookshelf or on top of the fridge.

SHORT-SUBJECT FEATURES

Editor's Angle
Talking Back
Tips From Your Shop
Ask WOOD
Great Ideas For Your Shop
Products That Perform
Outdoor Finishes
Finishing Touches

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We welcome comments, criticisms, suggestions, and even compliments. Send your correspondence to: Talking Back, Better Homes and Gardens® WOOD® Magazine, 1912 Grand Ave., Des Moines, IA 50309-3379.

Reinforcing the wreath
After building the “Autumn Leaves” scroll saw pattern in the October 1993 issue, I found the wreath extremely fragile. To solve this problem, I cut a ring out of 1⁄4” Lexan (clear-plastic sheet), 1” wide and 10” in diameter. I glued this ring behind the leaves. This clear-plastic ring gives the project some much needed reinforcement, and provides a sturdy support to hang it by.

—Kevin Stoeckle, Short Hills, N.J.

Price correction
The price of the hardware kit in the Buying Guide for the “Angle Master Miter Jig” from our January 1994 issue should be $49.95 rather than the $14.95 listed. Send orders to: Miller Hardware, 1300 M.L. King Pkwy., Des Moines, IA 50314, or call 515/283-1724. We apologize for any inconvenience this may have caused our readers.

Just plane facts
In the “He Makes Old Tools Sing Again” article in the September 1993 issue, you included a photo of four planes with their blades inserted, resting on their bases. This is a “no-no” for a conscientious woodworker. It dulls the blades and makes it necessary to hone the blades more often.

I first learned woodworking using planes before I was ever allowed the use of power tools. My seventh-grade woodworking teacher taught me that planes should sit on their blades only when they are being used.

—Glenn Perlman, Houston

Most woodworkers, Glenn, retract the plane iron up and out of the mouth (opening in the sole of the plane) to prevent dulling the cutter when storing the plane. However, setting the plane on its side when interrupting work will help keep a sharp edge on the plane iron.

Continued on page 8
Super Dado

Super cuts in veneered plywood, melamine, chipboard and solid woods.

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THIS SIDE OUT

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When we listen to woodworkers, we understand what you mean — after all, we are woodworkers! You told us you needed a dado to cut plywood, solid wood, hardwood veneered plywood, laminates and melamine chip-free. You told us that it needed to cut precise slots and maintain accuracy. And it especially needed to accommodate today’s undersized plywood.

So we engineered a dado that would not only meet your needs, but would surpass your expectations. First we started with our superior tri-metal brazing to bond a special tooth design to an extra stiff blade body. You wanted dados with super smooth flat bottoms so we included 4-wing chippers. You said you hate it when chips build up in the chipper, so we perfected a gullet which ejects the chips. And then we eliminated the hub on the outside blade so chips cannot build up between the blades. What we came up with, was a dado will cut all your materials chip-free with a dado so smooth, you'll hate to cover it up.

To make it even better, we added something no other dado manufacturer has...a sixth chipper that is \( \frac{1}{8} \)" thick. That doubles the number of possible slot widths (from \( \frac{1}{8} \)" up to \( \frac{1}{2} \)" wide), and allows you to set the dado to fit today's undersized plywood. To make it even more flexible, we’ve included a set of precision steel shims for fine adjustments. Here is a dado that matches the slot width flexibility of an adjustable dado while maintaining the safety and finish of a stacked dado system.

And speaking of safety, we used the same anti-kickback technology associated with our saw blades and router bits. It's the anti-kickback shoulder design that reduces the chance of kickback from overfeeding. This higher level of safety lets you dado with confidence.

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TALKING BACK

Continued from page 6

The source of a stain

The "Autumn Leaves" article in the October 1993 issue calls for Delta's Home Decor gel wood stains. I have contacted hobby shops, and hardware and paint stores in my area, and none of them carries this product. Where can I buy this stain?

—Dale Goellns, Grand Island, Neb.

For an answer, Dale, we contacted customer service at Delta Technical Coatings. To obtain the name of a supplier near you, call or write the company at:

Delta Technical Coatings
2550 Pellisterr Place
Whittier, CA 90601
800/423-4135

Urned errors

I am in the process of constructing the "Ageless Urn" from the November 1993 issue. The carrierboard drawing gives a stave-pocket size of 1 ¾ x 8". The Bill of Materials calls for the body staves to be 1 ¾ x 8 ½". Which dimension is correct?

—Keith Lyons, Louisville, Ky.

Bill of Materials

<table>
<thead>
<tr>
<th>Part</th>
<th>Finished Size*</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>A body staves</td>
<td>1 ¾ x 2 x 8 ⅝</td>
<td>A 16</td>
</tr>
<tr>
<td>B&quot; body accent</td>
<td>⅛ x 2 ⅛ x 8 ⅝</td>
<td>W 16</td>
</tr>
<tr>
<td>C base accent</td>
<td>⅛&quot; x 5 dia.</td>
<td>W 1</td>
</tr>
<tr>
<td>D base</td>
<td>¾&quot; x 5 dia.</td>
<td>C 1</td>
</tr>
<tr>
<td>E neck</td>
<td>1 ¼&quot; x 5⅛ dia.</td>
<td>C 1</td>
</tr>
<tr>
<td>F neck accent</td>
<td>⅛&quot; x 5 ⅜ dia.</td>
<td>W 1</td>
</tr>
</tbody>
</table>

*Please read the how-to instructions before cutting these parts to width or length.

Materials Key: Ash, P-walnut, C-cherry,

You have sharp eyes, Keith! The carrier board stave pocket should be 8 ¼" long. Another reader noted that if the stave pocket depth was changed to 1 ½", and the stave width to 1 ½", the finished urn will match the plans. In fact, we goofed on some other dimensions. The corrected Bill of Materials and the revised Carrier Board drawing here should make everything right.

Continued on page 10
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◆ Why you should NEVER use a tack cloth with water-based finishes. PAGE 27.
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◆ One of the quickest and most effective ways to repair nicks and scratches. Easy and on PAGE 252.
◆ Using polyurethane? Be careful—it does NOT bond well to certain finishes or sanding sealers. PAGE 134.
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TALKING BACK

Continued from page 8

The right number for Jet
In the "Woodworking's Sure Shots" article in the December 1993 issue, we gave the wrong 800 number for Jet Equipment and Tools. The correct number is: 800/274-6848.

Give Grizzly a fair shake
I do not believe you gave Grizzly a fair shake in the "Low Cost Lathes" article in the October 1993 issue. You said you could not get their copy attachment to work on the G1174 lathe. I own and use this copy attachment every day, and I find it works very well. Granted, it takes time to set up and tune this copyer, but the result is well worth the effort.

—Jim Boyd, North Robert, VT.

More detail on screws
The article "What Woodworker's Need to Know About Screws" from the October 1993 issue didn't answer some of my questions. The article would have benefitted from a drawing of a screw, showing the parts and where measurements are taken.

—Edward F. Ronkai, Roswell, N.M.

Ed, your wish is our command. We hope the drawing below helps.

And some more
The "What Woodworkers Need to Know About Screws" article in the October 1993 issue did not give any rule of thumb for selecting the size and length of a wood screw. How does one make a choice?

—Ken Seals, Edenton, N.C.

Ken, we know of no absolute rule on choosing screw sizes and lengths. Here, however, is a chart comparing sizes and uses.

<table>
<thead>
<tr>
<th>SIZE</th>
<th>USES</th>
<th>EXAMPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>#2 – #6</td>
<td>Attaching small hardware</td>
<td>Plates, brackets, braces</td>
</tr>
<tr>
<td>#8 – #10</td>
<td>(Drywall and particleboard screws)</td>
<td>General assembly with power driver</td>
</tr>
<tr>
<td>#7 – #9</td>
<td>General assembly</td>
<td>Fastening two pieces of ¼&quot; stock</td>
</tr>
<tr>
<td>#10 – #14</td>
<td>Heavy-duty</td>
<td>Joint reinforcement and large hardware</td>
</tr>
</tbody>
</table>

Continued on page 12
RBI Woodplaners Are The Most Versatile, Affordable You Can Buy.

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Mark both sides

The outdoor oak and mahogany furniture from the June 1993 issue looked like a project I could attempt, and it really turned out quite nice. This was my first attempt at making mortise and tenon joints, and I had trouble with the mortises. The top side came out fine, but I struggled with the fit on the back of the mortise. Are there some 'tricks' to help with this?

—Matt Hawk, Woodstock, Ga.

Mark and cut a through mortise from both faces of the board, Matt, to get a clean, crisp joint. Lay out the mortise sides and ends on one face of the board. Transfer the end lines of the mortise to the opposite face using a square, (see drawing). Transfer the side lines of the mortise to the second face using an adjustable square and sharp pencil (see drawing), or better yet, a marking gauge.

Now, drill out the waste material on the mortise. Then start the corner cleanup on the first side, using a chisel to cut about half way through the board, and undercutting slightly on the ends. (See drawing.) Turn the piece over, and clean up the other half of the mortise.

Use a chisel to cut downward, only, when cleaning out the mortise. Prying out chips with the chisel will round over the mortise edges. Start the cleanout cuts in the middle of the mortise and pare towards the sides and ends. Keep the bevel of the chisel facing the center of the joint to help maintain a crisp, straight, mortise edge.
While other geniuses have been out collecting their Nobel Prizes, ours have been experimenting in the basement again.

They look harmless enough. But send these men to the basement at Ryobi R&D, and they go wild. This year, it all started with the new OSS450 Oscillating Spindle Sander— the first in its price range to combine up-and-down and rotary motion for burn-free finishes on a huge array of shapes and contours. Which led to the new BS900 Band Saw for more intricate cuts and 9” capacity. Ah, then came the TDS4000K—the only cordless drywall and deck screw gun to operate at pro-standard 4000 rpm’s. The RA202 Radial Arm Saw, with its patented Control Cut™ feature for operator-selected saw head advance and automatic return. Our ever-popular Detail Sander. And the handy AP12 Portable Planer with its quick blade changes and lateral adjustment of knives to eliminate scoring. Fact is, whatever the tool—benchtop, cordless or handheld—some Ryobi genius is always finding a refreshingly better, more accurate and efficient way to get the job done. Are they really mad scientists? Probably not. Are they coming up with products you’ll be crazy about? You bet.
**EARN CASH, PRIZES FOR YOUR TOP SHOP TIP**

Do you have a great shop tip (or two) you'd like to share with other WOOD® magazine readers? For each published submission, you will get at least $40 from WOOD magazine (as much as $200 if we devote a page or more of space elsewhere in the magazine to your idea). You also may earn a woodworking tool if we select your idea as the Top Shop Tip for the issue.

We try not to use shop tips that have appeared in other magazines, so please send yours to only one. **We do not return shop tips.** Mail your tip(s), address, and daytime phone number to:

**Top Shop Tip**

WOOD Magazine
1912 Grand Ave.
Des Moines, IA 50309-3379

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**No more digging in the sawdust for nuts and bolts**

**You can lose a lot of nuts, screws, plugs, and small parts when you vacuum dust from your benchtop or drawers.**

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**TIP:** Cover the end of your shop vacuum hose with a screen mesh and secure it with duct tape or a rubber band. Choose a mesh size large enough so that it won't clog up, but small enough to hold back the items you want to keep. When you turn on the vacuum, dust passes through the mesh, but nuts, bolts, and small items stop at the screen where you can brush them off easily.

—Jerry Roy, Vinemont, Ala.

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**Get a grip on glue-ups with an end brace**

**Keeping the boards in a panel flat during edge-gluing operations challenges even the best woodworkers. Dowel pins or biscuit joinery solve the problem, but both take a lot of time and specialized equipment.**

**TIP:** To keep the individual boards flat, make two braces that slip over the ends of your panels. Cut a 2x4 as long as the panel is wide, and rip it in half to make the two braces. Mark the location of the soon-to-be glue lines on the braces, and bore holes at those locations with a Forstner or spade bit as shown in the illustration.

Next, cut a dado about 3/4" deep along the length of the braces as wide as your panel is thick. Glue and clamp the panel, and slip the two braces over the ends, centering the glue lines on the holes. The holes prevent the glue squeeze-out from attaching the brace to the panel.

—Allen L. Formby, Springhill, La.

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**Jigs hold panels on edge**

**Clamping any long narrow object, such as a door or a sheet of plywood on edge requires a door bucks or other specialized equipment that most home woodworkers don't own.**

**TIP:** Clamp large, bulky objects to your workbench vertically with these two right-angle jigs. Glue and screw together these jigs from 3/4" plywood. Place threaded inserts in your workbench at regular intervals, and fasten each jig to the workbench with a thumbscrew and washer. Secure your workpiece to the front of the jigs with C-clamps, and you're ready to work.

—Bob Shermer, Los Osos, Calif.
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Multiple cuts go faster with a step on the table

Even with a stopblock on your miter saw fence, making repetitive cuts takes time. You have to make the cut, wait for the blade to stop to safely remove the piece, and then slide the stock over to saw again.

TIP: Speed things up and make the job safer at the same time by adding an auxiliary table and high-mounted stopblock as shown above. Clamp the 3/4" thick auxiliary table (plywood or particleboard will work fine) to the miter saw table, and saw the end. Mark your stock where you wish to cut. Align that mark with the side of the blade opposite the auxiliary table. Position the stopblock against the upper corner of the stock to be cut, and clamp it to the miter saw fence.

Now, the cut-off piece will fall to the saw table. Then, as you slide the stock to the stopblock for the next cut, it pushes the piece out of the way. With this setup, the cut piece cannot bind between the stopblock and the blade as the saw returns. And because sawdust won't build up against the stopblock, you won't end up with undersized pieces.

—Harlan Flock, Long Beach, Calif.
Maybe it's time you seek professional help.

Say you've always wanted a good band saw. Or you've about given up trying to make precision cuts with your hand-held circular saw. Or perfect holes with a portable drill.

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The American Woodshop with Scott Phillips.
Multiple-pass router cuts go quickly

You like to make certain cuts with your table-mounted router in steps, cutting a little deeper each time. What you don’t like is reaching under the table to adjust the router 1/16" or 1/8" after each cut—it slows down the job.

TIP: Set your router to the final cut depth, and then leave it there. Now, make your depth adjustments by laying several pieces of thin cardboard, artist’s mat board, or poster board (all available from art-supply dealers and some crafts shops), or even 1/4" hardboard on the router table. Each piece must be wide enough and extend far enough past the bit on each side to support your workpiece properly. Cut a hole in each piece for the router bit to protrude through, and secure the pieces to the table with double-faced tape.

Bench vise stays scarce until you need it

A mechanic’s bench vise often comes in handy in a woodworking shop, but it isn’t very handy to have it taking up most of a corner of the bench when you’re not using it.

TIP: Mount the vise on a base that clamps into your woodworking vise. Cut a piece of 3/4” plywood as long as your woodworking vise’s jaws, and about 1" wider than the width of the mechanic’s vise. Mark and drill the plywood for 3/8 or 1/2” T-nuts or threaded inserts (depending on the vise’s mounting-bolt size). Cut a piece of 2x4 to fit lengthwise along the center of the bottom of the plywood. Fasten the narrow edge of the 2x4 against the plywood with screws and glue. Bolt the mechanic’s vise to the base assembly. Store the vise and base assembly out of the way. Then, when you need the mechanic’s vise, just secure the base in your woodworker’s vise.

—Bob Agner, Muskego, Wis.

—Alan Holtz, Torrance, Calif.
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Benchtop equipment doesn’t have to be on the bench
With benchtop space at a premium for most of us, permanently mounting power tools is out of the question. Here are two approaches to quick, solid temporary mounting.

TIP 1: Turn your tablesaw into a tool stand. First, cut a 3/4"-thick auxiliary base for the tool. On the underside, attach a strip that fits your saw’s miter-gauge groove.

Then, rabbet one edge of another piece of 3/4" stock, forming a lip that fits between the table edge and rip-fence guide rail. Attach this positioner to the front edge of the auxiliary base, perpendicular to the miter-gauge strip, rabbet facing out. Mount the tool.

To set up, place the auxiliary base on the saw table (the miter-gauge strip locates it). Secure it with a wedge between the edge of the table and the backside of the positioner.

—Al Eichman, Hilton Head Island, S.C.

TIP 2: Look to your lathe for a rock-solid tool stand. The lathe bed makes an ideal platform for benchtop tools.

Cut an auxiliary base large enough to accommodate the tool and span the lathe bed. Next, provide a means to clamp it to the bed. In most cases, a simple nut, bolt, and clamping-block arrangement will do the trick. You could use U-bolts or a yoke for a lathe with tubular ways.

Fasten the tool to the auxiliary base. Then, to use the tool, slide the tailstock up out of the way, set the mounted tool on the lathe bed, and clamp it.

—William Dawson, Jonesboro, Ga.
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**TIPS FROM YOUR SHOP**
(AND OURS)

Continued from page 21
Whip wandering bits
with a mason’s trowel
Try to bore into metal with a
portable drill, and your bit wanders
all over, marring your proj-
ect. Without a drill press, how do
you control the bit?

**TIP:** Make your own drill guide by
drilling an assortment of your
most commonly used hole sizes in
a mason’s trowel. To use, start your
hole with a metal punch, hold or clamp the trowel flat on
the workpiece where needed, insert the bit in the appropriate
hole, and drill.

—George L. Williams, Elk Grove, Calif.

**MORE TIPS FROM OUR WOODWORKING PROS**

- **Want to make curly tails for cut-out or carved animals?** Check out the basket reed
tails on the carved mice and the technique for making them on page 4.
- **Cutting a perfect circle freehand is just about impossible.** But with the jig we’ve built
on page 43 and a disc sander, you can sand dimensionally
true circles.
- **Adapt the auxiliary faceplate shown on page 67 for turning
toy wheels.** Select the center bolt to fit the axle hole of a
bandsawed wheel blank.
How much of your time is wasted on cleaning up the mess in your shop or work area caused by airborne dust? Whether you operate a commercial facility or just a small home shop, the CleanAir System from TotalShop can help rid the environment of the unhealthy and troublesome dust, and allow you to spend more time on your projects and less time cleaning up.

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WOOD® Magazine
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Des Moines, IA 50309-3379

De-spotting a tabletop
Is there a method to get rid of white marks left on a tabletop after someone mistakenly placed wet clothing on it?

—Robert Tredrick, North Hills, Calif.

To remove water spots from a finish, Bob, you need to remove the layers of finish that have become cloudy due to water damage. You can do this by lightly rubbing the whitened area with a fine abrasive, and repolishing the abraded finish to the original gloss.

For the traditional approach, use a small amount of rottenstone or a fine pumice, combined with boiled linseed oil, to abrade and polish the cloudy area. Rub this mixture into the affected area with a soft cloth, until the cloudy finish disappears. Apply a wax to blend the repair into the surrounding unmarred finish.

For a more contemporary approach, try Micro-Mesh abrasives. Similar to an extremely fine sandpaper, this product comes in grits from 1500 to 12000. As you work through a succession of grits, the finer abrasives will produce a glossier surface, making a match of the original finish easier. For more information on this approach, contact:

C.W. Crossen Co.
706 E. River Drive
Davenport, IA 52803
800/722-9342

If the water spot has penetrated through the layers of finish, then you need to remove the finish down to the wood. Touch up the area with a similar finish, and blend the repair into the tabletop with one of the above approaches. We do not recommend the use of polyurethane varnishes for repair of older finishes.

Continued on page 26
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HOW TO LAUNCH A WOODCRAFT BUSINESS

I want to start a woodcraft business to increase my income. Can you advise me on the best way to sell my work?

— Rashid Diyah, Richmond Hill, N.Y.

First of all, Rashid, you need to make contact with a lot of people in the woodcraft business. We presented your question to Dean Young, owner of Dean's Dreams, a retail woodcraft store in Des Moines, and a veteran crafter. He said, "Get out there. Talk with people, talk with show promoters, find out what people buy, and build it better and cheaper than your competition. The market is always changing, and this requires flexibility in the design and selection of your finished product. Look at what the other crafters have done in displaying their work, and design a display system that will meet many situations."

We also recommend going to crafts shows and talking with vendors. Many of the better craftspersons will give tips to beginners, as they know that better competition and high-quality work will bring more people to the shows. Many crafters also will display flyers for future shows.

And don't forget to contact woodworking clubs in your area. These groups often will have members who sell their products on the crafts circuit, and often will have information on local shows. Check with your hardwood supplier and community adult education classes for information about woodworking clubs in your area.

Another source of information is The Crafts Fair Guide, a quarterly publication that lists crafts shows around the nation and presents reviews of the show and the promoter. The subscription cost of this guide is $42.50 per year or $15 per issue. You can write to the publisher at:

The Crafts Fair Guide
P.O. Box 5508
Mill Valley, CA 9494

LEAVE IT TO THE PROS

Can you furnish tips on sharpening Forstner bits?

— R.C. Profit, Oak Harbor, Wash.

For an answer, we contacted Dave MacColl of Forrest City Tool Works, a manufacturer of Forstner bits. Dave said, "Forstner bits are usually professionally sharpened. This ensures concentricity, cutting edge height, and longer tool life."

Jim Boelling, WOOD® magazine project builder, agrees with this point of view, saying, "These expensive drill bits require close sharpening tolerances beyond the capabilities of most home craftsmen."

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Get belt-sanding power with pinpoint accuracy

Here's a tool that will cure an ailment we all experience—sanding drudgery. It's the Black & Decker Quantum Variable-Speed ½" Belt Sander, a specialist when it comes to sanding nooks and crannies.

With a belt width of ½", this tool works a lot like a motorized file. The 2.8 amp motor moves the belt along at 3,300 to 4,900 feet per minute. As with a big belt sander, a tracking adjustment knob centers the belt on the arm, and a belt-release lever enables you to change belts quickly. To help keep your work area cleaner, a cloth dust-collection bag attaches below the handle.

During my test drive of the sander, I realized right away that the tool cuts aggressively. I had to keep it moving over the work surface to prevent it from gouging or removing too much material. I also learned that two-hand operation is a must.

In addition to the tool's ample power, I particularly liked the clear view I had of the sanding action and its instant impact on the wood. I knew exactly how much material still needed to be removed at all times, due to the narrow, extended arm supporting the sanding belt. This design feature makes the sander an excellent tool for flush-sanding dovetails or protruding dowel ends.

If you sand a lot of woodworking, this tool will save you time and the skin on your fingertips. I give it a thumbs up, and recommend it for the serious home woodworker.

—Tested by Jim Boelling

Black & Decker Quantum Variable-Speed ½" Belt Sander, Model No. BD5900, about $60. Where Black & Decker tools are sold. Call 800/762-6672.
Benchtop jointer gives big tool performance

Smaller tools usually translate into reduced performance, but not so with this new Delta 6" benchtop jointer. In addition to excellent jointing and planing, this machine offers variable speeds from 6,000 to 11,000 rpm and easy-to-adjust knives.

Setup took me just 15 minutes including assembly of the fence, cutter guard, and cutterhead lock. The cast-aluminum infeed and outfeed tables line up level with one another, providing a total support length of 30".

During my tests, I edge-joined 3/4"-thick pine and 2"-thick oak. The aluminum cutterhead, powered by a 10-amp motor, plowed through it all without hesitation or strain, even when removing 1/16"-worth of stock. I did get some chatter when surface-planing 6" material, but the action was controllable. In both jointing and planing, the end results felt as smooth as if I’d sanded the wood. The 4½×20" extruded-aluminum fence tilts from 0° to 45° with ease and accuracy, and provides rock-steady support when jointing wide lumber. A flip-up cutterhead lock and two adjustment screws make blade-height changes, normally a frustrating task, fast and convenient.

I keep two full-size jointers in my shop, and I honestly like this benchtop model as well as either of them. The universal motor on the Delta benchtop jointer makes a lot of noise (as do all universal motors), so I recommend that you use ear protection. But that’s the only drawback I could find.

—Tested by Bob McFarlin

Delta 6" Variable-Speed Benchtop Jointer, Model 37-070, about $280 at Delta dealers. Call 800/438-2486 for more information.

Swedish combo square proves extremely accurate

Most combination squares offer reasonable precision, but you won’t find their angles deadly accurate over their length. This Nobex Automatic Locking Square gives you both superb accuracy and fold-up convenience.

The only complaint I have is that the English scale steps off in 1/4" increments—too big for many of my woodworking measurements. The metric scale, as you might expect coming from a Swedish manufacturer, uses much finer millimeter markings.

—Tested by Bob McFarlin


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EASTERN RED CEDAR

The fragrant survivor

In the 1920s, Virginia apple growers waged war on the eastern red cedar. Because the species can harbor a harmful fungus disease, it was officially proclaimed cheaper to eradicate eastern red cedar trees found near orchards than to spray the apple trees in them! But by then, eastern red cedar had already survived a major attack.

For the 100 years prior to the First World War, U.S. eastern red cedar had supplied the world with pencil wood. During the heydays of this harvest, rafts of eastern red cedar logs containing millions of board feet were regularly floated down the rivers of Tennessee and other states where the tree grew in abundance. Later, pencil-cedar buyers sought out whole cabins and even fences made from this long-lasting, easily worked wood.

Pencil manufacturers now rely on Pacific Northwest cedar and imported stock. And apple growers control disease without felling cedar trees. And although large trees are few and far between, eastern red cedar still maintains its traditional role as a woodworking stock that's perfect for trunks, chests, and closet linings because the aromatic wood lends its fragrance to stored items.

Wood identification
Depend on where you live within its range, you may call eastern red cedar (Juniperus virginiana) any one of a number of names, such as pencil cedar and aromatic red cedar. Yet, the species isn't a cedar at all; it's really a juniper.

The second-growth eastern red cedar you now find tends to be 16' or less in diameter and 20' to 50' tall. It grows practically anywhere, except in damp, spongy lowlands.

Unlike most evergreens, eastern red cedar has lacy-like fronds that turn brown with age, rather than needles. By fall, the tree bears pale, blue-green berries that were once used to flavor gin. Reddish-brown in color, the bark of eastern red cedar readily shreds and strips from the tree. Inside, the pinkish heartwood that eventually darkens to a deep raspberry shade is bordered by a thin band of starkly pale, nearly white sapwood.

Although light at about 35 pounds per cubic foot air-dried, the wood rates as having 80 percent the strength of oak. If you doubt its identity, smell the stock close to a knot. The wood's natural oil has a pleasant aroma.

Uses in woodworking
Most woodworkers recognize the widespread use of cedar for closet and blanket-chest linings. But the wood has long been the stock for boat trim, jewelry boxes, and novelty items.

Availability
Because eastern red cedar has earned cabinet-wood status, the softwood follows hardwood grades. Most boards bear the common label and a price of about $1.50 per board foot rough-surfaced. You'll rarely see boards wider than 6', longer than 6', or thicker than 1'. For closet/chest linings, you can buy eastern red cedar plywood in 1/4"-3/4" thickness, plus chipboard and 5/8" tongue-and-groove stock.

Continued
eastern red cedar
(Juniperus virginiana)

Because the days of long, wide, and clear boards of eastern red cedar have long passed, you'll have to make due with knottier stock of smaller dimensions. That means that you must carefully select your wood, looking for boards with tight knots that won't fall out when machined. Avoid, too, those boards showing surface checking—the result of hurried seasoning. Otherwise, eastern red cedar shouldn't give you any working problems. Just remember the following tips.

**Machining methods**
Eastern red cedar works great with hand or power tools, but the fairly brittle wood does tend to tear a bit, especially around knots, so keep all your cutting edges sharp.

- Always feed boards into a power planer at a slight angle to minimize tearing and chipout.
- Lighter passes when removing wood during planing or shaping with a router also will help you avoid chipping.
- Don't fail to use a backing board when drilling.
- Because the wood also tends to split, be sure to predrill for nails and screws.
- All types of adhesives work well on eastern red cedar if you remember to first wipe joining surfaces with acetone or lacquer thinner to remove natural oils.
- To retain the fragrance of eastern red cedar when used in projects such as chests, don’t finish the wood on interior surfaces. And remember that you can revive the fading aroma of old wood by sanding lightly to bring inner oils to the surface.
- Never use polyurethane and plastic finishes on eastern red cedar because the same oil that makes it fragrant also resists their adherence and they’ll eventually peel off.

**Carving comments**
Due to its softness, eastern red cedar lends itself to carving as well as it did to the pencil industry. However, you'll have to make do with small pieces to avoid knots. Then, keep these tips in mind:

- Use caution when taking deep cuts in straight grain, as the wood may tear or pop out.
- Avoid carving tiny details. The wood may not be hard enough to hold them.

**Turning tricks**
In Tennessee and parts of Arkansas where the tree grows in abundance, craftsmen turn novelties from eastern red cedar. But they avoid knotty wood and they keep cutting edges sharply honed to avoid tearout.

---

**SHOP-TESTED TECHNIQUES THAT ALWAYS WORK**

Any exceptions—and special tips pertaining to this issue’s featured wood species—appear under other headings elsewhere on this page.

- For stability in use, always work wood with a maximum moisture content of 8 percent.
- Feed straight-grained wood into planer knives at no angle. To avoid tearing, feed boards with figured or twisted grain at a slight angle (about 15 degrees) and take shallow cuts of about 1/32".
- For clean cuts, rip with a rip-profile blade with 24–32 teeth. Smooth crosscutting requires at least a 40-tooth blade.
- Avoid drilling with twist drills. They tend to wander and cause breakout. Use a backing board under the workpiece.
- Drill pilot holes for screws.
- Rout with sharp, preferably carbide-tipped, bits and take light, shallow passes to avoid burning the wood.
- Carving a softwood generally means fairly steep gouge bevels—greater than 20 degrees—and deeper cuts.

**E. RED CEDAR AT A GLANCE**

- **Cost**: $5-
- **Weight**: A
- **Hardness**: T T T
- **Stability**: T T T T
- **Durability**: A A
- **Strength**: 1 1
- **Toxicity**: C C C
- **Workability**: C C C

*Look-alike: Redwood*

Compiled with woodworkers Jim Boelling and Jim Watson Illustrations: Steve Schindler
In retirement, Illinoisan George Goatey has loads of fun adding personality to the basic box.

Cases to Catch A Craftsman’s Fancy

With a grin spreading across his neatly bearded face, George Goatey says “I’m having so much fun, I hope that I’m lucky enough to have it last 35 years, just like my job did!” And he isn’t kidding.

Ever since his retirement five years ago from the St. Louis-based Union Electric Company where he was a service manager, George, 63, has busied his days with basswood. From the spacious walkout basement shop at his home in Columbia, Illinois, he’s turned out everything from caricature carvings to ones in an old-world Santa style, and lots of gorgeous, hand-crafted boxes. In fact, George often becomes so involved in his work that his wife, Marlene, gets worried by the silence and has to check on... Continued

In his fifth year of retirement, craftsman George Goatey feels that he has never been busier—or happier. George builds special boxes for collectors who specialize, and his own carving box featuring relief-carved tools is no exception.
him. "Yeah," he chuckles, "sometimes I'll get going on a carving, and before I know it, seven or eight hours have gone by without my making a sound except the slicing of wood, and she can't hear that upstairs."

Containers for the connoisseurs of collectibles
An enthusiastic collector of hand tools, Civil-War era sewing machines, cast-iron lawn sprinklers, and Victorian pencil sharpeners, George caters his carved boxes to other such specialty collectors. "Of course, you know that people collect practically anything," he comments, glancing quickly at his carving-tool rack which is chock full of gouges, knives, chisels, and other implements of his craft that he has accumulated since he started carving eight years ago.

"Well, I got to thinking, 'What if I made special boxes to hold those things that people treasure, like pocket watches?'" And as George's large inventory attests, he made the right decision and will sell plenty of them this year.

Priced between $175 and $400, his carved boxes inform at a glance just whom and what they're destined for. For the pocket-watch collector, there's one emblazoned with a carved watch on the lid. Inside, George has customized a tray to show off an array of handsome timepieces.

A collector of leather-working tools would lean toward the chest bearing likenesses of those instruments. The cabinetmaker, or lover of the tools of that trade, would prefer a box featuring measuring devices and a miter saw.

George sees to it that others' interests won't go unsatisfied, too. That's why he crafts boxes with carved sunflowers, ones with oak leaves and acorns, or cattails, and even Christmas boxes bedecked with basswood bows, ribbons, and tiny Santas. George also accepts commissions for specific designs.

Then, too, there are those who have even started collecting the boxes. "I have people from several years ago, when I sold at my very first show, call me up to order another one. So I guess they can be collected," he points out with just pride.

Yet, although the boxes alone would be enough to sell, appealing as they do to happy customers with bountiful billfolds, George has developed a mixed-marketing strategy. He mingles the carved boxes with old-world Santas of all conceivable sizes and shapes, and relief-carved Christmas pendants and ornaments. "All I try to do is keep my carving paying for itself," explains George, "but I don't want to get tired of doing it, either. This way, when I start to get fed up with Santas or ornaments, I move to a box for a change of pace."

Why the box must always fit the board
George isn't at all consistent when it comes to building lids for his boxes, or with what hardware he attaches it to the box carcass. "I make some lids with lips, like a Roman ogee," he says. "On others, I wrap the carving on the lid right over onto the front of the box so that people really have to explore how it opens. I just do whatever seems right to me, even down to the hinges. I'll use different types and sizes—but all the same on any one."

When it comes to boards and boxes, however, the bewhiskered craftsman only goes one way. "I always make the box to fit the board, rather than the board to fit
Above: George accents his finely crafted boxes with carvings that often flow over the lid, such as this strap hinge.

Top left: This basswood creation has already caught the eye of a timepiece connoisseur. The inner tray neatly cradles ten pocket watches.

Middle left: A box destined for a cabinetmaker has an overhanging lid, one of several lid designs George uses. Note the carved hand-plane handles.

Bottom left: Flowing the lid carving over onto the front of the box requires exact measurement as well as skill.

"the box," he says firmly. The reason? It's not because George fears edge-to-edge gluing, joint failure, or wood movement, but instead, staining. "You see, with basswood, at least the locally grown basswood I get from my supplier over in Peron [Illinois], each board seems to take the stain differently. A box made up of wood from different boards could end up looking blotchy," he says.

"That's why I prefer to make the box to fit the board I have on hand," he continues. "And I'm talking a board wide enough to do the top as well as the sides and bottom without edgejoining—say nine to fourteen inches. And it has to be long enough to wrap around. I guess you could say that I wrap the board around the box!"

The many fine details of hand-craftsmanship

Like most other woodworkers in these days of reliable power tools, George relies on a planer and a table saw to machine his boards to size. But when it comes to joining, this craftsman sticks strictly to hand tools.

"I've always admired hand-cut dovetails, so that's how I assemble my boxes. But I'm not inhibited by any rules over making them."
And my customers appreciate the look, too,” says George, placing his brass-trimmed backsaw on the end of a board. “Cutting them is easy enough, it’s only the laying out that’s a little difficult.”

With his saw, George deftly follows the penciled lines that outline his dovetails on the board. “It’s these details, even if folks don’t know how they’re made, that make the boxes special,” he comments. “Even when they’re not perfect, they complement the carving. And I’ve seen boxes made 100 years ago with dovetails just like mine that have stood the test of time.”

Hand-cut dovetails undoubtedly add to the attraction people have for George’s boxes. But matched to another detail—the handles—they pale in comparison. He really knows how to handle a handle.

“If there’s a subject that’s appropriate for a handle—I mean that fits—I’ll carve it for that purpose, then glue and screw it to the box,” he explains. And what is an appropriate shape? Try spoke-shaves, planes, marking gauges for tool boxes. An enlarged sunflower bloom or a cattail works well on boxes destined for a living room or bedroom. On a Christmas box, above, look for a Santa.

Yesterday’s tools that still work today
George began collecting woodworking tools long before he became a full-time woodworker. Back in the early 1970s he learned about the joinery—and tools—of yesteryear when he and his wife owned an antique shop.

“If I had a repair to do, such as a broken part on an old chair, I couldn’t use modern tools on it. The part had to match, so I used hand tools, ones that I picked up here and there at a sale or auction. I mostly hung on to them, too, and rely on many to this day.”

Roaming two of the rooms that house George’s collectibles, he points out old plow and molding planes, saws, and cooper’s tools.
in one. In the other, there's a paddle-powered scrollsaw and a foot-operated honing wheel in front of a case filled with pencil sharpeners from the late 1800s.

"When Marlene and I go to a crafts show, I usually take the scrollsaw and the wheel," says George, "just because people enjoy seeing them work." But machines such as these aren't exclusively for demonstration—there's a matching pair in the shop that see regular use. There, in an open area near his workbench, George demonstrates, as shown left.

"None of my basswood scrap goes to waste," he says, as his hands skillfully maneuver a piece of wood against the blade's up and down motion. His foot thumps a practiced rhythm on the treadle. "And it's kinda fun cutting out ornament and necklace blanks the old way on this Barnes machine." For George, pedaling only provides a change of pace. His electric scrollsaw as well as the bandsaw see regular use.

To hone his carving tools, non-electric power also has a place. He proves it seated at his workbench, top. "I made this hand-crank honing wheel," says George. "It turns like an old pencil sharpener. I can hone gouges and V-tools on the thick leather wheel. You see, the tool's shape gets worn on the leather so that the tool tips fit in perfectly. With this, I can carve maybe fifty Santas before I have to redo the edge. I hone when the tool isn't sliding through the wood."

Two tools on George's "favorite" list receive regular honing. "I wish I could find more tools like these," says George as he fondles the handles of a pair of gouges. "The handles are of laminated rosewood and beech, and the steel was made in Sheffield, England. It really takes and holds an edge, even compared to today's steel from the same place. How much did I pay for them? Two bucks each at a flea market!"

Never remove a tool stroke
Sure, George sands his work—but only the flat surfaces. "I like to see tool marks on the carvings. If the tool's edge was sharp, these marks appear smooth, clean, and honest," he says. To the touch, his boxes defend his statement. Handling them, they feel like sculpted marble, yet with the warmth of wood. There's good reason for it, besides sharp tools.

"I mix my own blends of Minwax oil stains to get the shade I want," George notes. "Then I stain and let the wood dry thoroughly before I do any painting. When I'm ready to paint, I add any color with acrylics. Using oil stain first controls bleeding into the grain from the water-based paints."

When all has sufficiently dried, George sprays on three coats of Deft lacquer, rubbing between coats with extra-fine steel wool to smooth out the finish. "The finish not only must protect the wood, but hold up to handling," explains the carver. "I rub it down to knock the gloss, but leave as much thickness as I can."

So it goes, from carving and joinery to finishing, collecting, and crafts fairs. A pretty hectic life for a retiree? "Absolutely not!" says George. "After five years, it still feels like I'm on vacation."

Have gouges, will travel
George Goatey teaches carving seminars at Belleville, Illinois, and at other locations in the greater St. Louis area. He and Marlene also travel to a half-dozen or so crafts shows a year. For more information, write to George at: 818 South Rapp St., Columbia, IL 62236.

Written by Peter J. Stephano Photographs: Todd V. Phillips
Let's face it: From time to time we all need to use a dab or two of wood putty to cover up our woodworking imperfections. And when you do, it helps to know that you have a wood putty that will perform up to your expectations. To help you find the right product, we recently tested 10 widely available wood putties (and a homemade concoction). Here's what we discovered:

You can choose from these types
As with most wood-finishing products, advances in chemistry help make possible the continual introduction of new wood putties. To help you sort through today's choices, we'll talk a bit about five basic categories:
- **Solvent-based putties.** These products contain powerful solvents such as acetone and alcohol that give off strong odors and make them extremely flammable. These solvents also help give the products excellent performance characteristics such as quick drying and low shrinkage.
- **Water-based putties.** These relatively new products offer you a low-odor, nonflammable option in exchange for lower performance in most areas (see chart at right). In our tests, 3M Just Like Wood Wood Putty performed best, but it was also the most expensive. It's a smart choice if you don't go through lots of putty.
- **Powders.** With these products you have nearly unlimited shelf life, but you need to mix them with a liquid prior to use (a hassle if you only need a small amount). The Bix Stain Putty performed on a par with the premixed products in our test, and you can mix it with water, stain, or solvent to make it behave like a water- or solvent-based product.
- **Two-part formula.** Only one product in our test—Minwax High Performance Wood Filler—belongs in this category. It consists of a polyester resin that you mix with a hardener prior to use. Except for its wood-like color, the Minwax product reminds us of automotive body putty. Like an epoxy, it does not shrink or crack.

A word about packaging
Most wood putties come in metal cans, plastic tubes, or squeeze tubes as shown in the photo below. We found the squeeze tubes the most convenient to use.

The metal cans required the greatest effort, and most of the fast-drying, solvent-based products come in metal cans. With these you need to be careful to tightly seal the can, and turn it lid-down during storage to prevent the putty from drying out.
**HOW TO CHOOSE THE RIGHT ONE WHEN YOU HAVE SOMETHING TO HIDE**

### WOOD PUTTIES PUT TO THE TEST

<table>
<thead>
<tr>
<th>MANUFACTURER/PRODUCT</th>
<th>TYPE</th>
<th>AVAILABLE COLORS</th>
<th>MIXING REQUIRED</th>
<th>CLEANUP</th>
<th>WASHING TIME</th>
<th>DRYING TIME</th>
<th>SHRINKAGE AND CRACKING</th>
<th>SANDING EFFORT</th>
<th>SPANDER RESISTED</th>
<th>ADHESION TO REPAIRED</th>
<th>SURFACE HARDENING ABILITY</th>
<th>TAKES STAIN EASILY</th>
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<td>S</td>
<td>P</td>
<td>F</td>
<td>G</td>
<td>E</td>
<td>F</td>
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<td>W</td>
<td>E</td>
<td>G</td>
<td>E</td>
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<td>G</td>
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<td>E</td>
<td>G</td>
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<td>P</td>
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<td>**</td>
<td>Y</td>
<td>W</td>
<td>E</td>
<td>G</td>
<td>F</td>
<td>G</td>
<td>F</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>2.70 (8 oz.)*</td>
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<tr>
<td>3M JUST LIKE WOOD PUTTY</td>
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<td>N</td>
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<td>E</td>
<td>E</td>
<td>4.29 (3.5 oz.)</td>
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**NOTES:**

1. (H) Homemade
2. (P) Powdered
3. (S) Solvent-based
4. (T) Two-part polyester
5. (W) Water-based
6. (*) Product container states that you can mix stains and/or paints with product prior to application.
7. (**) Color varies according to type of sawdust used.

### How we tested the putties

To arrive at the results presented in the chart above, we put our sample putties through a variety of tests. Using numbered hardwood sticks such as those shown below, we applied the putty into 1/4"-diameter holes.

We observed the odor, working and drying time, shrinkage, sandability, and stain acceptance of each product. We also drilled pilot holes into each plug and drove screws into them to test the adhesion and screw-holding properties of the putties.

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Written by Bill Krier
Product testing: Dave Henderson

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Some reader letters really grab our attention, such as the one we received from John Grant of Palmer, Alaska. It began, “You’re not going to believe what I am about to tell you. I know how to taper a round table leg on my router table using only a straight bit.” John went on to describe his easy-to-do process for attaching wooden discs to both ends of a piece of stock, then rotating the stock over a spinning straight bit to make it round.

After reading his letter, we tried his procedures in the WOOD® magazine shop. They worked like a charm! Before too long, we found ways to produce flutes, coves, and beads, too. The results were truly impressive. Now, we’re ready to introduce you to these incredibly simple and accurate techniques.
You'll need this simple fence system
To get things under way, build the router-table fence, stops, and dust-collection accessory as shown right. The 6"-high fence works with turnings that have round or multi-sided discs up to 12" in diameter. These discs mount to the ends of the workpiece and support it as you slide or rotate the workpiece along the fence as shown left.

Discs: the key ingredient
Just as lathe-turned workpieces rotate against a cutter as they take on a rounded shape, so do router-turned objects. The low-tech solution for rotating router-turned objects: round wooden discs screwed on center to both ends of the workpiece.

To make the discs, first measure diagonally (corner to opposite corner) on the end grain of your workpiece. Add 1/4" to this measurement, and with a compass draw a circle of this diameter on a piece of 1/4"-thick stock. Bandsaw the disc roughly to shape, staying just outside the marked line. Drill a 1/8" hole through the center of the disc.

For router-table turning to work well, you must create perfect circles. Fortunately, this is easy to do. Simply make a disc-sanding jig like the one shown right. Place the hole of the disc onto the pivot pin and slowly advance the disc into the sander. Set the stopblock when the sanding surface removes stock up to the compass-made layout line. Slowly rotate the wheel to make it circular.

SAND YOUR WAY TO PERFECT CIRCLES

1/8" pivot pin
3/8" x 3/4" sliding bar
3/8" deep, 3/4" wide dado

1/8" hole in disc
Locate stop block to achieve desired radius
Auxiliary plywood or particleboard table clamped to stationary sander table

1/4" x 6 1/4" x 60" base is glued and nailed to fence with 6d finish nails, 6" center to center

Glue and nail fence to clamp boards with 6d finish nails

3/4" x 16" clamp board (length may vary with the width of your router table)

1 1/2 x 2" notch
2" drywall screw
3/4" x 4 1/2" x 4 1/2"

3/4" x 3 1/2 x 3"
6d finish nail

3/4" x 4 x 4" Dust chamber cap
Bore hole to fit your vacuum hose

1/4" x 4 x 4" DUST-COLLECTION ACCESSORY

STOP

4 1/8"

ROUTER-TABLE FENCE

3/4" x 4 1/2" x 27"
(2 of these)

2" drywall screw

3/4" x 4-1/2" x 4-1/2"

3/4" x 3 x 4"

3/4" x 2 1/2 x 3"
A couple more things you’ll need

Depending on the complexity of your design, you’ll need one or more router bits to execute various cuts. The drawing below shows some of the basic bits for router turning. How you use each one will become clear in the following sections.

**BOTTOM-CLEANING**
For cutting straight surfaces (tapers and cylinders)

**POINT-CUTTING ROUND-OVER**
3/8"-1"
For cutting beads and round-overs

**V-GROOVING**
60° and 90°
For cutting V-grooves and V-shaped flutes, and for completing round-overs at shoulders

**ROUND-NOSE**
1/8"-1/8"
For cutting coves and flutes

**DOUBLE Ogee**
3/4"-1 1/4"
For various decorative grooving and fluting effects

**OGEE**
3/8"-1 1/4"

Try your hand at a simple cylinder

After drawing diagonal lines on the ends of your workpiece, mark the centerpoint of each with an awl. Then, center and fasten a disc to each end of your workpiece with 1 1/2" drywall screws as shown right. Check to make sure that no part of your workpiece extends past the rims of the discs.

Now, position your workpiece, fence, and stops as shown right. A straight bit works for this task, but we found that a bottom-cleaning bit (also referred to as a surface-planing bit) produces an even smoother cut. (See our Buying Guide on the final page of this article for a source.)

**Note:** No matter what cut you make, remember to always center the router bit directly under the workpiece.

To make your first cut, turn the router on and slowly lower the left end of the workpiece onto the router bit (with the right-side disc in contact with the stop screw on the right-side stop).

These simple changes will help you produce a tapered leg

First, mount discs of equal size to your workpiece just as described earlier for making cylinders. With a round-nose bit, cut a groove that defines the area where the top of the taper meets the shoulder as shown right. Make these cuts in several passes, remembering to always rotate the bottom of the workpiece into the fence.

Switch to a bottom-cleaning bit, readjust the stops, and turn the leg to a cylinder as shown in Step 1 of the drawing right. Cut the cylinder no deeper than the bottom of the rounded groove at the base of the shoulder. Follow steps 2 and 3 of the same drawing to determine the size of the smaller disc at the narrow end of the taper. Mount the smaller disc and taper the leg using the same method for making a cylinder.

A round-nose bit cuts the shoulder that separates the shank from the tapered portion. Make the cut in several light passes to prevent splintering.

Although straight bits also work, bottom-cleaning bits such as this one work best for cutting flat surfaces, from the shank to the shoulder.
Move the workpiece from right to left until you contact the left-side stop. Without rotating the stock, slide it back to the right. Now, rotate the bottom of the workpiece toward the fence about 1/2" and make another cut from right to left. Repeat this procedure until you have cut the entire workpiece to a consistent diameter. Keep in mind that you’ll get a smoother surface by rotating the workpiece in small increments.

You can reduce the diameter further by raising the router bit 1/8" and repeating this process. These relatively deep cuts may leave a slightly rough surface, so remove only 1/16" or so of stock on your last series of cuts.

Finally, use a V-grooving bit to smooth the transition from the shoulder to the shank as shown in the photo below. Take light, controlled cuts to prevent grain tear-out and chipping.

With discs of different sizes you can create tapered workpieces.

V-grooving bits cut a smooth transition from the shank to the shoulder.
**ROUTER-TABLE TURNING**

Follow these easy steps for great-looking beads

To cut beads, you need a point-cutting round-over bit, generally available in \( \frac{3}{8} - 1" \) diameters. Your beads will look perfect as long as you space them accurately.

As shown below, the diameter of the bit determines the center-to-center bead spacing. After deciding how many beads you would like on your project, simply transfer spacing marks to your router fence base as shown bottom left. These marks tell you how far to advance your right hand stop for each successive beading cut. Once the right hand stop is set, snug the lefthand stop so that the stopscrew touches the disc.

Adjust the router bit so it makes a full cut. Turn the router on and hold the left-hand wheel above the router table as you set the righthand wheel against the right stop. Slowly lower the workpiece onto the router bit to start the cut, and rotate the stock to complete the beading cut. Before making the next cut, advance the righthand stop up to the next spacing mark, readjust the left stop, and make your second cut as shown bottom right.

---

**Add a classical touch with flutes**

By replacing the discs on both ends of your workpiece with flat-sided shapes such as hexagons, you can rout flutes into the cylindrical or tapered sections of your project. On a cylindrical workpiece the flutes will be a consistent depth over their entire length. But, on tapered legs, the flutes will decrease in depth over the length of the leg until they disappear, as shown in the opening photo of this article. The number of flutes will be the same as the number of flat surfaces on the shapes you attach to the ends of the workpiece. For example, hexagon ends will help you produce workpieces with six evenly spaced flutes. The drawings right will help you lay out hexagon and octagon discs. After cutting the shapes from \( \frac{3}{4}" \) stock, attach them with drywall screws so that the flat surfaces align with each other.

**Note:** You must exactly center the discs on the workpieces. Otherwise, your flutes will not be consistent in depth.

To align the flat surfaces of the shapes, set the workpiece on a flat surface as you tighten the screws as shown below. Then, add an off-center screw to each end to keep the multi-sided ends from rotating.

---

Mark the bead spacing on the base of the router-turning fence.

Point-cutting round-over bits produce perfectly shaped beads.

Discs with flat sides will help you cut evenly spaced flutes of varying numbers.
To cut the flutes, set your stops for the length and positioning of the flutes on the workpiece. Hold the left end of the workpiece above the router table, and place the right-hand shape against the right-hand stop with a flat side of the shape lying flat on the router table. Lower the left end of the workpiece onto the router bit and feed the stock from right to left. Lift the workpiece up after you cut each flute, rotate it for the next cut, and repeat this procedure.

**Laying Out a Hexagon**
- Using the same radius as the circle, strike four arcs as shown.
- Connect the intersections as shown.

**Laying Out an Octagon**
- Using the same radius as the circle, strike four arcs as shown.
- Connect the intersection of the arcs with the center of the circle.
- Connect the intersections with the circle.

---

**Large Workpieces Work Well, Too**
You can apply the techniques in this article to large objects such as pedestal columns or the cookie jar on page 70. You just need to make a few accommodations. For long projects you need to lengthen the fence. For large-diameter workpieces composed of staves, you attach discs as shown here.

**Attaching Discs to Staved Workpieces**
- Outer disc radius is approximately 1/4" larger than stave blank.
- Inner disc should fit snugly inside blank.
- 1/4" flat washer and nut.
- 1/4" all-thread rod.
- 1 1/4" F.H. wood screws.

With a large fence you can even produce large-diameter workpieces.

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**Final Touches**
Although your flutes and beads will come out pretty smooth, you'll have to sand the cylindrical and tapered portions of your workpieces. We suggest you remove small ridges and wood-grain fuzz with 80- or 100-grit sandpaper. Do the final smoothing work through a succession of 150- and 220-grit abrasives.

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**Buying Guide**
Bottom-cleaning router bits, as well as any other bit used in this article. Eagle America, 117 South St., P.O. Box 1099, Chardon, OH 44024. Call 800/872-2511.

Written by Bill Krier with Jim Downing
Illustrations: Kim Downing
Photographs: John Hetherington
Looking for a way to make some order out of those ever-growing stacks of cassettes, tapes, and CDs at your house? We can help. Our solid walnut cabinet, which features pull-out shelves and solid brass hardware, will meet the challenge—and do it with style.

Start with the basic cabinet
1. Cut the cabinet sides (A) and top and bottom (B) 1/4" wider and 1" longer than the size listed in the Bill of Materials. (We edge-joined narrower stock to form the wide panels.) Later, scrape off the excess glue and trim the four panels to finished size.
2. Cut the rabbets and dadoes in the cabinet sides (A) where shown and to the sizes shown on the Basic Cabinet Assembly drawing. Don’t forget to machine a 1/4" rabbet 1/2" deep along the back inside edge of the side panels.
3. Cut the cabinet front stiles (C) to size plus 1" in length.
4. With the surfaces flush and an even overhang on both ends, glue and clamp a stile (C) to the front edge of each cabinet side (A). Trim the ends of the stiles flush with the ends of the side panels. Sand the side panels smooth.
5. Cut a 1/2" notch 1" deep in the front corners of each top and bottom panel (B).
6. Glue and clamp the top and bottom (B) between the side panels. Check for square and that the front edges are flush. The back edges of the top and bottom pan-
A hardwood hideaway for your CDs, videotapes, and cassettes

**Bill of Materials**

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<tr>
<th>Part</th>
<th>Finished Size</th>
<th>Material</th>
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<tr>
<td>A* sides</td>
<td>9¼&quot; x 15&quot; x 31¼&quot;</td>
<td>EW 2</td>
</tr>
<tr>
<td>B* top &amp; bottom</td>
<td>9¼&quot; x 15¼&quot; x 14¼&quot;</td>
<td>EW 2</td>
</tr>
<tr>
<td>C* front stiles</td>
<td>9¼&quot; x 1&quot; x 31¼&quot;</td>
<td>W 2</td>
</tr>
<tr>
<td>D back</td>
<td>9¼&quot; x 14¼&quot; x 27¼&quot;</td>
<td>TH 1</td>
</tr>
<tr>
<td>E support</td>
<td>9¼&quot; x 4&quot; x 15¼&quot;</td>
<td>W 1</td>
</tr>
<tr>
<td>F* front base molding</td>
<td>9¼&quot; x 4&quot; x 16¼&quot;</td>
<td>W 1</td>
</tr>
<tr>
<td>G* side base molding</td>
<td>9¼&quot; x 4&quot; x 17¼&quot;</td>
<td>W 2</td>
</tr>
<tr>
<td>H* top</td>
<td>9¼&quot; x 17¼&quot; x 16¼&quot;</td>
<td>EW 1</td>
</tr>
<tr>
<td><strong>DOOR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I stiles</td>
<td>9¼&quot; x 1¼&quot; x 27&quot;</td>
<td>W 2</td>
</tr>
<tr>
<td>J lower rail</td>
<td>9¼&quot; x 2¼&quot; x 11¼&quot;</td>
<td>W 1</td>
</tr>
<tr>
<td>K upper rail</td>
<td>9¼&quot; x 1¼&quot; x 11¼&quot;</td>
<td>W 1</td>
</tr>
<tr>
<td>L* panel</td>
<td>9¼&quot; x 11¼&quot; x 22¼&quot;</td>
<td>EW 1</td>
</tr>
<tr>
<td>M* stops</td>
<td>9¼&quot; x 3/4&quot; x 23&quot;</td>
<td>W 2</td>
</tr>
<tr>
<td>N* stops</td>
<td>9¼&quot; x 3/4&quot; x 11¼&quot;</td>
<td>W 2</td>
</tr>
<tr>
<td>O* stops</td>
<td>9¼&quot; x 3/4&quot; x 23&quot;</td>
<td>W 2</td>
</tr>
<tr>
<td>P* stops</td>
<td>9¼&quot; x 3/4&quot; x 11¼&quot;</td>
<td>W 2</td>
</tr>
<tr>
<td><strong>SHELVES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q guides</td>
<td>9¼&quot; x 1¼&quot; x 14¼&quot;</td>
<td>W 8</td>
</tr>
<tr>
<td>R fronts</td>
<td>9¼&quot; x 2¼&quot; x 13¼&quot;</td>
<td>W 4</td>
</tr>
<tr>
<td>S bottoms</td>
<td>9¼&quot; x 13¼&quot; x 14¼&quot;</td>
<td>TH 4</td>
</tr>
</tbody>
</table>

*Initially cut parts marked with an * oversized. Then, trim to finished size according to the how-to instructions.

**Materials Key:** EW-edgejoined walnut, W-walnut, TH-tempered hardboard

**Supplies:** #8x1¼ flathead brass wood screws, #8x1¼ flathead wood screws, #6x1 flathead wood screws, 8x1¼ flathead wood screws, ¾x1¼ dowel pins (those with glue grooves), double-faced tape, #6x1¼ flathead brass wood screws, #17x4¼ brads, clear finish.

**Cutting Diagram**

- A: 3/4 x 11¼ x 96" Walnut
- B: 3/4 x 11¼ x 96" Walnut
- C: 3/4 x 7¼ x 96" Walnut
- D: 3/4 x 9¼ x 96" Walnut
- E: 3/4 x 5½ x 72" Walnut
- F: 3/4 x 5½ x 72" Walnut
- G: 3/4 x 5½ x 72" Walnut
- H: 3/4 x 5½ x 72" Walnut
- J: ½ x 7¼ x 96" Walnut
- K: ½ x 7¼ x 96" Walnut

*Plane or resawn to thickness stated in Bill of Materials

**Tempered hardboard**
STYLISH STORAGE

The raised-panel door comes next
1. Cut the two door stiles (I) and rails (J, K) to size.
2. Using the dimensions on the Door drawing and accompanying Section View detail, mark the dowel-hole locations and drill the holes. (We used a doweling jig.)
3. Using dowel pins, glue and dowel the door frame together.
4. Edge-join ½"-thick stock to form the door panel (L) ¾" wider and ½" longer than the size listed in the Bill of Materials. (We book-matched two pieces of highly figured walnut for the door panel.)
5. Measure the opening and cut the door panel (L) ¼" shorter and narrower than the opening.
6. Using the two-step drawing titled Making the Raised Panel below, machine the edges of the door panel.
7. Mark the locations and form the three ¼"-deep hinge mortises in the right-hand door stile where dimensioned on the Final Assembly drawing. Center the door top to bottom on the front.

Continued

Now, add the base molding and cabinet top
1. Using the dimensions on the Basic Cabinet Assembly drawing, cut the front base-molding support (E) to shape. Drill the holes and screw it to the cabinet.
2. For base molding parts (F, G), cut a piece of ¾" walnut to 4×5¼". Following the two-step Routing the Base Molding drawing below, rout along one edge of the 5¼"-long piece.
3. Miter-cut the front (F) and then the sides (G) to length. Transfer the full-sized half-pattern to the front (F) twice to mark the curves along the bottom edge. Bandsaw the curved section to shape, and drum-sand smooth. Drill countersunk holes through the inside surface of A and E and into the inside face of F and G. Screw the pieces to the cabinet.
4. Edge-join enough stock for the cabinet top (H). Later, trim the top to size.
5. Following the three-step Routing the Top drawing below, rout the decorative edge along the front and side edges (not the back) of the cabinet top. Sand the routed edges smooth. With the back edges flush and the top centered from side-to-side, screw the top to the cabinet.
of the cabinet and clamp it in place. Mark lines to transfer the hinge locations from the door to the cabinet, remove the door, and form the mortises where marked.
8 Attach the catches to the cabinet where shown on the Final Assembly drawing.

Cut and install the panel stops
1 Plane or resaw one piece of 3×36" walnut to ¼" thick. Rout ½" round-overs along both edges of the ¼" strip. See the Section View detail accompanying the Door drawing for the routed profiles.
2 Rip a 1¼"-wide strip from each edge of the 3″-wide board for stops (M, N). Then, rip two 1¼"-wide strips from the remaining stock for stops (O, P).
3 Miter-cut one stop M and one N from each 1¼×1¼×36″ strip. Miter-cut the back stops (O, P) to length from the 1¼×1¼×36″ strips.
4 Make a bit to drill the pilot holes through the walnut stops for the nails. To do this, snip the head off a 4d finish nail.
5 Chuck the headless nail into your portable drill. Turn the drill on. By holding the rotating nail against a drum sander or disc sander, reduce the diameter of the nail to the same diameter as the brad shown on the drawing titled Forming a Pilot Bit. Sharpen the point. Use the drill and “pilot bit” to drill the pilot holes through the panel stops. As shown in the Section View detail, we angled the pilot holes in the stops.
6 Build the panel stop positioning jig as shown below left. Use the jig to position the front stops (M, N), and then drive the brads as shown in the photo below. Set the brads and fill the holes (we used FIX walnut putty). Set the back stops (O, P) aside for now; you’ll add them later.

And now for the pull-out shelves
*Note: The location of the drawer guides (Q) against the inside face of the cabinet sides (A) will depend on the type of tape holders you use. Test-fit the guides (we temporarily held them in place with double-faced tape) before screwing them in position.

As shown in the opening inset photo and Final Assembly drawing, we used two pair of audio cassette holders on the top shelf, two pair of compact disc holders on the second shelf, and one pair of video cassette holders on the bottom two shelves. See the Buying Guide for our source of plastic holders and hardware.
1 Cut the guides (Q) to the size listed in the Bill of Materials. Cut a 1¼" groove 1¼" deep in each guide where shown on the Guide detail on the Final Assembly drawing.
2 Drill countersunk mounting holes through each guide, and screw them in place. (As shown in the photo below, we used a spacer to ensure accurate spacing between the guides from one side of the cabinet to the other.)
3 Cut the shelf fronts (R) to size. Rout the edges of each shelf front as indicated on the Shelf Section View detail accompanying the Final Assembly drawing.
4 Cut the shelf bottoms (S) to size. Check the fit of the bottoms into the shelf guides in the cabinet. The shelves should slide back and forth easily.
5 Glue the shelf bottoms into the ¼" grooves in the shelf fronts, checking that the shelves are square to the fronts.

Add the finish, and position the tape holders
1 Remove the hardware, and finish-sand all the parts.
2 Apply finish to the cabinet, door, door panel, back stops, and shelf fronts. Do not apply finish to the hardboard shelf bottoms (S). (We applied several coats of Watco Dark Walnut Oil Finish.)
3 Place the door panel in the door and secure the back stops (O, P). Set the nails, putty the holes, and wipe off any excess. Drill the mounting hole in the door for the pull. See the Final Assembly drawing for reference.
4 Adhere the tape holders to the top surface of the shelves.
5 Screw the back (D) onto the cabinet. Attach the hinges, pull, and catches.
Buying Guide

- Hardware and tape holders.
  Two pair 1¾×2" solid-brass cabinet hinges (32268), two ¼×1¾" brass ball catches and strikes (28613), and one brass pendant pull (35527). Kit no. 97544, $26.95 ppd. Add $3.95/pair for black plastic compact disc holders (30536), video cassette holders (30528), or audio cassette holders (30510). The Woodworkers' Store, 21801 Industrial Blvd. Rogers, MN 55374-9514. Or call 1-800-260-9663 to order.

---

Ball catch (mounts ⅛" from front edge of C)

#8 x ½" F.H. brass wood screws

#8 x 1" F.H. wood screws

#6 x ⅝" F.H. brass wood screw

1⅜ x 2" brass hinge

⅞" pilot hole ½" deep

⅞" hole ½" deep with a ⅛" hole centered inside

FINAL ASSEMBLY

Assembled shelves

Plastic tape holders

1/4" round-over set ⅛" deep along all front edges of A

SHELF SECTION VIEW DETAIL

Plastic tape holders

GUIDE DETAIL

1/4" groove 1/4" deep

1/2" deep

1/2"

8/16" hole,
countersunk

1/4"
Come with us as we visit the experts at the Forest Products Laboratory.

BOY, DO THEY EVER KNOW THEIR WOOD!
I'd been past the impressive building often on trips to Madison, Wisconsin. Traveling down University Avenue, you can't miss seeing it in the skyline. "What goes on in there? I'd often thought. Finally, last summer, I made it a point to spend a day at the facility. The visit could have been days longer. What the Forest Service researchers have found out about wood and wood products is mind-boggling, not to mention what they've got going for the future! I'm reporting on just a few things I found of interest.

Peter J. Stepanek
Senior Editor

Way back in 1910, forestry as we know it today was a little-understood science. Of course, everyone knew the role of wood. It became homes and business buildings, fences, ships, and railroad ties. And all across the northern lake states, lumber companies and their crews were harvesting vast stands of virgin white pine and hemlock to meet the demand.

But Gifford Pinchot (1865-1946), founder of the U.S. Department of Agriculture's Forest Service, saw a need to conserve this magnificent natural resource. He recognized the importance of forest management, and developed guidelines. Yet, Pinchot felt that that wasn't enough. Research, too, was needed to develop new forest products, thereby contributing to conservation by making the fullest use of our wood resource. Chipboard, for example, makes use of wood material that would otherwise be wasted.

So, in cooperation with the University of Wisconsin, the U.S. Forest Service's Forest Products Laboratory (FPL) was founded in Madison. At first, a few chemists and other scientists, along with a small support staff, took up quarters in the university. Then, in 1935, the present facility at One Gifford Pinchot Drive was built.

Naturally, buildings as well as staff have been added so that now FPL occupies a 20-acre site and employs about 350 people, including about 120 scientists—botanists, chemists, plant pathologists, engineers, biologists, physicists, dendrologists, and other disciplines. There are also eight Forest Service research stations around the nation, strategically located in timber-producing areas.

Getting to know wood from the outside in

John Zerbe, acting manager of FPL's important forest products Conservation and Recycling Technology Marketing Program, deals with basics: how to get the most wood from a tree. "We've been working with a mill that primarily saws small stuff—six- to eight-inch-diameter logs," he says in for instance. "Their [lumber] recovery had been averaging about 40 percent. Now, it's around 70 percent."

There's more to John's program, though, lots more. "Over the years, the Forest Products Lab has introduced computerized sawing which takes all the guesswork out of sawing for grade," he continues. "We've even seen research on sawing with high-pressure water jets—that's like using a laser. At present, we're doing lots of work in recycling, from the use of recycled paper in sheet goods to chipping down old pallets into wood fiber."

Across FPL's "campus," behind the sliding doors of the fiber and particle products area, some results of the recycling research program become evident. Here, chemists mix varying ingredients for fiber and particleboard, then test the products for durability, strength, paint adhesion, and other characteristics.

And many of their raw materials are unconventional. Take lignocellulosics, for example. That's a word FPL uses to describe materials that contain both cellulose and lignin, two plant substances that normally combine to form wood cells. Included in the category are grasses like flax and a bamboolike plant called kenaf. Mixed with recycled polyesters, phenolic resins, polypropylenes, and even cattle hair, they become a new generation of sheet goods.

Eventually, every new forest product or construction technique developed at FPL must undergo tough laboratory tests. Imagine a huge hydraulic press menacingly poised above a stage large enough to accommodate a modest tract home. At the flip of a switch, it lowers, slowly exerting a force that represents tons of snow on roof trusses, sheathing, shingles, and load-bearing walls. This stress test which takes place in the three-dimensional structural frame, benefits architects, builders, and do-it-yourselfers.

Continued
In the papermaking section of the plant, a small press toys with slurry made from some of San Diego’s curbside waste and wood fibers. Only instead of paper, the machine produces a space-age building material called—accurately enough—FPL Space board. This thin, light substance, with one smooth side and another that looks like a complex of tiny egg-carton depressions, can become wall sheathing, underlayment, and when covered with plastic laminate, even office furniture.

A full block away from the Spaceboard activity, you encounter the smell of burning wood. That’s not unusual, though, in the fire-safety experiment area. Here, in a carefully controlled environment, researchers test fire-retardant treatments’ effectiveness, the contribution of wall linings to fire growth, and the durability of fasteners in fire.

Of course, volumes could be written about the research and testing that continually occurs at this facility in the heart of Madison. (In fact, they’re written and published almost daily by the staff. See the box on page 57 for FPL’s address and what’s available from them.)

**Outdoor finishes that can stand the test of time**

As a research chemist conducting experiments with exterior finishes, Bill Feist has had his share of special challenges. “One year I had just a rash of calls from homeowners on the East Coast about solid-color oil stains peeling off their red cedar siding,” says Bill. “It turns out that all the siding had come from British Columbia mills, and the phenomenon was caused by what we call ‘mill glaze.’

“Although we don’t know yet exactly what causes it—the accumulation of extractives on the surface, the planing, or the drying process—mill glaze describes a condition in which the surface of the wood has hardened to the point where it can’t be penetrated by a finish, or a finish can’t adhere to it,” Bill explains. “The surface has to be roughed up for an exterior finish to last.”

At an open-air test site called Valley View, about 10 miles from the main FPL facility, Bill runs several experiments designed to test exterior finishes. And many of them back up his statement about roughing up wood for maximum finish protection. “On our siding samples here, we’ve found that a solid color oil stain on smooth, vertical-grain western red cedar can fail in six months,” he says. “But if it were abrasive-planed, then given two coats of paint, it lasts the longest of all our samples. That first coat takes a lot of paint, but it will more than double the life of the coating.”

Because FPL wanted to test the protection of different types of finishes on decking of various species and grades, they had an extensive deck built at Valley View. All the results aren’t in yet, but FPL has so far discovered that CCA-treated wood holds a finish better than redwood or cedar, and

**Surprising facts about outdoor finishes**

Here are some more—often surprising—lessons Bill has learned in the outdoors:

- Western red cedar wears away from the weather 20 percent faster than either redwood or fir and therefore requires the most protection.
- Clear finishes on all surfaces fail faster than toned ones.
- Woods with high-tannin content, such as redwood or red cedar, react with steel or electroplated fasteners. Even particles from steel wool or a wire brush on these woods can trigger a reaction under a finish.
- To renew weathered redwood and cedar, wash them with a mixture of household bleach and water.
- Never let any wood weather prior to finishing.
- To repaint a weathered finish, first sand and wash, then treat with a water repellent. But never paint over decay.
that it really doesn’t matter how the deck boards are laid. “When the bark side is up, checking and cracking results. Pith side up, you get defoliation or grain-raising,” Bill comments. “A deck manufacturer who installs 10,000 decks a year told me that the best policy is to install the most attractive side up and don’t worry about whether it’s the bark side or pith side. And that seems to be the case here.”

How dry is dry?
From his office in FPL’s main building adjoining the University of Wisconsin campus, Sid Boone fields lots of telephone calls. As part of the Wood Processing and Drying Systems program staff, he fields questions on everything from how to successfully air-dry red oak to advice on how to build and operate a solar drying kiln. And he responds to all in direct, easy-to-understand terms.

“In fact,” Sid explains, “we mail out a reply to the most commonly asked questions, just so they’ll have hard copy to refer to. And our fact sheets are written with the minimum technical jargon and maximum common sense.”

Most of the questions that reach Sid have to do with how dry the wood has to be for furnituremaking or other projects, and how to keep it that way. He has a standard answer.

“Wood is commercially kiln-dried to six- to eight-percent moisture content because that’s what homes with central heating and air conditioning will be at most of the time. So, to avoid wood movement, it has to be that low for indoor use,” he comments. “Outdoors, though, such as for porch furniture, you can use air-dried wood of higher moisture content—let’s say air-dried wood of 11 to 12 percent moisture.”

And when it comes to kiln-dried wood, Sid ends every conversation with one emphasis. “Because kiln-dried wood will pick up moisture, buy or dry only what you can use in a moderate amount of time, such as a year. And store it where the humidity approximates that of the place where it will be used after it’s made into a project.” End of lesson.

What wood is that?
Still another guru at FPL, Regis Miller directs the Center for Wood Annoyance Research. Amid a host of other duties, this accomplished expert in rain-forest woods (and most of the world’s commercial wood as well) curates the world’s largest research wood collection. It includes over 100,000 samples. With a resource like that, it’s no wonder that Regis’ department identifies wood samples for diverse organizations.

“I’ve worked with archaeologists and paleontologists to identify wood found in boats that they have unearthed that were thousands of years old,” says Regis. “We also identify wood for the National Park Service so their building restorations can be accurate. I have also worked as an expert witness to identify wood associated with crime cases. Of course, we do identifications for industry and woodworkers, too.”

But, according to the director, because FPL’s wood identification service is the only one of its kind in government, there’s a great demand on their small staff. So, an individual is therefore limited to the identification of five wood samples per year.

Written by Peter J. Stefano  Photographs: Jim Fietz
BRING IN THE SHOP COMPRESSORS

If you feel blown away by all the choices available in today's air-compressor market, you're not alone. We felt the same way before producing this article. To get a handle on this tool group, we narrowed our choice to nine models with the features that woodworkers demand, in an affordable price range. Then, we put these units through their paces to see which ones came out on top.

A mighty-handly machine to have around
As we reported in the December 1993 issue of WOOD® magazine, air-powered brad nailers and staplers have found widespread popularity among woodworkers. And for many of us, the advantages of a pneumatic nailer alone would be reason enough to own a compressor. But, the uses for these incredible air-producing machines go well beyond fastening applications.

Today, you can purchase a truly amazing array of air-powered tools for woodworking, automotive, and other applications throughout your shop and home. Some of the more commonly found air-powered tools include drills, sanders (narrow-belt, random-orbit, straightline, and palm-grip orbitals to name a few), spray guns, air brushes, impact wrenches, ratchets, grinders, tire inflators, and sandblasters. You even can buy air-powered circular saws, jigsaws, routers, drywall-texture pistols, grease and caulk guns, hacksaws, and screwdrivers.

Many of these tools cost less than their electric-powered counterparts, and they make considerably less noise. (Compressors produce quite a bit of noise, but you can often isolate this noise from your work environment by piping in the compressed air.) We also find air-powered tools easier to handle because they weigh less, and they don't require as much storage room. And because you can quickly connect any number of air tools to a single hose, you don't have to do battle with separate power cords.

Generally, air-powered tools operate more smoothly than electric versions, with equal or greater power. And, thanks to sturdy construction and few moving parts, you can't beat the reliability of a pneumatic tool.
How compressors put the squeeze on air

All compressors work in basically the same way. They pump air into a tank where it remains under pressure until you need it to run a tool. However, among our tested models, we found two distinctly different types of pumps—oil-lubricated and oil-less. Here's a close look at each:

Like the model depicted below, oil-lubricated compressors have a flywheel driven by a motor via a belt. These components turn a crankshaft that pumps the pistons up and down. On the downstroke, these pistons draw air through the air-intake valve. On the upstroke, the air pushes through an air tube and into the air tank.

As more and more air builds up in the tank, it becomes compressed to the point where the motor “kicks out”—usually 110 or 120 pounds per square inch (psi). As you use the air, the pressure drops to about 80-90 psi, then the motor “kicks in” again.

Like a car engine, oil-lubricated compressors have an oil-filled crankcase. The oil reduces the friction between the moving parts within the crankcase and cylinder block. This helps the components wear less and run cooler and quieter.

By comparison, oil-less air compressors require no lubrication because they have Teflon-coated components at the wear points between the piston and cylinder. To cool these parts, oil-less compressors have a fan-cooled open crankcase as shown right. There's no belt, flywheel or crankshaft

Continued
because the motor connects directly to the piston rod via an eccentric-bearing assembly.

Our tests revealed important performance differences between the oil-lubricated and oil-less compressors. The chart below summarizes the advantages and disadvantages of each system.

As you might suspect from reading the chart, oil-lubricated units appeal more to the serious air-power user. Oil-less units have advantages geared to sporadic users who don’t want to be concerned with routinely maintaining a compressor.

If you decide that an oil-lubricated compressor suits your needs, then you will need to choose between versions with a separate cast-iron crankcase and cylinder block, and models with a one-piece aluminum crankcase/cylinder block assembly.

Our tests showed that the cast-iron units were about two decibels quieter than the aluminum models (easily noticeable to the ear). Also, manufacturers and service personnel told us that cast-iron units hold up a little better (about 500 additional hours between pump rebuildings). On the other hand, aluminum construction helps hold down the manufacturing costs of the unit, and makes the tool a little lighter.

<table>
<thead>
<tr>
<th>THE PROS AND CONS OF OIL-LUBRICATED AND OIL-LESS COMPRESSORS</th>
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<tbody>
<tr>
<td><strong>ADVANTAGES</strong></td>
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<tr>
<td>OIL-LUBRICATED COMPRESSORS</td>
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<tr>
<td>- Much quieter operation</td>
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<tr>
<td>- At least twice as much life between pump rebuildings. (Properly maintained machines may last a lifetime.)</td>
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<td>- Very safe because of lack of moving parts and nearly total enclosure of hot components</td>
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<tr>
<td>- No chance of oil contamination in air hose.</td>
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<tr>
<td>OIL-LESS COMPRESSORS</td>
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<tr>
<td>- Little regular maintenance required.</td>
</tr>
<tr>
<td>- Most people can do pump rebuilding themselves.</td>
</tr>
<tr>
<td>- Very safe because of lack of moving parts and nearly total enclosure of hot components</td>
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**OIL-LESS MODELS**

Sears 15292
Sanborn M07F350-20
Air America F3520

Shop for air delivery, not horsepower
Power-tool manufacturers tell us that most consumers place a great deal of importance on horsepower when buying power tools. Not surprisingly, most manufacturers of home-use compressors emphasize horsepower ratings. To "pump up" the horsepower ratings, all manufacturers of compressors in this market list the "peak" horsepower of the compressor motors rather than the more realistic "continuous-duty" rating found on most stationary woodworking machines. (A motor with a continuous-duty rating of 2 hp may have a peak rating as high as 4 hp.) For this reason you can run compressors with peak-horsepower ratings as high as 4 hp on a 120-volt circuit.

But, no matter what type of horsepower rating a manufacturer uses, this specification doesn’t give you an accurate idea as to how much air a compressor will deliver. Because
the design of a compressor’s pump can dramatically affect its air delivery, regardless of the motor driving it, you need to compare air delivery rates when evaluating compressors. Manufacturers list air delivery in cubic feet per minute (cfm), and we’ve listed these specifications for the tested compressors in the chart at the end of this article.

To determine your cfm needs, check the chart left. It shows the cfm requirements for some commonly used pneumatic tools. Then, select a compressor that can deliver the amount of air required for the tools you’ll use. If two or more tools will be powered simultaneously by your compressor, then add together the required cfm.

Remember that cfm ratings only give you a general idea of what a tool requires and what a compressor will deliver. So, it makes sense to buy a compressor that’s a little more powerful than what you think you need. Also, try to anticipate future needs when buying a compressor. For example, if you don’t use a pneumatic random-orbit sander now, but think you might, you may want to spring for a compressor capable of supplying its air requirement.

In the chart at the end of this article, we rate the compressors according to how well they keep up with two tools: a random-orbit (also called dual-action) sander, and a spray gun. Note that all of the machines did a good or excellent job with these two tools in intermittent usage under average home-workshop conditions. If you use the tools in a continuous, production-type setting, you may need a more-powerful compressor. In that case, discuss your needs with an air-compressor supplier or manufacturer.

Charge Air Pro
5E30AD

Campbell Hausfeld VT6196

OIL-LUBRICATED MODELS

Sanborn
G5003PL44V

WOOD MAGAZINE  APRIL 1994
More points to consider

Air filters
We discovered big differences in the size and quality of the air filters on our tested compressors. These filters clean incoming air before it reaches the pistons. They also muffle noise somewhat. We consider this an important feature for typical dust-ridden woodworking shops.

As you can see below, we came across felt and foam filters in various sizes. The larger felt filters do the best job of filtering air.

Oil drains and plugs
Of all the tested units, only the Quincy’s provide dipsticks you can remove by hand for quickly and accurately checking the oil level. However, these were also the only oil-lubricated models that did not provide for convenient oil draining. As shown below, the oil drain on the Quincy does not extend past the crankcase, all but ensuring that you will spill drained oil on the machine. The other compressors have extended oil drains that you can place a basin under for catching waste oil as shown below. A Quincy representative said his company recognizes this shortcoming and plans to fix it by adding an extension to the oil drain.

Balance
If you need to move a compressor from place to place on a regular basis, take note of how much effort it takes to lift the front end and roll the machine. The Sears 15293 was excellent in this regard. As shown below, we could lift this well-balanced unit with one finger. It also has a 1-inch-diameter handle that we could easily grasp (most of the other units had ½-inch-diameter handles).

Tanks
A large air tank has one advantage over a smaller air tank: it will delay the time before the pressure drops in the tank and the compressor kicks in. This may buy you some extra time when using air-gobbling tools such as random-orbit sanders. But, a large tank doesn’t improve the performance of a compressor under continual-use circumstances.

Oil-lubricated compressors have felt air filters like those on the left and right from Quincy and Sanborn units. Oilless machines have small foam filters like the Air America version (middle).

Like the Charge Air Pro shown here, most oil-lubricated compressors have extended oil-drain plugs.

Good balance and a stout handle make the Sears 15293 a breeze to move from place to place.

Safety
If small children or inexperienced users frequent your shop, pay attention to the “guard” rating in the chart on the following page. Hot air tubes, spinning flywheels, and fast-traveling belts can do serious harm if not fully shielded.
Recovery time: the best machines recharge quickly

To judge for ourselves the air-pumping power of the test machines, we timed how long it took each of them to repressurize its tank. To do this, we discharged the air in the tanks until each compressor reached its kick-in pressure. With our stopwatch running, we timed how long it took each compressor to reach its kickout pressure and turn off. We repeated this procedure five times and recorded the average recovery time in the chart at the end of this article. When looking at these figures, keep in mind that it takes equally powerful pumps more time to pressurize a larger tank (the test tanks ranged from 20 to 44 gallons).

At the conclusion of this test, we were especially impressed with the Quincy 131A20PN3. True to what Quincy representatives told us, this manufacturer appears to take a conservative approach to rating the power of its compressors. Here's why: Although its cfm and horsepower ratings would make this machine appear to be about equal to, or less powerful than, most of the machines in our test, its recovery time was 16 seconds—about half the time it took other compressors to recover.

Our recommendations

At the conclusion of our testing, the Quincy 131A20PN3 stood out as the machine we would most like to have in our own woodworking shops. In addition to its excellent air delivery and short recovery time, it had the highest-quality components of any machine in the test. The Campbell Hausfeld VT6196 came in a close second among the portable units.

For those of you who make frequent use of pneumatic tools with high-cfm requirements, we give our top rating to the Sanborn G500BPL44V. With its high-output air pump and 44-gallon tank, this machine delivers a lot of value. Sanborn also manufactures a similar compressor in this price range with a 60-gallon tank.

If the benefits of an oil-less compressor appeal to you, we urge you to turn one on before making a purchase. Some people find the noise generated by these machines intolerable. But, you may be able to put up with it for occasional use, or with ear protection.

Written by Bill Krier  
Technical consultant: Dave Henderson  
Illustration: Kim Downing  
Photographs: Hopkins Associates
Woodworkers generally rely on fasteners that take their grip in the wood, such as nails or screws. But some cases call for a fastener that resists pulling out, something that acts like a clamp, something like a nut and bolt.

Nuts and bolts have a long history in woodworking. Wagons and carriages, for example, couldn’t have held together more than a few miles if builders had used only nails or wood screws.

Today, nuts and bolts come in handy for outdoor furniture, play structures, and other projects that will see rough use. They’re ideal for attaching hinges or other hardware. They allow easy disassembly and reassembly without the danger of stripping out screw holes. And, with nuts and bolts, you can make a pivoting joint that resists working itself loose.

The big three in bolts
Bolts come in startling variety. But for this survey, we’ll skip the unusual types and specialty fasteners. Let’s just look at three kinds you’ll find most useful. You can buy these basic bolts at hardware stores or homecenters.

- **Hexhead bolt.** For many, the first stumbling block is determining a bolt’s size. A string of numbers like ⅜-20×5" or ¾-16×4" isn’t exactly self-explanatory, but it is easy to decode.
  The first element in the string refers to the diameter of the bolt body, ⅜" and ¾" in our examples. The second number is the thread pitch—the number of threads per inch on the bolt. In our examples, the ⅜"-diameter bolt has 20 threads per inch, the ¾" one 16, both standard coarse threads (see the chart right for other common coarse and fine threads).
  The last number shows the bolt’s overall length, measured from the bottom of the head. Thread length varies with bolt diameter and length, generally falling within the range of twice to four times the bolt’s diameter. Though standard machine bolts don’t have full-length threads, you may find other types that do.

- **Carriage bolt.** Well-suited to joining wood or attaching hardware to wooden parts, this bolt features a smooth, domed head with a square shank right underneat, shown in the illustration. Tightening the nut onto the bolt draws the shank into the hole drilled through the wood, keeping the bolt from turning.
  Some hardware has square holes, allowing installation with a carriage bolt head on the front. Otherwise, to install hardware with carriage bolts, insert the bolt...
OF THREADED FASTENERS

Nuts and washers and such

Always place a washer between the hexhead and the wood to increase the bearing surface. You don't need a washer under a carriage-bolt head—in fact, you don't want one there at all. Likewise, put a washer under a hex nut bearing directly on the wood. You can get by without one when the nut tightens against a piece of hardware.

Lock washers can keep a nut from working loose, but there are other, neater choices. A nylon-insert locknut is a good option, one that's particularly useful for pivoting joints. Unlike a lock washer, the locknut doesn't need to be torqued down to be effective; it will stay put anywhere on the bolt threads.

Chemical thread lockers, such as Loctite (available from auto-supply stores) work great, too. They also can inhibit rust and thread seizure—a plus for outdoor projects that disassemble for storage.

Assembly couldn't be easier

Nut-and-bolt fastening doesn't involve much complexity when it comes to drilling holes. A single-size hole through each piece does the trick. What size hole? The same size as the bolt—just drill a 3/16" hole for a 3/8" bolt, for instance. (Our chart shows the hole sizes to drill when you're using numbered machine screws.)

To determine bolt length, just measure the thickness of the assembled parts. Then add enough to allow for the nut and washers. The bolt should extend a couple of threads beyond the nut, too. Adding 1 1/2-2 bolt diameters to the measured length will be about right—the nut is usually about a bolt diameter thick.

<table>
<thead>
<tr>
<th>COMMON BOLT SPECIFICATIONS</th>
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<th>Machine screws</th>
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<td>5/32&quot;</td>
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<td>3/32&quot;</td>
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<td>7/32&quot;</td>
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<tr>
<td>1/8&quot;</td>
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Restaurant in the Round

Turners and birds both will love it

We used these tools and supplies:
Stock
1x12x48" (nominal dimensions) cedar or redwood, 2½x2½x12" pine or fir.

Lathe equipment
Spur drive center, rotating cone tail center, 3-6" faceplate.

Tools
¼" parting tool; ½", ¾", and 1½" gouges; ½" and 1" skewes.

Lathe speeds
When truing the discs, particularly the large one, run your lathe at 500-800 rpm. Increase the speed to 1200-1500 rpm for the profile turning.

Expect a bevy of birds to gather 'round this clever feeder, which combines a few simple turnings with a section cut from a plastic pop bottle. Use rough cedar for a rustic look, or build one from redwood.

From ¾" thick cedar or redwood stock, bandsaw or scrollsaw six discs, one 11" in diameter, two 9", one 7", one 6", and one 3". (We cut our cedar circles from a 1x12x48" board, even allowing for waste around knots.)

On the 7" disc, draw a line ½" in from the edge and parallel to it, creating a 6" circle and a ½"-wide ring around the outside, shown in the Cutting the Ring drawing. Cutting parallel to the grain, bandsaw in from the edge to separate the disc and the ring. Or, drill a blade start hole, and scroll saw it. Glue closed the entry cut through the ring. (We used cyanoacrylate adhesive. Woodworker's glue or epoxy would work also, but you'll need to clamp the ring with a band-type clamp or large rubber band.) Drill a ½" hole through the center of each disc.

CUTTING THE RING

Enter inside cut by sawing into the stock with the grain.
Chop a pop bottle to make the cylinder

Wash out a 2-liter plastic pop bottle—either a clear or tinted one will work fine. With a utility knife, slice the straight-sided center section from the bottle, cutting where shown in the Plastic Seed Holder illustration.

Drill or punch a series of 1/4" holes around each end where shown in the illustration. Then, wrap a piece of 3/4" wide masking tape around one end of the plastic cylinder, flush with the edge.

Following the full-sized pattern right, draw two seed openings on the tape on opposite sides of the cylinder. Cut them out with scissors or snips, and remove the tape. Set the feeder cylinder aside now while you turn the wooden parts for the top and bottom.

Make a faceplate for the discs

Attach a 3/4"-thick, 8"-diameter scrapwood auxiliary faceplate to a metal faceplate 3-6" in diameter. Round down the wooden disc's edge, and turn the face true.

With the assembly still mounted on the lathe, bore a 3/8"-diameter hole through the center of the wooden faceplate. Start by pushing a small gouge into the center of the rotating workpiece (we used a 5/16" miniature turning gouge—other sizes also would work). Enlarge the hole to fit a 3/8" x 2 1/2" hex-head bolt.

Scribe or draw index marks on the lathe faceplate and the auxiliary faceplate, and remove the wooden one. Counterbore the backside of the wooden faceplate to accept the head of the bolt. Insert the bolt through the hole from the back of the auxiliary faceplate, and epoxy it in place, keeping the threaded end perpendicular to the front surface. After the glue cures, align the marks, and reattach the wooden faceplate to the metal one. Remount the assembly on the lathe.

Continued
Turn the big disc first
Slide the 11" disc onto the bolt extending from the auxiliary faceplate. The top of the disc goes against the faceplate. Because the bolt threads don’t reach the bottom face, slide the 3" disc onto the bolt as a packing piece. Secure with a hex nut or wingnut.
With a gouge, true the edge of the disc. The final diameter isn’t critical, but try to keep it in the vicinity of 10 1/2"-11". True the edge of the 3" disc, too. Taper it slightly, like a cork stopper.
Measure the diameter of the plastic cylinder (ours measured 4 3/4”). With the parting tool, cut a 1 1/2” wide groove about 1/4” into the face of the disc to fit the cylinder.
Now, run the lathe at a medium speed (about 1000 rpm). Hold the cylinder perpendicular to the disc with the top toward it. (The top is the end without seed openings.) Briefly and lightly press the end of the cylinder into the groove. Heat generated by friction will melt the plastic, forming a rolled edge.
Remove the disc from the faceplate, and turn it over, placing the grooved side against the faceplate. Instead of using the nut to secure it this time, drive a pair of #6x1 1/4” drywall screws into the disc through the back of the faceplate. (We were able to do this without dismounting the faceplate.)
Slide the 3” disc onto the center-bolt with the largest diameter against the larger disc. Draw a pencil line around the small disc, and slide it off.
With the parting tool, cut about 1/4” deep straight into the wood inside the pencil line. Then, with a gouge, cut a hole through the disc to fit the 3”-diameter plug. Don’t try for a tight fit; allow about 1/8” clearance all around.
Now, turn the edge to the cove profile shown on the opposite page. A 3/8” gouge will do the job. Be sure to form the smallest diameter on the top of the disc—the side facing out. Remove the disc from the faceplate.

Getting to the bottom of it
Slide a 9” disc then a 6” one onto the faceplate, the best side of each facing out. Align the grain on both, and then fasten them together with three #6x1 1/4” drywall screws driven in through the 6” disc. Place the screws inside an imaginary 2 1/2”-diameter circle around the center.
Secure the discs to the faceplate with a nut or wingnut. True the edges, and turn the cove edge profile on each piece.
Remove the assembly from the faceplate, and replace with the small disc toward the inside. Secure the turning, and turn a groove for the bottle section as you did on the 11” disc. Roll the bottom edge of the plastic cylinder as you did previously.
Next, center the 7” ring around the groove. Glue it into position with waterproof glue. Turn the ring to the profile shown opposite page. Be careful as you work on the inside of the ring.

Turn the lid for the feeder
Slide the remaining 9” and 6” discs onto the faceplate as you did previously. Screw them together, and turn the edge profiles as before.
Turn the assembly around on the faceplate, and center the 3” plug on the underside by sliding it on over the bolt. Glue the plug in place with waterproof glue.

Two finials finish it off
Remove the faceplate from the lathe, and install a spur-type drive center and a tail center to turn the finials. A cone-type revolving center will work best in the tailstock.
Locate the center on each end of your 2 1/2”x2 1/2”x12” stock. (For contrast with the discs, we turned our finials from fir, which we sawed from a piece of 4x4. You also could laminate material for the finials.) Mount the stock and round it down to 2 3/8” diameter.
Lay out two finials on the cylinder, using the full-sized template on the opposite page. Here’s one way to do it: Place them base-to-base, turning the top of the first one 2” from the headstock end of the cylinder. Leave about 1/4” between the bottoms of the bases. Turn the sphere with a gouge or 1” skew, working from the largest diameter down. The bullseye pattern formed by the woodgrain will aid you in turning a true sphere rather than an egg. Just watch for a round target.
After shaping both finials, turn a small-diameter tenon (about 1 1/4” works fine) at the top of each sphere and between the bases. Remove the workpiece from the lathe, then cut off the waste and separate the turnings from each other with a backsaw.
Now, drill the 3/8” hole through the center of each finial. Grip the turning with a handscrew clamp to drill the hole with a drill press.

Put it all together
With epoxy, glue the plastic cylinder into the grooved discs. The top, the end without the seed openings, fits into the groove on the largest disc. Fill the groove with epoxy, then insert the cylinder into it. The epoxy will flow through the holes around the rim to aid in making a strong joint. Glue on the bottom the same way. Glue one finial to the lid, the other to the bottom. Align the holes using the auxiliary faceplate. Assemble the bird feeder on a 3/8”-diameter brass, aluminum, or galvanized steel rod 36” long. First, drill a 3/8” hole 1/4” from each end of the rod. Slide a 1”-diameter split-ring key ring into one hole. Place the bird feeder body on the rod, finial pointing down, and slide it down. Place the lid on the rod, and install the other ring in the hole at the top of the rod. Hang the feeder by the top ring. To fill it up, slide the lid up the rod and pour seed in through the hole in the top of the feeder. genitalia.

Project Design: Ron Pavelka Illustrations: Kim Downing Photograph: John Heffernonton
Split ring

FINIAL

(3/4 x 6" dia.)

(3/4 x 8 1/2" dia.)

(3/4 x 2 1/2" dia.)

(3/4 x 10 1/2" dia.)

FINIAL

FINIAL

FINIAL

Split ring

2" dia.

3/8" hole

1 1/4" dia.

1 1/8" dia.

2 1/4" dia.

1/8" groove 1/4" deep (outside diameter to fit bottle)

3/8" hole centered

3/8" hole

3/8" hole

3/8" hole

3/8" hole

EXPLODED VIEW

Plastic liter pop bottle

1/8" groove 1/4" deep (outside diameter to fit bottle)

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1/8" groove 1/4" deep (outside diameter to fit bottle)
Even if you don't have a lathe, you can make this nifty round cookie jar. Just read the router-table turning article on pages 42-47, then follow the directions here for all-round fun.

Tilt your tablesaw blade to 22½°, and bevel-rip one edge of three pieces of ¾x3x24" stock. (We built our cookie jar from mahogany.) Keeping the same face of the material down, bevel-rip the other edge to the staves' finished width of 2¾" (2½" on the narrow face). Reset the saw blade to vertical, and crosscut eight body staves 7" long from the beveled stock.

Dry-assemble the staves to test their fit. Apply woodworker's glue to the edges of the staves, and assemble them to form the body blank. Wrap the assembly with waxed paper, and clamp with strap-type clamps. Clean the glue squeeze-out from the inside of the blank.

Now, cut four ¾x7x7" squares of particleboard or plywood. Draw diagonal lines to locate the center on each square. On two of the squares, scribe a 7"-diameter circle around the center. These will be the outer discs, as shown in the drawing on page 47.

On the other two, draw circles for discs that will fit snugly inside the top and bottom openings of the staved blank. Draw a 5"-diameter circle, and set the blank in position to check the fit by eyeball. Enlarge or reduce the circle as needed. With a drill press, drill a ¼" hole-through the center of each square. Then, bandsaw and sand the circles.

Assemble the inner and outer discs as shown in the drawing in the technique article. Clamp the assemblies to the ends of the blank with a ¼x10" all-thread rod, shown in the Side-Section View in the technique article.

Follow the procedures in that article to shape the body. The Side Section drawing, opposite page, shows the dimensions and bit profiles to use for the cookie jar. Sand the body inside and out.

After completing the body, saw two ¼x5¼x5¼" squares. Stand the body on one of the squares. With a sharp pencil or an X-Acto knife, trace the body's inside shape onto the stock. Mark the octagon to identify the body end it fits. Stand the other end of the body on the other square, and repeat.

Bandsaw the octagons. Sand the top one to achieve a slip fit in the body opening. Then, bandsaw two circles from ¾"-thick stock, one 7" in diameter for the base and one 6" in diameter for the lid. Sand the lid edge flush with the side of the body, and sand the base as necessary. Then rout a bead along the top edge of the lid and the base.

Glue the octagon for the top of the body to the bottom of the lid, aligning it so the lid edge fits flush with the body side. Glue the bottom octagon to the top of the base, centering it on the base.

Glue the body to the base. Finish as desired (We used Delta Home Decor white pickling gel, following the package instructions.) Add the lettering, using the full-sized pattern. Complete the job by installing a round drawer pull at the center of the lid.
COOKIES

Project Design: James R. Downing  Illustrations: Kim Downing  Photograph: John Hetherington

WOOD MAGAZINE  APRIL 1994  71
Scrollsawed SAFARI PUZZLE

Join us for this exciting scrollsaw tour through the animal kingdom. Wherever you look on this wild pattern, you’ll spot a different animal nestled among friends. After cutting out this challenging design, you’ll feel like the King of the Scrollsaw Jungle.

**Note:** You’ll need two 8½x10" pieces of ¼" birch plywood.

Photocopy the full-sized pattern on the opposite page. Spray a light coating of mounting adhesive (we used 3M 77 Spray Adhesive) on the back of the pattern, and allow it to dry for a minute or so. When the glue becomes tacky, center the pattern on the good side of one piece of birch plywood.

Drill ½" holes where indicated by the red dots on the pattern. Thread the blade through the starting hole on the elephant. (We used a #5 blade, .037x.015", with 14 teeth per inch.)

Scrollsaw the interior cuts designated by red pattern lines first. Making the sharp inside cuts calls for spinning the workpiece around the blade as you cut.

To do this, stand directly in front of the saw, and feed the workpiece steadily into the blade. When you reach a sharp turn, reduce the feeding pressure and simultaneously spin the workpiece sharply, pivoting on the blade. Feed the work into the blade again when the pattern line aligns with the front of the blade. Avoid putting sideways pressure on the blade.

The hole marked “Last” acts as the blade-start hole for sawing around the perimeter of the puzzle. After threading the blade through the hole, saw along the red line in the direction indicated by the arrow.

When you reach the blue perimeter line, saw along it to free the center of the puzzle from the outer frame. Lift the center out, then glue the outer frame to the other piece of plywood.

Now, cut out the animals. From the point marked “Begin animals,” cut around the polar-bear, sawing the short cuts for the mouth and toes as you come to them. Cut out the rest of the animals the same way, placing each completed one inside the frame.

Sand as necessary, and finish the puzzle with transparent colors. (We used Delta Home Decor pickling gels and gel stains and Delta Ceramcoat acrylic colors, all available from craft-supply dealers.) Colors shown (pickling gels and gel stains unless specified) are: BL-Navy blue; BU-Burgundy; CG-Cactus green; CH-Cherry; DW-Driftwood; GO-Goldenrod; MG-Mahogany; ML-Maple; MW-Modern walnut; OR-Ceramcoat orange mixed 50-50 with Home Decor neutral gel; RP-Rose pink; SO-Sunset orange; WH-Desert white. Stain the back and frame with a 50-50 mix of Delta Ceramcoat Black green and Home Decor neutral gel. Wipe on Desert white and wipe it off again to glaze the frame and back.

Project Design: © Peggy Johnston  Photograph: John Henlekerington  Illustration: Kim Downing
COMFY COUNTRY

This simply styled furniture piece proves that you don’t have to spend a fortune to spruce up your favorite outdoor area. If you’re interested in expanding this country piece into a set of furniture, take a look at the accompanying settee and table/bench photo and ordering information on page 76.

Note: For our chair, we hand-picked fir 2x stock. Pine, spruce, or redwood also will work well. If you have trouble locating straight and uncupped stock, edge-join narrower pieces to width. For joints that will stand up to the extremes of Mother Nature, use Titebond II water-resistant glue, slow-set epoxy, or resorcinol glue.

Build the chair ends first

1 Cut the ends (A) to 20¾” long from 2x12 or edge-joined stock.
2 Transfer the full-sized heart half-pattern onto a piece of heavy paper or poster board. Cut the full-sized template to shape.
3 Position the template, and trace the heart outline on all four end pieces (A) where located on the End View drawing. Cut the marked outlines to shape on the bandsaw or with a jigsaw, and then drum-sand the cut edges to remove the saw marks.
4 Clamp each matching pair of 2x12s together, heart edge to edge, with the top and bottom edges flush. Now, using the dimensions on the Exploded View drawing, mark the two dowel-hole locations on one face. Remove the clamps. Using a square, transfer the lines to the inside edge of each end piece.
5 Check that you’re square to the edge, and bore ¾” holes 1¼” deep centered from edge to edge where marked. (We used an electric drill and a spade bit.)
6 Set a stop, and crosscut four pieces of ¾” oak dowel stock to 3¾” long. For ease of insertion, sand a chamfer on each end of each dowel. (We formed our chamfers on a belt sander.)
7 Cut four 3/8”-thick spacers. Glue, dowel, and clamp both chair ends together, placing the 3/8” spacers between the end pieces (A) for a consistent ¾” gap. Save the spacers; you’ll use them when joining the seat and back pieces later.
8 Using trammel points, swing an arc to mark the 15¾” radius on the bottom end of each chair assembly where dimensioned on the End View drawing. Cut the arcs to shape.
9 Sand a slight round-over on all edges of each chair end assembly.

Now, for the seat

1 Cut the two seat pieces (B, C) to length. (We ripped the two pieces to width from 2x12 stock.)
2 Rout a ½” round-over along the top front edge of the seat front piece (B).
**CHAIR** Affordable, easy-to-build seating for your deck or patio

**EXPLODED VIEW**

- #8 x 1 1/4" deck screw
- 3/4" shank hole
- 25° chamfer along top back edge
- #8 x 2" deck screw
- 3/4" hole 1 1/2" deep
- 3/4" oak dowels 3 3/4" long (dowels protrude 3/16")
- 3/8" gap
- 3/8" hole 3/8" deep with a 5/32" hole centered inside
- 3/4" plug 7/16" long, sanded flush after assembly
- #8 x 2" deck screw
- 9 1/4" round-over

**Bill of Materials**

<table>
<thead>
<tr>
<th>Part</th>
<th>Finished Size</th>
<th>Material Key</th>
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</thead>
<tbody>
<tr>
<td>A ends</td>
<td>1 1/2&quot; x 1 1/4&quot; x 20 1/4&quot;</td>
<td>C, 4</td>
</tr>
<tr>
<td>B seat front</td>
<td>1 1/2&quot; x 9 1/4&quot; x 21&quot;</td>
<td>C, 1</td>
</tr>
<tr>
<td>C seat rear</td>
<td>1 1/2&quot; x 7 1/4&quot; x 21&quot;</td>
<td>C, 1</td>
</tr>
<tr>
<td>D splats</td>
<td>3/4&quot; x 6 1/4&quot; x 30&quot;</td>
<td>C, 3</td>
</tr>
<tr>
<td>E cleats</td>
<td>1 1/2&quot; x 2 1/2&quot; x 21&quot;</td>
<td>C, 2</td>
</tr>
<tr>
<td>F cleat</td>
<td>3/4&quot; x 1 1/2&quot; x 19 1/4&quot;</td>
<td>C, 1</td>
</tr>
<tr>
<td>G armrests</td>
<td>3/4&quot; x 3&quot; x 24&quot;</td>
<td>C, 2</td>
</tr>
</tbody>
</table>

**Material Key:**
- C-choice (fir, pine, spruce, or redwood)

**Supplies:**
- 2–36" lengths of 3/4" oak dowel stock
- #8 x 1 1/4" deck screws
- 3/4" x 2" deck screws, primer, exterior-grade stain or paint

**CUTTING DIAGRAM**

- 1 1/2 x 11 1/4 x 96" Fir (2x12)
- 1 1/2 x 11 1/4 x 96" Fir (2x12)
- 3/4 x 7 1/4 x 96" Fir (1x8)
- 3/4 x 7 1/4 x 48" Fir (1x8)
**COMFY CHAIR**

**Build the backrest next**
1. Cut the backrest splats (D) and backrest cleats (E, F) to size.
2. Mark a 6" radius on two of the backrest splats where shown on the Chair Back drawing. Cut the corners to shape and sand smooth to remove the saw marks.
3. To keep the back edge of the middle cleat (E) flush with the back edge of the chair ends (A), bevel-rip a 25° chamfer along the top edge of the cleat where shown on the End View drawing.
4. Using the dimensions on the Exploded View and Chair Back drawings, clamp the cleats (E, F) against the splats (D), using 3/8" spacers to create gaps between the splats. Check for square.

**Mark and drill the dowel holes**
1. Using the dimensions on the End View drawing, mark the seat centerline first and then the centerline for the backrest cleats on the outside face of each seat end assembly. Locate and mark the six dowel-hole centerpoints on the marked lines on each chair end.
2. Bore 3/4" holes through the chair ends at the marked centerpoints, backing the stock with scrap to prevent chip-out.

**Assemble the pieces**
1. From 3/4"-diameter oak dowel stock, set a stop, and cut 12 dowels to 3 3/8" long. Sand a 3/8" chamfer on both ends of each dowel.
2. Cut two 1x2 scraps to 26" long and two to 14" long. Clamp one of each length to the inside face of each chair end where shown on the Support Locations drawing. The strips help center the ends of the seat and backrest assembly pieces over the 3/4" holes. [To test the locations, we positioned a piece of 2x stock on each support to check that the holes in the end pieces would center on the ends of the seat pieces (B, C) and cleats (E) before drilling.]
3. With a helper, position the seat pieces where located on the End.
View drawing. Slip the 3/8" spacers between the pieces for a consistent gap. Clamp the seat pieces firmly between the chair ends.

4 Chuck a 3/4" spade bit into a portable electric drill. Using the previously bored holes in the end sections as guides, bore a pair of 1 1/2"-deep holes squarely into each seat piece end. As soon as you've bored the first hole, insert one of the 3 3/4"-long dowels into the hole to help steady the seat piece for boring the next hole. Do not insert the dowel more than 1/2" into the seat piece; you may have trouble removing it if you insert it all the way.

5 Repeat the procedure to position and drill the 3/4" holes in both ends of the backrest cleats (E).

6 Remove one of the 3 3/4"-long dowels. With a small brush, coat the inside of the hole with glue. To prevent marring the chamfered dowel end, use a rubber-tipped mallet to slowly drive the dowel into the hole. Drive the dowel until just the chamfered end protrudes. Be careful not to drive the dowels too far—they're almost impossible to back out. Immediately wipe off any excess glue. Repeat for each dowel. Let the glue dry and then remove the clamps.

Now, let's add the armrests

1 From 3/4" stock, cut two pieces to 3 x 24" for the armrests (G).

2 Using the dimensions on the armrest drawing, mark the profile on one piece and cut it to shape. Use the first piece as a template to mark the shape onto the second armrest, and then cut it to shape.

3 Mark the hole centerpoints. Drill and counterbore the holes.

4 Screw the armrests to the tops of the end assemblies (A).

5 Plane or resaw a piece of stock to 3/4" thick, and use a plug cutter to cut 3/8"-diameter plugs. Plug the holes, and sand the plugs flush with the top of each armrest.

Sand, paint, and sit a spell

1 Sand the entire chair, sanding a slight round-over on all edges.

2 If you decide to paint your chair, an oil-based enamel or water-based latex will provide adequate protection. Regardless of your paint selection, be sure to apply a prime coat that's compatible with the top coat. Also, be sure to apply several coats to the porous end grain.

For a more natural look, finish the chair with an exterior house stain, and then apply several coats of spar varnish.

Produced by Marlen Kemmet
Project Design: James R. Downing
Photographs: Wm. Hopkins
Illustrations: Roxanne LeMoine
"They're just the thing to decorate the cheese tray next time you throw a party," Oklahoma woodcarver Bill Payne says of his carved mice. You'll have fun with them right from the start, too, because they're quick and easy and just plain enjoyable to carve.

Transfer the side-view pattern for either the crouching or begging mouse onto your carving stock. "I paste the photocopied pattern onto light cardboard, and cut it out. Then, I draw around it onto the wood," Bill explains.

Bandsaw or scrollsaw around the side-view pattern line. For the crouching mouse, fasten the waste pieces back in place on the cutout (masking tape works fine for this). Trace the top-view pattern onto the top edge, and saw the top-view outline.

Pencil a centerline along the edge of each cutout. This will help you avoid carving a lopsided mouse. Now, you're ready to carve.

**Start with the crouching mouse**

With your knife, shape the mouse's body from the ears back. Keep the curvature from the centerline to each side approximately the same as you round the back of the body. You'll come close enough just eyeballing it. Leave the sides straight for now; we'll come back to the feet. Do carve the tip for the neck right behind the mouse's ears.

Next, carve the top of the head between the ears. Remove the waste with your knife or a small gouge. Make the top of the head slightly lower than the highest point on the back—about \( \frac{1}{4} \)" lower would be fine. Blend the top of the head, the neck, and the back into a smooth curve.

Blend the ears into the top of the head. Form a deep, smooth curve from the top of one ear, down to the top of the head, and back up to the tip of the other ear. Each ear should be about \( \frac{4}{4} \) the width of the head at the widest point. Leave the outside of the ears straight and flush with the sides of the head.

Shape the nose by rounding off the top corners and blending them into the face. Form a slight peak on the face, running from the hollow between the ears to the tip of the nose. Taper the bottom edges inward slightly, but don't round them under. In cross-section, the nose resembles the letter D lying on its back.

Sketch the outline for the hind leg on each side of the body. Stop-cut the line with the tip of your knife. The stop cut, which is simply an incision along the pattern line, allows you to carve up to the line without chipping out the wood beyond it. Cut about \( \frac{1}{2} \)" deep, holding your knife perpendicular to the surface.

With your knife or a gouge, cut away the side of the body in front of the leg. At the same time, form the lower jawline at the back of the head, shown by the shaded area on the pattern. Carve the mouse's midsection about \( \frac{1}{4} \)" deep, blending it into the hollow on the back behind the ears.
Taper the back of the head into the mouse’s midsection. Hollow out the ears with a gouge or the tip of your knife. Draw the eyes, shown above, on the sides of the face, taking care to locate them at the same height and distance from the nose. Cut along the upper and lower lines, then the sides of the eyeball. Pop out the waste in the corners with your knife.

**Next, the begging mouse**

Round the mouse’s back side-to-side from the bottom of the blank to the neck. Keep the back centered on the centerline. Gently round the sides of the neck, but leave the back of the neck flat.

Carve away the waste between the ears. Go about 1/2" deep at the top of the head—deep enough to

---

**We used these tools and supplies:**

**Stock**
Bill often carves natural-finish mice from butternut, aromatic cedar, or mahogany. For painted mice, he chooses basswood. You’ll need a piece of stock 1 1/4 x 2 x 3" for each mouse.

**Knife**
Bench-type carving knife
(Tools below are optional)

**Gouge**
No. 5 or 7, 1/4-3/8"

**V-tool**
No. 12, 1/8"
MICE

make outsized ears while still leaving a hint of a forehead above the nose. Blend the back of the head into the neck.

Draw the front and back legs and the tapered top view of the nose onto the blank. Stop-cut the lines for the legs, and carve the body sides down slightly to set the legs out in relief. (You also could use a small V-tool here.)

Taper the front legs into the body at the shoulders. Now, carve the nose to shape. Round over the top of the nose, but keep the bottom relatively flat, again forming a tipped-over D shape in cross-section.

Then, remove the wood from between the legs. Make the legs about 1/8" wide at the body, tapering to maybe 1/16" thinner at the feet. Carve carefully—the grain direction makes the legs easy to break.

You can carve oval-style eyes, like those on the crouching mouse. But, for the big-eyed, innocent beggar look, you'll want to put round eyes on your mouse. A 1/16" eye punch (available from carving-supply dealers) makes round eyes quickly; just press it straight into the wood, then rotate it.

Details, details, the tails
Look over your carvings and clean up any ragged cuts before adding the details. Sand the mouse now if you want a smooth surface without tool marks.

Using the tip of your knife, drill two nostrils about the size of a pinhead in the end of the nose.

Inscribe a U-shaped line on the bottom of the lower jaw (also known as the flat underside of the nose) to represent the mouth. Point the closed end toward the tip of the nose.

Finish your mice before adding the curlique tail, one of their most distinctive features. The mice shown are finished with clear lacquer, but you also could stain or paint them. Before spraying on the lacquer, Bill likes to accentuate the eyes, nose, and mouth with a woodburner. He also woodburns lines to delineate toes. "If you're going to paint your mice white," Bill reminds, "paint the nose pink."

Make the tail from basket reed, available from craft-supply stores. Start with a 6-8" length of reed for each mouse. Drill holes the same size as your reed, about 1/4" deep where shown on the patterns. Center the holes on the mouse.

For a straight tail, bend the reed, insert an end into each hole, and glue with cyanoacrylate adhesive. For a curly tail, soak the reed in water overnight. Coil the wet reed around a 1/2" dowel or other cylindrical form, and secure it with rubber bands. Allow the reed to dry overnight, and install as with the straight tail.

Here's lookin' at you
Finally, make a pair of glasses for each mouse. For each pair of spectacles, cut a 6" length of soft 20-gauge solid wire, such as steel picture frame wire or copper electrical wire. (If you don't have any of those, a straightened-out paper clip works pretty well.)

About 11/2" from one end, form a loop about 1/4" in diameter. Wrap the wire around the shank of a 5/32" drill bit for a neat loop, as shown in the photo above.

Toward the long end of the wire, form another loop. Make the loops far enough apart to fit your mouse's nose (1/8" spacing worked for both of our mice).

Place the glasses wherever you like them on the nose—either close to the eyes or nearer the end of the nose. Then, bend the ends of the wire back to form the glasses' temples. Mark the length to the approximate middle of the ear, then cut the wire about 1/4" longer on each side.

Bend the ends inward as shown in the illustration, previous page. Place the glasses on the nose, and mark the head by pressing the wire ends into the wood. Drill a small hole at each point, put the glasses on the mouse, and insert the ends into the holes. Glue with cyanoacrylate adhesive. 

Project Design: © Bill Payne
Illustrations: Kim Downing
Photographs: John Hetherington
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HOW TO PROTECT OUTDOOR PROJECTS FROM THE ELEMENTS

Rain, shine, sleet, or snow may not stop the postman, but they will quickly ravage unprotected outdoor furniture projects. Fortunately, today’s paints and coatings can do a fantastic job of shrugging off the elements. So what’s the key to success? Selecting a product with all the right ingredients.

According to William C. Feist, a research chemist at the Forest Products Laboratory in Madison, Wisconsin, a successful outdoor wood coating should contain three ingredients: a water repellent, a mildewcide, and an ultraviolet light (UV) blocker. The label on the can will tell you if the product you select contains these elements. Here are your choices:

**Deck stains do it best**

For a clear or semi-transparent stain on your project, you can’t beat the one-step, oil-based stains developed to protect outdoor decks, says Feist. These coatings penetrate the wood and will not crack or peel like paint. And you can rejuvenate them easily by brushing on a new coat every few years. Manufacturers offer a wide selection of colors, and you also can find stains that hide or minimize the green tint of pressure-treated wood.

Weather-resistant woods such as redwood, cedar, and teak will keep their natural wood colors longer with a clear penetrating stain. Even with a coating, however, these woods will eventually weather to a silver gray color.

**Select a custom color**

If you don’t find a deck product with a stain color you like, try coating your project with a clear, oil-based penetrating sealer, and then follow up with an oil-based stain that has the desired color. The sealer will repel water but still allow an oil-based stain to adhere, says Feist. As with any finishing product, test these coatings on a sample board first.

**Paints work well, too**

For a solid color, Feist recommends an oil-based primer followed up with a high-quality exterior latex paint. Exterior paints contain mildewcides, and the paint film will repel water and damaging UV rays. You also can prime some projects with latex-based formulas, but if your project contains redwood or cedar, use a stain-blocking primer. These prevent the wood’s natural resins from bleeding through the finish. To avoid chalking, choose a semigloss or high-gloss paint.

Although many manufacturers claim that one coat of an oil or latex product is enough, you’re better off with two coats to start. Take special care to thoroughly coat end grain and joints—the most common entry points for water. Also, keep in mind that horizontal surfaces (like the arms of chairs) take more of a beating from sun and rain than do vertical surfaces, and may require additional coats.

Illustration: Jim Stevenson
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—Dr. W. F. Lenz
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ECON-ABRASIVES—manufactures abrasives belts up to 52" wide in any grit. We carry hundreds of woodworking related accessories including: Velcro backed sanding discs, wood chips, comer, sanders, slides, hinges and hundreds of sanding accessories. Send for our 1992 catalog. ECON-ABRASIVES. Free. Circle No. 1223.

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CASCADE TOOLS—The 1993 Cascade Tools catalog is the finest ever. It's jammed with great buys on SY brand industrial-grade router bits, shaper cutters and an excellent assortment of hard-to-find accessories. You'll have to see it to believe it. CASCADE TOOLS INC. Free. Circle No. 1315.


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PRODUCTION QUALITY CARBIDE TIPPED ROUTER BITS—MLCS Ltd. has a new 32-page catalog featuring hundreds of high quality carbide tipped router bits, shaper cutters, the Router Speed Control, and the "Miter Adjustable Corner Clamp," plus other Professional Woodworking Products. Prices from 50% to 70% lower than elsewhere. Value, quality and prompt service guaranteed! MLCS LTD. Free. Circle No. 1350.


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MERLE ADJUSTABLE CORNER CLAMP—Quick & easy to use. It folds your work into square. Fully adjustable from 2" to 6". Perfect for clamping picture frames, cabinets, or anything that requires 90° corner clamping. The Merle Clamp is cast aluminum & steel construction, a true industrial quality tool. See our price for information. MLCS LTD. Free. Circle No. 2200.

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**DREMEL 2014 Cutaway Sheet**

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- Contact information
WOODWORKER ON A MISSION

At WOOD® magazine, readers write to us from all around the globe. In the past, we’ve corresponded with woodworkers in Australia, South Africa, Japan, and Europe. And recently, we received a letter from Kevin Brown, a missionary in Bolivia, that really grabbed our interest.

He wrote to request copies of articles that he saw referred to in an issue of WOOD. He found the magazine in a book display during market day in Cochabamba, the town where he’s stationed. Of course, we obliged Kevin, because woodworking publications in his part of the world are next to nonexistent. In his letter, he also mentioned the difficulty in subscribing to any English-language magazine; it seems that copies get stolen before delivery. That’s particularly sad because Kevin has a group of neighborhood boys that he wants to teach woodworking to. Although Kevin didn’t specifically ask for help, why not give him some?

If you have any woodworking periodicals or books you can spare, please send them to Kevin. Here’s his address (and according to him, first class gets through best):
Kevin R. Brown, Cajon 3279, Cochabamba, Bolivia, South America.

Furniture for the homeless, by Black & Decker

NBA great Walt Frazier, right, gets an assist from Black & Decker president Gary DiCamillo in putting the finishing touches on a dining table during the New York build-a-thon.

About this time last year, tool manufacturer Black & Decker was laying plans for a first-ever build-a-thon in conjunction with its introduction of a new line of power tools. The purpose was to provide furniture for homeless shelters in New York City, built by company volunteers, media personnel, members of New York’s chapter of Habitat for Humanity, and at least one sports great (see photo above).

In late June, the woodworking team spent 24 straight hours building 114 tables, 222 benches, and 37 storage units. Black & Decker donated power tools from their new Quantum line for the task, and the furniture was delivered by members of the New York Army National Guard. Said Gary DiCamillo, president, Black & Decker North America and build-a-thon participant, “By putting our tools to work for this cause, we are hopeful that we will help improve the plight of the homeless.”

Outdoor projects, yes!

Planning to build a few projects for your deck, patio, or lawn? Then see our 18 outstanding plans in WOOD Magazine’s Best OUTDOOR PROJECTS. From Adirondack furniture to planters, this new magazine has them all. See our ad on page 22.
MAKITA DRIVES STAPLE TECHNOLOGY ANOTHER 7/8!!

That may not seem like a lot except when you consider we do it 750 times on a single charge. Our 9.6 Volt Makpak stapler gives you that much and more. You can choose either the T221D or the complete kit, T221DW, which includes a charger and tool case. This new model has incomparable features like our Rapid Drive mechanism to help you work faster. Makita’s Actuation Lever allows the stapler to operate only when the stapler's nose presses against the material. The Adjusting Knob lets you adjust staple depth. And a "Peek" window shows you how many staples you have left. No other cordless stapler works harder or longer than Makita. Or lets you work with a wider range of applications from insulation to ceiling tile to roofing paper and more. For high quality tools ask for Makita. You'll go farther.
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We built our first radial arm saw in 1956. And we've been building on that design ever since. Our newest radials incorporate improvements such as our revolutionary new blade guard that will make Craftsman an industry leader for generations to come.

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The new Craftsman radials are on display at your nearby Sears store.

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