

10
PROJECTS
INSIDE!

PRO-SIZE YOUR BANDSAW TABLE
GLAZE: THE MYSTERY FINISH EXPLAINED

April 2000 #114

Popular Woodworking

The Skill-Building Project Magazine for Practical Woodworkers

Shaker Steps

Handmade
with old-world
know-how

Stickley Server

Built for the
next century

Woodworking on Death Row

PLUS:

- Ice Box Media Center
- Amazing Puzzle Box
- Garden Storage Bench

www.popwood.com

\$3.99 US, \$4.99 CAN



Ht: 0.816", Wd: 1.4872",

Mag: 80% BWR: 1



7 25274 01355 6



24



40



62



30

IN THIS ISSUE

24 Arts & Crafts Sideboard

For collectors, sideboards are one of the most prized pieces of Arts & Crafts furniture. For woodworkers, this design will give you a sturdy heirloom that's interesting to build.

30 Woodworking on Death Row

Some of the most dangerous people in the country are woodworkers who spend hours each day at their craft. Learn how they build projects without leaving their cells.

36 Garden Storage Bench

Keep your hoses and garden equipment handy but protected from the elements with this rock-solid garden bench.



58

40 **Magic Shelves**

You probably saw these shelves in an ACE Hardware ad last year. But what you didn't see is the construction techniques and installation tricks that make these shelves a snap to build and install.

46 **Modern Console**

Shelving doesn't always have to be predictable and boring. These stand-alone console units create interesting nooks and crannies for displaying your books and collections.

By Mark Kessler

52 **Shaker Stepstool**

Learn to build these sturdy dove-tailed steps the same way the early Shakers would: using hand tools, a few old-fashioned tricks and a dose of patience.

58 **Spring Safe**

Jeff Vollmer, a master maker of puzzle boxes, shows you the secrets to constructing this puzzle "safe" that has a spring-loaded drawer.

By Jeff Vollmer

62 **Icebox Entertainment Center**

In the first furniture project from the new "Little Shop that Could," learn to build this useful TV stand without a lot of expensive machinery.

IN EVERY ISSUE

6 **Out On a Limb** *Advice for the New*

8 **Letters** *Mail from readers*

12 **Cris Cuts** *Tools That Changed My Shop Forever*

16 **Tricks of the Trade** *Don't throw away your mustard bottles; super glue simplifies compound sawing*

18 **Ingenious Jigs** *Nick Engler shows you how to vastly improve your band saw using leftover lumber*

22 **Projects From the Past** *20th Century Desk*

68 **Tool Test** *Delta's new miter sled, the Microplane and Porter-Cable's new 12-volt drill*

74 **Endurance Test** *Four-way Screwdrivers*

76 **Flexner on Finishing** *Glazes and Glazing Techniques*

82 **Caption the Cartoon** *Win a set of Quick Grip clamps*

86 **Classifieds**

88 **Out of the Woodwork** *The Art of Making Mistakes*

ON THE COVER

Turn on the radio when you build these Shaker steps because your table saw and router will stand silent as you learn to master through-dovetails.



Cover photo by Al Parrish

Popular Woodworking®

April 2000, Vol. 20, No. 2

www.popwood.com

Editor & Publisher **Steve Shanesy**

Senior Editors **David Thiel & Christopher Schwarz**

Associate Editor **Jim Stuard**

Art Director **Amy Schneider**

Contributing Editors

R.J. DeCristoforo

Nick Engler

Bob Flexner

Glen Huey

Troy Sexton

Technical Advisers:

Bill Austin Makita USA, Inc.

Scott Box Delta International

Chris Carlson S-B Power Tool

Dale Zimmerman Franklin International

General Manager **Jeffrey M. Lapin**

Editorial Director **David Fryxell**

Creative Director **Matthew Small Gaynor**

Magazine Art Director **Nancy Stetler**

CIRCULATION

David Lee, Director

Mark Fleetwood, Single Copy Sales Mgr.

Terry Webster-Isgro, Direct Sales Mgr.

PRODUCTION

Barbara Schmitz,

Director of Manufacturing

Martha Wallace, Magazine Production Dir.

Matt Walker, Production Assistant

Ruth Preston, Studio Manager

ADVERTISING

National Sales Representative

Bill Warren, Five Mile River Assoc. LLC

RR1 Box 1400, Stockton Springs, ME 04981

Tel. (207) 469-1981; Fax (207) 469-3050

Advertising Sales

Joe Wood, Tel. (513) 336-9760

Fax (513) 336-9761

Classified Advertising Sales

Joan Wright, Tel. (513) 459-9298

Advertising Production Coordinator

Debbie Thomas, Tel. (513) 531-2690, ext. 219

SUBSCRIPTION SERVICES Subscription inquiries, orders and address changes can be made at www.popwood.com (click on Subscriber Services).

Or by mail: **Popular Woodworking**,
P.O. Box 5369, Harlan, IA 51593 or call
(515) 280-1721. Include your address with all inquiries. Allow 6 to 8 weeks for delivery.

Popular Woodworking (ISSN 0884-8823, USPS 752-250) is published seven times a year in February, April, June, August, October, November and December by F&W Publications, Inc. Editorial and advertising offices are located at 1507 Dana Ave., Cincinnati, OH 45207; tel.: (513) 531-2222. Unsolicited manuscripts, photographs and artwork should include ample postage on a self-addressed, stamped envelope (SASE); otherwise they will not be returned. Subscription rates: A year's subscription (7 issues) is \$19.97; outside of U.S. add \$7/year.

Canada Publications Mail Agreement No. 0546232. Canadian return address: 2744 Edna St., Windsor, ON N8Y 1V2

Copyright ©2000 by *Popular Woodworking*. Periodicals postage paid at Cincinnati, Ohio, and additional mailing offices. Postmaster: Send all address changes to *Popular Woodworking*, P.O. Box 5369, Harlan, IA 51593 Canada GST Reg. #R122594716

Produced and printed in the U.S.A.

ATTENTION RETAILERS:

To carry *Popular Woodworking* in your store, call (513) 531-2690, ext. 327, or write: Dealer Program, F&W Publications, Inc., 1507 Dana Ave., Cincinnati, OH 45207.
Woodworker's Book Club: 1507 Dana Ave., Cincinnati, OH 45207; (513) 531-8250

Audit Bureau of Circulation membership applied for.

Advice for the New

A list of the things that a book or magazine can't teach.

Maybe it's the time of year or perhaps the planets have aligned, but we've all noted an increase in the number of calls, letters and e-mails from folks new to woodworking. We enjoy the questions and comments, and they cause me to reflect on what I wished I'd known when I first began woodworking.

Safety is more than a set of rules. It's a way of working, if not a way of life. Most beginners are rightfully concerned about safety. Serious injuries can and do occur.

How close is too close to allow your hands near a spinning blade? The only absolute answer is *in the blade*. Otherwise, it depends. While you can get too close, the danger lies not so much in proximity to the blade as the way you hold the work. Kickbacks cause most hand injuries, not having your hands too close.

So avoid kickbacks. Know what causes them and work accordingly. Apply pressure in the right place to hold the work down and to the fence.

Safety procedures in machine manuals are there for two reasons. Some keep you safe; others keep the manufacturers safe from lawsuits. After a while, you'll know the difference between the two.

Wear safety glasses. But don't forget you damage your hearing every time you turn on a machine. Injury to your hearing is very serious. The damage from loud noises accumulates over many exposures. There's no blood, no pain, it just happens. Unlike a cut, this damage won't heal.

Listen to your instincts. Sometimes you'll get an inkling something isn't right. Pay attention because it probably isn't. Re-think what you are about to do and you'll come up with a much safer solution.

Don't ever fear a machine. If you do, don't use it. Always respect a machine. It has more power than you know.

Build every project in your head first. Then build it on paper before you attempt to build it in the shop. Your mistakes will be reduced to almost none.

Learn why certain joints work and others fail. Know that as the application of a

joint changes so does its potential for success or failure. Rely on joints for strength instead of the thickness of the wood.

Learn patience. As a new woodworker there's the temptation to rush to complete a project. It's natural to want to see the fruits of your labor. But often this leads to compromises in workmanship.

When you have learned the patience woodworking requires you will enjoy spending time in the shop far more than the things you build.

Practice until you get it right. Don't waste good wood learning how to cut a joint, to use a router or to install a hinge. Practice on scraps until you do it right several times. Practice teaches patience.

Buy good tools and take care of them. In turn, they will take care of you. Buy the highest quality tool you can reasonably afford, even if it means putting off buying other tools. Doing without some tools will help you become clever about other ways to get the job done.

Understand that finishing is not woodworking. It is a separate craft that deserves attention and passion. A great finish can make a so-so project great. A so-so finish will make a great project so-so. Always make a sample board before finishing your project. Oil finish is the exception to this.

Learn to read the wood. Select boards for beauty and place them appropriately in your projects. It's a shame to hide a pretty face. Read the wood for grain direction so it won't tear out.

If you can, make friends with a more experienced woodworker. Ask as many questions as you can without becoming a pest. Read books and magazines about woodworking, but know there are more suspect ones than good ones. Ask your friend which are the good ones. Remember the words of English woodworker John Brown, "(G)lean what you can by reading what the experts say. Just don't let it get in the way of your woodworking." **PW**

Steve Shanesy

CONTACT INFORMATION

Steve Shanesy

Editor & Publisher

Specialties: Projects, techniques, article and project selection
(513) 531-2690 ext. 238
steves@fwpubs.com



David Thiel

Senior Editor

Specialties: Projects, new products and tools, tricks of the trade
(513) 531-2690 ext. 255
davidt@fwpubs.com



Christopher Schwarz

Senior Editor

Specialties: Author liaison, website, projects, photography
(513) 531-2690 ext. 407
chriss@fwpubs.com



Jim Stuard

Associate Editor

Specialties: Projects, carving, turning, project illustrations
(513) 531-2690 ext. 348
jims@fwpubs.com



Amy Schneider

Art Director

Specialties: Magazine and cover design, photo direction
(513) 531-2690 ext. 471
amys@fwpubs.com



Got Questions or Problems With Your Subscription?

To report problems with your subscription visit our website at popwood.com, call our subscription offices at 515-280-1721, or write to *Popular Woodworking*, P.O. Box 5369, Harlan, IA 51593.

Our Privacy Promise to You

We make portions of our customer list available to carefully screened companies that offer products and services we believe you may enjoy. If you do not want to receive those offers and/or information, please let us know by contacting us at: List Manager, F & W Publications, 1507 Dana Ave., Cincinnati, OH 45207

SAFETY NOTE

Safety is your responsibility.

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

Mystery of the Roman numeral IIII deepens

Many Explanations for why 'IV' is Printed 'IIII' on Clock Faces

In regard to Tim Neveldine's observation of the use of "IIII" on the face of your Shaker clock, I have the utmost respect for S. LaRose as a parts supplier for horologists, but Mr. Laing's explanation doesn't even scratch the surface of the IV/IIII controversy.

If you were to eavesdrop on a conversation about this topic in a room full of members of the National Association of Watch and Clock Collectors (NAWCC), of which I'm a former member, you would probably hear at least half a dozen explanations being bandied about. In fact, this question has been revisited a number of times in the group's newsletter.

The three most popular explanations seem to be: 1. The "IIII" was used to "balance" the clock dial by providing symmetry and offsetting the heaviness of the VIII. 2. That a clock made for a monarch (some say Louis XIV) was initially made with the "IV," to which the king objected as being incorrect. The clockmaker, not wanting to offend his monarch, immediately changed the dial. 3. That "IV" is from an old Roman text, and is how the Romans spelled the name of the god Jupiter. Obviously, 1, 2, 3, god, 5 wouldn't have worked when writing numerals. In fact, the earliest Romans apparently did use "IIII" and not "IV."

Which is correct? Only the first clockmaker to make a dial with "IIII" can answer that question, and he ain't talking.

Michael O'Handley
Kenmore, Washington

Another Vote for Symmetry

Let me comment on your reply (PW #112) to a letter regarding the use of the Roman numeral "IIII" on the face of old clocks. I was once told by the curator of a clock museum that "IIII," as opposed to "IV," better balances with the "VIII" on the opposite side of the clock, thus providing a sense of symmetry.

For the same reason, in most advertisements for watches and clocks in the print media, the hands are positioned symmetrically at approximately 10 minutes past 10. I've heard it said that 10 past 10 is preferred to 18 past eight because it puts a smile on the face of the clock rather than a frown.

Jacob Petersen
Brandon, Vermont

The 'Rise of Home Woodworking' Article Brought Back Memories

"The Amazing Rise of Home Woodworking" article (January 2000, #112) was very interesting. Although I haven't gotten into furniture-making as such, I make a lot of wood crafts and have recently started to do the painting, which my daughter previously did.

The comments regarding manual arts training in high schools were especially interesting to me because that is where I got my first taste of woodworking in the early 1940s. Also included in the manual training course was mechanical drafting, which I thoroughly enjoyed, to the extent that I took a correspondence course in mechanical drafting, which led me to my career in engineering with General Motors after graduating from GMI (General Motors Institute) in 1952. I will always

WE WANT TO HEAR FROM YOU

Popular Woodworking welcomes letters from readers with questions or comments about the magazine or woodworking in general. We try to respond to all correspondence. Published letters may be edited for length or style. All letters become the property of Popular Woodworking.

How to Send Your Letter:

- E-mail: Popwood@FWPubs.com
- Fax: (513) 531-0919
- Mail carrier:

Letters • Popular Woodworking 1507 Dana Ave. Cincinnati, OH 45207

remember my manual arts teacher and what/how he taught me.

My wife bought me a Mark V Shopsmith for \$450 from one of the local hardware stores for Christmas in 1972. I subsequently bought the band saw attachment with which I do the majority of my craft making, together with the disc sander and horizontal drill.

We live in Sylvania, Ohio, a suburb of Toledo and have a daughter and four grandsons in Lexington, Ky., so every trip to Kentucky requires a stop at the Shopsmith store in Dayton to see what's new and to buy some band saw blades.

As a side note, I also am involved in helping to build a timber-framed barn for our Sylvania Historical Village. We want to make half of this barn into a blacksmith shop and the other half into a "period" woodworking shop, so we'll be looking for vintage belt-driven tools etc. some time when funds are available. Any ideas on where these machines might be located would be appreciated. Thanks for the article.

*Bruce Wharram
Sylvania, Ohio*

Hey, That's Not an Antique— That's My Table Saw!

I was reading your newest issue (January 2000) and was shocked. I believe it was on page 50 that you had an ad for a Delta 10" saw and 6" jointer combination in "The Amazing Rise of Home Woodworking" article. The ad was dated 1936 and the article confirmed that Delta created the first tilting arbor in 1937.

Would you believe that this 1936 saw combination is still used in my workshop today? I felt the tilting table was a little dangerous, so I replaced the saw. But I am still using the jointer. I based my new table saw purchase on the reputation of the old saw, so it is no surprise I picked up another Delta 10" saw.

I was always curious how old this thing was. Thanks for the information.

*Peter Commerford
Walpole, Massachusetts*

Staining Maple Legs is Not for the Faint-Hearted

I'd like to pose a question that has me

Continued on page 11

LETTERS

Continued from page 9

stumped. I'm building a kitchen table from maple for my daughter. At the lumberyard I was warned about this material's tendency to take stain unevenly. I cut a sample of the wood I brought home, and tried a half dozen different stains from partially empty leftovers I had in the shop, and sure enough, the stain left a very uneven appearance. It was speckled. I tried using a wood conditioner before staining, but it didn't help.

Any advice to help me get a good, uniform appearance? Or am I going to end up just oiling the wood and letting age take care of darkening it? It's a country farm table with turned legs. The whole project will be maple, with no painted surfaces.

Glenn Martin
Ontario, New York

Editor's note: Maple, as you have learned, is tough to stain. Because your project includes turned legs, which are hard to sand well and will expose a certain amount of end grain, you are guaranteed staining problems. The makers of wood conditioners don't tell you that you need to apply coat after coat of the stuff to get it to work right, and it will still be a problem for legs. If you can live with the oil finish, you'll save yourself a lot of work. If you want to add color, I suggest you use an aniline dye instead of a stain. But before applying the dye, sand the wood to at least 180 grit, then raise the grain with a damp cloth, resand with 180 or whatever your last grit was, then apply the dye. Of course, experiment with sample pieces first. You can read more about this in a book I'd highly recommend called "Understanding Wood Finishes" by Bob Flexner.

— Steve Shanesy, editor and publisher

One Cautionary Note on the 'Little Shop' Miter Sled

I have just been reading the article on the shop-built miter sled and felt that I should

point out that, as shown, this device actually can be dangerous. You have created a false bed with a plywood base, which means the offcut is no longer supported.

As you approach the end of the cut, the waste is still attached to the workpiece, but its weight can cause it to droop and bind on the saw blade — causing it to be thrown back at the saw operator.

This problem can be overcome by temporarily attaching another piece of ply of the same thickness as the sled's base to the saw table on the other side of the blade so the level on both sides of the blade is equal.

Michael Simmons
Southampton, England

Editor's note: Thanks for the suggestion. We actually use a similar cutoff board when cross-cutting pieces with long falloff. We should have mentioned it and stand corrected.

— Jim Stuard, associate editor

Hooray for Nick Engler

What a coup for your magazine to present Nick Engler as a contributing editor. He is a genius at designing jigs to assist wood-working power tools.

His books have enabled me to advance from a "fair to middling" woodworker to a "better than average one." They are clear and concise and full of numerous photos and repetition of important points.

I encourage all less than average woodworkers to take a look at The Woodworkers Companion series of books produced by him and his staff and published by Rodale Press. Most libraries have the series or can assist with the information to order it.

Congratulations for bringing Nick on board. Your readers will be enriched by his efforts. **PW**

Paul Scupholm
Redford Township, Michigan

COMING IN THE JUNE 2000 ISSUE

Shop of the Crafters Morris Chair • We build an exact replica of an Arts & Crafts Morris chair that isn't as chunky as many of the Stickley chairs, and it's within the reach of most beginning woodworkers in small shops.

The Way Wood Works • Contributing Editor Nick Engler explains how to use the grain and structure of the wood so your projects are sturdy and stable.

CORRECTIONS & CLARIFICATIONS

In the February 2000 issue (#113), we listed the Delta Unisaw model 34-783 in our tool report. That machine is not available for sale. Also, since the publication of the tool report, Black & Decker has increased the voltage on its line of Firestorm cordless drills. **PW**

Tools that Changed My Shop Forever

The dean of home woodshop writers gives you a personal look inside his shop and the tools we now take for granted.

In the late 1940s, the Shopsmith, a power tool that contributed significantly to the growth of amateur woodworking, was placed on the market. It was a multi-purpose machine, a five-in-one concept that was greeted lovingly by some and with skepticism by others — the latter group being woodworkers who couldn't understand why you would want to rearrange components to change from a table saw to a drill press. They also didn't like the fact that the machine had a tilting table (instead of a tilting arbor), though most people forget that many saws of the time were built that way.

About 600,000 woodworkers have bought a Shopsmith, which gives you an assortment of power tools without taking up much more space than a couple bicycles. I admit to a degree of fondness for the machine because the introductory model, the 10ER, was my first power tool. It allowed me to work efficiently in my shop of the time, an 8' x 10' corner of an apartment basement.

Whatever I did with the tool impressed the manufacturer enough to transport me from New York to California so I could produce the Shopsmith bible, "Power Tool Woodworking for Everyone." There have been transformations since then in the book, the tool, manufacturers and my interest in tools generally. But one factor seems perennial, the camaraderie that exists among users of multi-purpose machines.

Since that first machine entered my life years ago, I've had the opportunity to use hundreds of woodworking tools. Some of them changed forever the way we work. The following is a look at the tools that earned a permanent place in my shop.

Saber Saw

Some tools achieve overnight success. The saber saw, imported from Switzerland in the 1940s, was quickly adopted by professional and amateur woodworkers, despite its \$150



Who is the young man demonstrating horizontal boring on the Shopsmith 10ER? Why it's R.J. DeCristoforo himself using the first power tool he ever owned.

price. How can you not be impressed with a small, lightweight tool that can substitute for a hand saw, portable circular saw, jigsaw, band saw, coping saw and keyhole saw? With a pivot guide it can saw perfect circles, and it can form its own starting hole.

Importers soon had considerable competition from American manufacturers, which resulted in added features and lower prices. Stanley, Black & Decker, Millers Falls, Porter-Cable, Sears, Wen and others produced saber saws with about a \$50

or \$60 price tag. Some were as low as \$30. Disston, famed for its hand saws, even produced a 5-pound saber saw that had a handle that duplicated the one on its famous D-23 hand saw.

Electric Drill

It would be unusual to discover a shop without a portable electric drill. My first one was a monster, a $\frac{3}{8}$ " unit that was surplus from an aircraft plant that was scaling down at the end of World War II. My



drill was heavy and awkward by today's standards, with a design that, with consistent use, could lead to carpal tunnel syndrome. But it served me well. I made a stand for it so I could also use it for drum sanding, grinding and buffing.

A few years later I tested the new Disston $\frac{1}{4}$ " 1,800 rpm drill that looked like a paint sprayer. I thought the design made sense. Its "in-line" drive feature placed your hand directly behind the bit, and that let you drill straighter and with more muscle.

The drill's offset motor and recessed chuck gave it the slimmest profile in the



Continued from page 13

Scrollsaw

When this machine was first introduced, many woodworkers were disinterested because they viewed it as something for crafts or jigsaw puzzles.

The origin of the scrollsaw began centuries ago with treadle-powered machines made with wooden components. The same concept was used in sawmills that had a huge reciprocating saw blade to cut rough stock to size. The small units we now use were made possible by the advent of fine-toothed scrolling blades and compact electric motors.

My first powered scrollsaw was my sister's treadle-type sewing machine that I had modified by installing a fractional horsepower motor. This happened because an employee of the Bosch Manufacturing Co. thought of replacing the needle on his wife's sewing machine with a small blade. I tested and adopted the idea. Now we might smile at the concept, but I did OK with it for quite a while.

Modern machines have eclipsed their ancestors' reputation for cutting gingerbread and become an important woodworking machine. They can handle stock up to 2" thick with the table at 90 degrees. And it is adept at "pad sawing," which allows you to layer multiple pieces and cut them all at once.

Benchtop Mortiser

For most of my woodworking life I made

The first jigsaw. Though it looks much like today's models, modern tools are packed with features unheard of when the tool was introduced (photo courtesy of Bosch) (right). Pad sanders helped ease one of the most dreaded aspects of woodworking: finishing. This Rockwell sander was the first one DeCristoforo owned (middle right). An early router from the Carter company. Though modern tools have a boatload of features, the basic concept is still true. A spinning bit on the shaft of a motor. (far right).



mortises with a mortising accessory on my drill press. I've never complained about this method, but I often thought it would be nice to have a permanent mortising setup.

The new benchtop mortisers give you a quick setup for mortising, and make the operation easier. For example, the Delta unit that I recently tried out borrows from the arbor press used in metal working. Its husky steel arbor and long handle let you convert 32 pounds of downward force into 320 pounds. The gearing allows you to make a complete cut with a 90-degree pull of the handle. A similar cut on a drill press would require you to turn the feed lever a full circle.

Router

I've done my share of routing with hand tools, namely Stanley planes designed for

Early jigsaws and scrollsaws shared a common ancestor, a sewing machine with a blade in place of the needle. An employee of Bosch came up with the idea, now Bosch makes what is considered to be the premium jigsaw for professionals and serious home users.

dadoing or combination machines that formed flutes, fillets and other moulding designs. While the tools strengthened my arms, I was happy to switch to an electric router — one of the wonder tools in woodworking.

The history of the router goes back to World War I, its invention generally credited to R.L. Carter, a patternmaker who designed a cutter from the worm gear of an electric barber's clipper and secured it to the shaft of an electric motor. The efficiency of the "Electric Hand Shaper" was quickly noticed and Carter found himself producing thousands of the units for sale. In the late 1920s, Stanley acquired the Carter business and produced the first "modern" router, not especially for me, of course.

There's little point to touting the virtues of the portable router because, "Is there a woodworker with a soul so dead he never to himself has said, 'I love my router'?" The mechanics of the router haven't changed but improvements continue to make it an exciting tool, especially the plunge feature.

What's next? A recent innovation is a wrench-free collet, something like the keyless chuck on a drill. I haven't had the chance to check it out, but if it eliminates having to use two wrenches in a tight area, I'll buy it.

Dovetail Jigs

Before the advent of dovetail jigs, you had to cut this joint by hand. Even though these jigs made the task quick, we didn't





fully embrace the concept because the first jigs dictated the width of the stock you could use and spaced the tails perfectly even. In the early 1980s, the Leigh jig from a Canadian company changed all that. You can vary the spacing of the pins and tails on any workpiece up to 24" wide. It also cuts a wide variety of joints, even sliding dovetails. Needless to say, careful adjustment of components is required.

Electric Sanders

When it comes to preparing wood for finishing, I'm open to anything that makes the chore easier. So when power sanders made their debut, I was a quick customer.

My first unit was the Rockwell "speed bloc sander" that was later acquired and is still being produced by Porter-Cable. The unit has a high speed of 12,000 orbits per minute and works with 1/4 sheets of sandpaper.

As I mentioned, I'm addicted to speedy wood smoothing, so my shop has a special cabinet filled with portable sanders, belt sanders, detail sanders and the relatively new random-orbit tools.

One claim of these random-orbit sanders is that their high speed and tiny orbits eliminate crossgrain scratches and swirls. A counterclaim is that no matter which sander you use, some hand sanding is necessary. Well, maybe. Let's ask Bob Flexner!

Carbide

Not all innovations come in the form of tools, some are materials, notably, tungsten carbide. My first experience with a carbide-tipped blade was with a Disston eight-tooth design that was offered as a "safety blade." Why, I don't

An early sander that looks more like a toaster. Woodworkers didn't care what they looked like as long as they quickly smoothed the wood. Photo courtesy of Porter-Cable.

know. All I could see was the blade thunk, thunk, thunking through a saw cut. It wasn't exciting except to construction workers who used it in portable saws to cut through house-framing members.

In the late 1970s and early 1980s, woodworking magazines inundated readers with praises of multi-toothed carbide blades. High cost was a factor, but superior performance and a life span of as much as 20-to-1 over steel blades made the price seem more reasonable. We now take carbide blades for granted.

But carbide has made a more general impact. There are few cutting tools that can't be obtained with carbide edges, dado blades, router bits, shaper cutters and blades for planers and jointers. All of these make our workshop effort easier and more professional.

What will follow? Will we get to sawing wood with laser beams? **PW**

R.J. DeCristoforo is a contributing editor to Popular Woodworking and the author of dozens of books on woodworking, power tools and jigs.

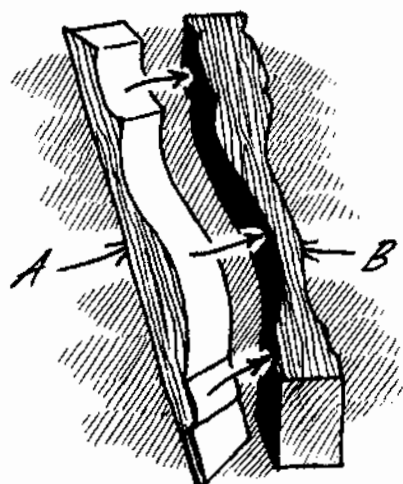


WINNER!

Super Glue To The Rescue

All the woodworking books I've seen show that when you are making complex band saw cuts (such as on cabriole legs) you face-tape the waste block back in place, then flip the stock over and cut from the side. Instead, I started using some super glue (cyanoacrylate) to hold the scrap in place. I put a drop of glue in an area that will be waste so there's no problem with getting it loose after the cut. But if you had to, you could always break the scrap free. This system works well, and the cut lines are not obscured by masking tape.

Allen Weiss
Fresh Meadows, New York



*GLUE CUT-OFF PIECE (LEFT)
TO WORK WHERE INDICATED.
FLAT SIDE "A" RIDES TABLE SURFACE
FOR OPPOSITE (B) SIDE'S CONTOUR CUTS.*

Don't Move the Guide, Move the Router

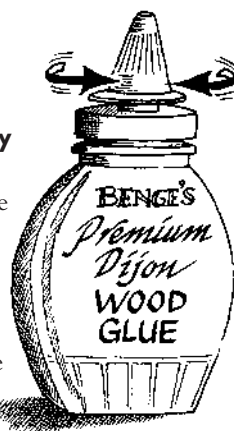
When cutting grooves or dados for cabinet assembly or for a series of shelves, it's unlikely you will have a router cutter of the correct width for the groove. Most likely you will have to make each groove with two passes using a narrower cutter. When doing this it's usual to run the router base against a clamped-on guide strip. If you move this for the

second pass each time, you may not always get it exactly right and end up with some slack-fitting shelves. It's better to leave the guide strip in the first position and use a spacing piece to guide the router in its second pass. I go a stage further and attach the guide strip to another piece that's square to it. You can let the router cut through it. Before cutting a set of shelf grooves, experiment on scrap wood and plane the spacing piece to thickness so you can get the correct result.

Percy W. Blandford
Stratford-on-Avon, England

Pardon Me, But Do You Have Any Grey Poupon?

When I use some manufacturers' wood glue containers, the tips always wear out quickly from being dragged across the wood, and I always lose the plastic plug that seals the container. I now use clean plastic mustard bottles with twist-top seals. When the tip gets worn, I just replace it with a new bottle. And because the twist top seals, I no longer worry about the glue hardening. **PW**



Jerry Benge
Perryville, Missouri

BE AN INNOVATIVE THINKER AND WIN!

Turn your woodworking knowledge into a truly tricked-out tool from the Simpson Machine Tool Co. (www.smtco.com). Your best trick or shop tip can earn you a reproduction of the 19th Century Stanley Odd Job #1 — the original multi-tool — and a check for \$50. The Odd Job is an inside miter and try square, mortise scribe, layout tool, depth gauge, beam compass and bubble level, with a 6" and 12" brass-lined maple rule. This re-creation of a classic tool is cast from solid manganese bronze and is machined to within .0015 tolerance. One winner will be chosen each issue; published runners-up receive \$25.

To make things easier, you can e-mail your trick and daytime phone number to us at DavidT@FWPubs.com or mail it to: Tricks of the Trade • Popular Woodworking • 1507 Dana Ave. • Cincinnati, OH 45207. All entries become the property of Popular Woodworking.

Sponsored by *SIMPSON MACHINE TOOL CO.*



Illustrations: John McCormick

Auxiliary Band Saw Table

The cure for the incredible shrinking work surface isn't a new band saw.

By Nick Engler

There I was, perfectly content with my miniscule 14"-square band saw table, not even aware that there was something far, far better. Then I took a job teaching wood craftsmanship at the University of Cincinnati, and life was never the same. I walked into class and was smitten by a classic Tannewitz band saw. This industrial-sized baby had 20" wheels, more cast iron than an armory and—best of all—a table that was bigger than most workshops. I was seduced by the ease with which you could handle workpieces of all sizes on that expansive surface.

If you've never worked on a large band saw, you'd be surprised and delighted by how it supports and balances the work. It also adds to the safety and accuracy of operations that involve large boards. If you use your band saw for ripping and resawing, the large table mounts a longer fence, making those chores easier.

No longer satisfied with a small work surface, I studied my own band saw and was amazed to find it has room for a much larger table. Fact is, almost all band saws that are made for small workshops will accommodate bigger tables. In most cases you can easily triple the size of your work surface—I expanded my table from 196 square inches to 576 square inches!

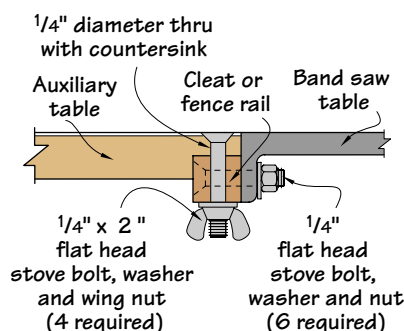
To expand the work surface on a band saw, make an auxiliary table. The sim-

Continued on page 20

The tie bar holds the auxiliary table rigid after allowing space for the fixture to be slipped over the blade. Use a wooden clamp to hold the fixture's surface flat while you tighten the tie bar.



Photos by Al Parrish



Mounting detail



INGENIOUS JIGS

Continued from page 18

plest way to do this is to cut a piece of plywood or particleboard to the size you want. Drill a hole for the blade no more than 10" from the front edge. Cut a saw kerf from an outside edge to the hole. Attach this fixture to the saw by bolting it to the fence rails, if your machine has them. If not, fashion wooden clamps to hook over the bottom edge of the metal table and screw them to the underside of the auxiliary table.

While this design works well, it has a drawback. It decreases the vertical capacity of the saw by the thickness of the auxiliary table. You'll find yourself removing the fixture when sawing thick stock or resawing wide boards—the very occasions when an expanded table is most needed.

To solve this problem, I made the auxiliary band saw table you see here to extend the existing table, rather than cover it. The extension is made from medium density fiberboard (MDF) and edged with hardwood. I covered the surfaces with plastic laminate to make them more durable, although this isn't absolutely necessary. The cutout in the middle of the extension rests on the old fence rails. If your band saw doesn't have rails, bolt hardwood cleats to the edges. Rabbet the extension so the top surface will be flush with the table. I cut my rabbets a little deeper than they needed to be, then shimmed the extension with strips of masking tape to get it dead even with the table. Secure the extension by bolting it to the rails (or cleats).

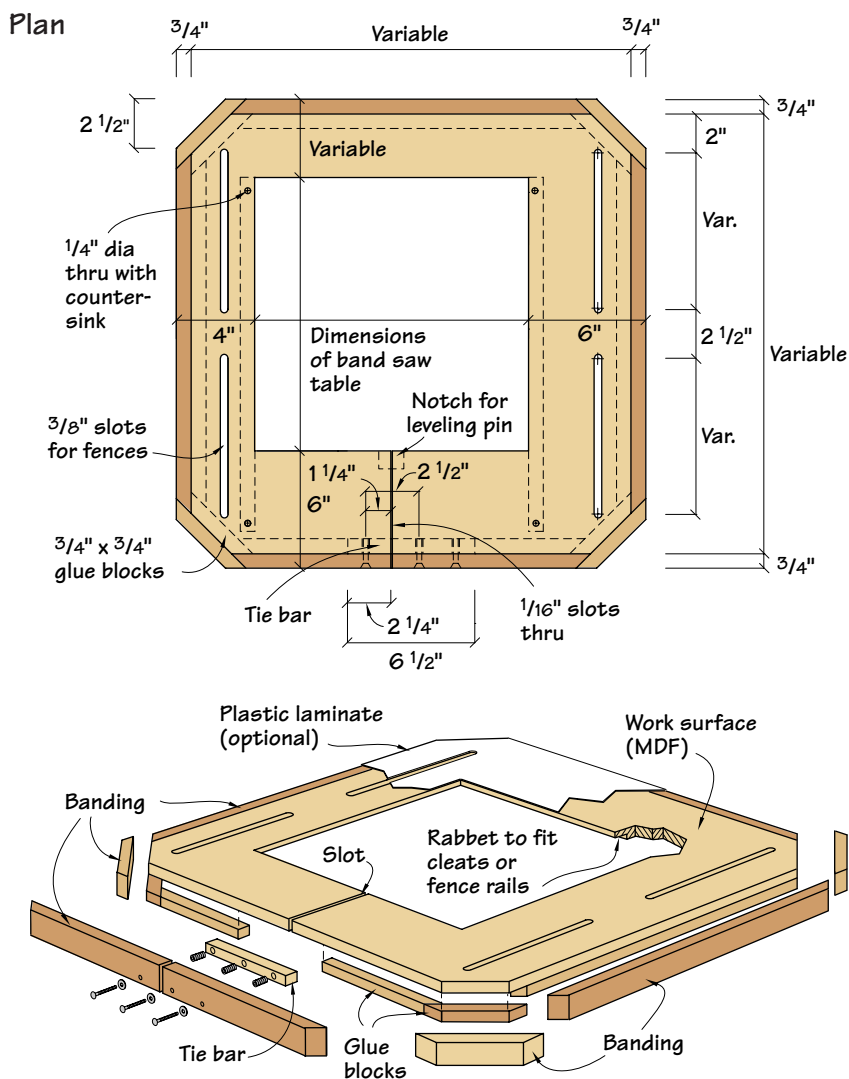
You can make this extension any size you want, but don't extend the table more than 4" at the front. Any more, and it may become difficult to reach the blade while you're working. Don't make the table rectangular—knock off the corners to prevent painful bumps and scrapes. To mount a fence and other jigs, rout slots in the extension at the front and the back.

I've gotten so fond of this extended work surface that I can't imagine how I ever did without it. It's not exactly a Tannewitz, but it's the next best thing. **PW**

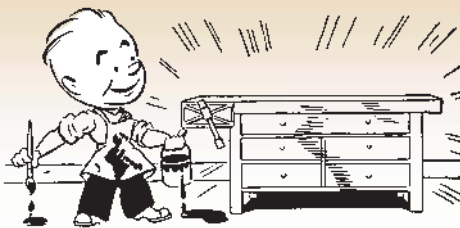
Nick is a contributing editor to Popular Woodworking, the author of 52 books on woodworking, and an inventor of numerous woodworking tools, jigs and fixtures. In his spare time ... well, he has no spare time.



The expansive surface of the band saw table gives you extra support when you need it, such as when cutting large ovals.

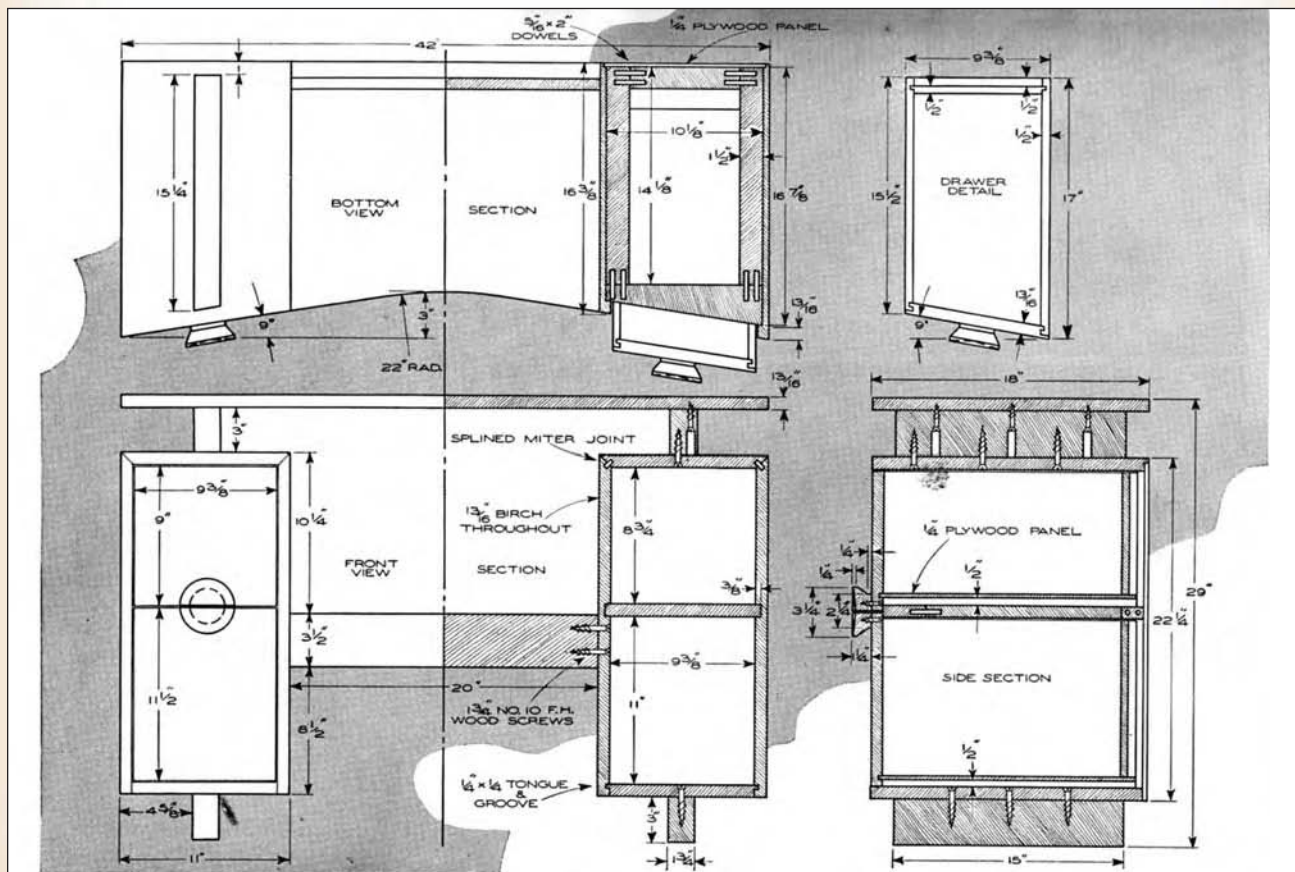


**From Volume 16,
Issue No. 5, 1946-47**




Here is a small desk of modern design which presents slightly different lines, giving it a rare and unusual appearance. The desk is built from $1\frac{3}{16}$ " birch or maple plywood. The edges of the plywood may be either painted to match the finish, or veneer facing may be glued in place to conceal the core wood. The construction details and complete dimensions are shown in the drawing. The drawer arrangement is different in that it has fronts that are set at a slight angle and a drawer pull which is divided in the middle to provide a pull for both the top and bottom drawer. This drawer pull is a lathe turning which may be built up either as a split turning or it may be cut in two after making a solid drawer pull.

In making the side compartments which hold the two sets of drawers, be sure to make one right and one left hand. The feet and top spacers are then added to these end sections and are screw fastened as shown. The top spacers are first fastened to the underside of the top. The edges are then completed with either paint or veneer and you are ready for the finish, which is natural with white shellac or varnish. **PW**







This essential piece of dining room furniture is slightly scaled down to fit today's household demands and dimensions.

Arts & Crafts Sideboard

When the Arts & Crafts movement swept America in the early 1900s, furniture scale was anything but diminutive. Houses had 10'-high ceilings, and even the "modest" bungalow of the time had larger spaces for living (but much smaller spaces for sleeping) than today's typical tract house. Common sizes for sideboards at that time were 38" to the top, 24" deep and anywhere from 40" to 80" in length. In today's 12' x 12' dining area that's just too large. I scaled mine down to 34" to the top, 19" in depth and 66" in length. Some of the construction has been updated as well, using biscuits where appropriate and plywood panels.

As with most Arts & Crafts pieces, wood selection and hardware are the features that bring the simple construction to life. The material for the legs, top, sides, drawer faces and doors should be carefully selected from quartersawn white oak to provide the largest and most uniform ray flake possible.

Start Construction With the Side Panels

After choosing your lumber for the most dramatic effect, begin construction by cutting the legs to size and marking the locations of the $\frac{1}{2}$ " x 2" x $\frac{3}{4}$ "-deep mortises for the three 3"-wide rails. In addition, the back legs get a $\frac{1}{4}$ " x $\frac{1}{4}$ " groove on the inside face for the backs to slip into. The side panels are assembled using tongue-and-groove construction. Set your table saw to run a $\frac{1}{2}$ "-deep center groove down the inside edge of the stiles and rails. Make the groove wide enough to allow your $\frac{1}{4}$ " panels to fit snugly without forcing. Then reset your saw to cut $\frac{1}{4}$ " x $\frac{1}{2}$ " tongues on both ends of the top side rails, and the bottom of each stile.

by David Thiel



The sides are where everything comes together with the three mortises, the back slot and finally the biscuit joint for the long drawer rail.

The final step on the lower rails is to draw an arch 1" up from the bottom of the rail, running from side-to-side. Cut the arches on both lower rails using a jigsaw, then sand the edge smooth. Next, cut the panels to size (leave $\frac{1}{16}$ " clearance all the way around the panels so they won't interfere with assembly). Prior to assembling the sides, finish sand both sides of the panels and the inside edge of the stiles and rails. Then glue up the parts, putting only a spot of glue on the panels.

Attaching the Rails

The next step is to cut and prepare the rails that will divide the drawers and run between the two side panels. The long rails (one oak and two poplar) are the same size

and can be cut and tenoned at the same time. Once the tenons are complete, the front rail gets a 1" arch as on the sides. The two back rails each get a $\frac{1}{2}$ " x $\frac{1}{2}$ " rabbet to hold the back pieces and partitions.

I made the rest of the rails and the two center partitions out of plywood with a 1" solid oak front edge. With the rails and partitions edged, cut notches in the front edge of the two partitions and the back edge of the long drawer rail to form a bridle joint. This provides strength and rigidity to the rails and allows the grain of the top rail to run the width of the cabinet without interruption. Also, the top back corner of each partition requires a $\frac{1}{2}$ " x 3" notch for the top rear rail to attach.

For the half-blind dovetails, I used the \$20 jig method outlined in Troy Sexton's article in the September 1999 issue of Popular Woodworking. It seemed like a clever idea when we ran the article, so I had to try it for myself. The scrap-wood templates and router template guide worked great. There's a different template for each row of drawers, but the templates are quick and easy to make.



Join the three drawer rails to the cabinet with biscuits — the two short rails between the two partitions, and the long one between the two side panels. When cutting the biscuits in the side panels, remember that the drawers, partitions and drawer rails are set back $\frac{3}{8}$ " from the legs.

Next mark the bottom piece and the front and back lower rails for biscuits, attaching the rails flush to the top surface of the bottom piece. Then glue the rails in place to the bottom. Pay careful attention to the length of the bottom at the rail tenons.

Now clamp the center drawer section together and mark the partition locations on the bottom piece. Then drill clearance

SCHEDULE OF MATERIALS: ARTS & CRAFTS SIDEBORD

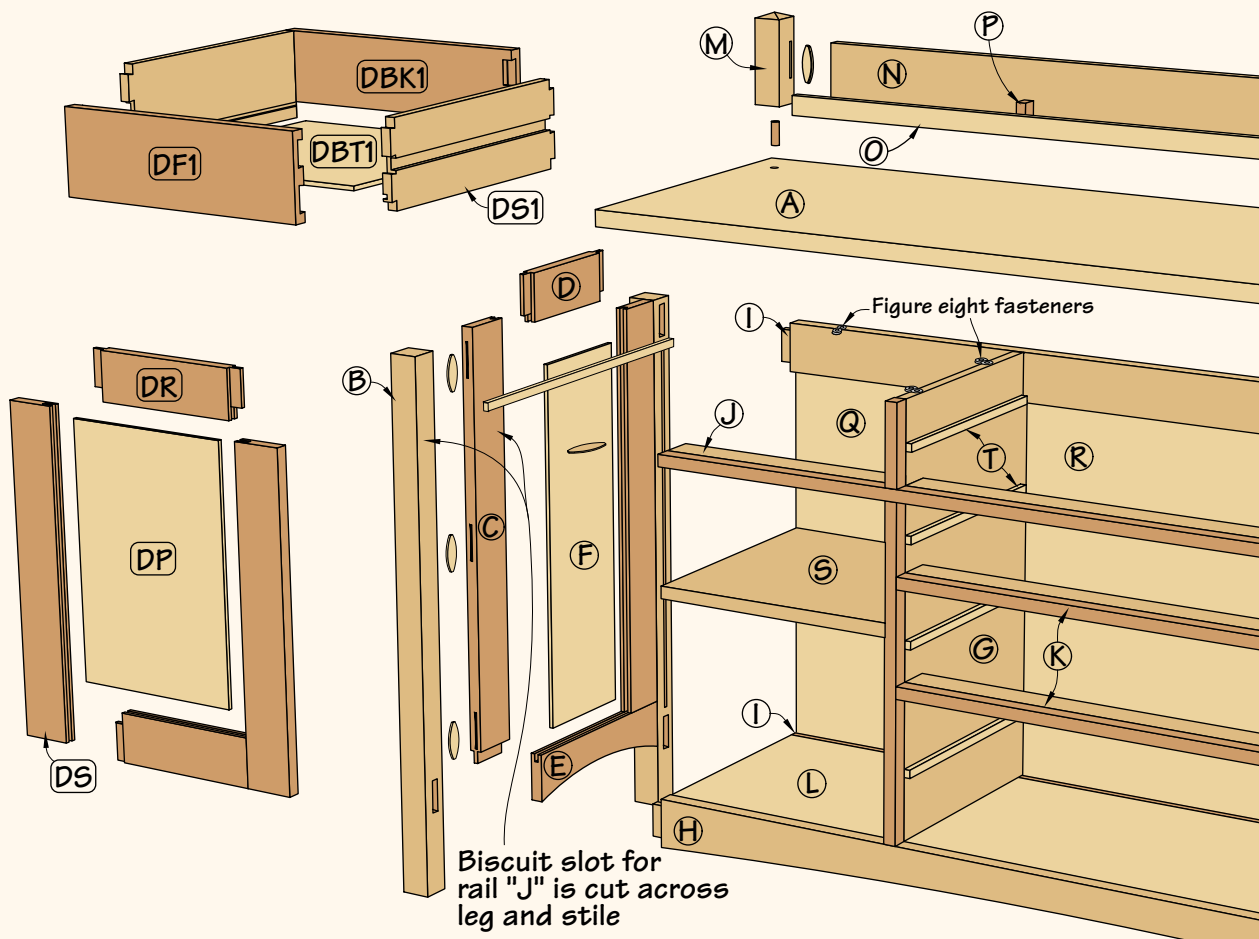
Cabinet

No.	Ltr.	Item	Dimensions T W L	Material	Comments
1	A	Top	1" x 19" x 66"	WO	
4	B	Legs	1 $\frac{3}{4}$ " x 1 $\frac{3}{4}$ " x 33"	WO	
4	C	Side stiles	1" x 3" x 26 $\frac{1}{2}$ "	WO	$\frac{1}{2}$ " TOE
2	D	Side rails	1" x 3" x 8"	WO	$\frac{1}{2}$ " TBE
2	E	Side rails	1" x 3" x 13"	WO	
2	F	Side panels	$\frac{1}{4}$ " x 8" x 24"	WO Ply	
2	G	Partitions	$\frac{3}{4}$ " x 15 $\frac{1}{4}$ " x 26"	WO/Ply	
1	H	Front rail	1" x 3" x 61 $\frac{1}{2}$ "	WO	$\frac{3}{4}$ " TBE
2	I	Rear rails	1" x 3" x 61 $\frac{1}{2}$ "	P	$\frac{3}{4}$ " TBE
1	J	Drawer rail	$\frac{3}{4}$ " x 3" x 60"	WO/Ply	
2	K	Drawer rails	$\frac{3}{4}$ " x 3" x 28 $\frac{1}{4}$ "	WO/Ply	
1	L	Bottom	$\frac{3}{4}$ " x 13 $\frac{3}{4}$ " x 60"	Ply	
2	M	Posts	1 $\frac{3}{4}$ " x 1 $\frac{3}{4}$ " x 5 $\frac{3}{4}$ "	WO	20° bevel
1	N	Plate rail	$\frac{3}{4}$ " x 3 $\frac{1}{2}$ " x 60"	WO	
1	O	Front rail	$\frac{5}{8}$ " x 1 $\frac{1}{4}$ " x 63 $\frac{1}{8}$ "	WO	45° bevel
2	P	Rail spacers	$\frac{5}{8}$ " x 1" x $\frac{7}{8}$ "	WO	
2	Q	Backs	$\frac{1}{4}$ " x 15 $\frac{5}{8}$ " x 24"	WO Ply	
1	R	Back	$\frac{1}{4}$ " x 29" x 24"	Ply	
2	S	Shelves	$\frac{3}{4}$ " x 15" x 14"	WO/Ply	
12	T	Runners	$\frac{3}{8}$ " x $\frac{1}{2}$ " x 13"	WO	

Doors & Drawers (Sizes allow a $\frac{1}{16}$ " gap around doors & drawers)

No.	Ltr.	Item	Dimensions T W L	Material	Comments
4	DS	Stiles	$\frac{3}{4}$ " x 3" x 20 $\frac{1}{8}$ "	WO	
4	DR	Rails	$\frac{3}{4}$ " x 3" x 10 $\frac{1}{2}$ "	WO	$\frac{3}{4}$ " TBE
2	DP	Partitions	$\frac{1}{4}$ " x 10 $\frac{1}{2}$ " x 15 $\frac{5}{8}$ "	WO Ply	
2	DF1	Fronts	$\frac{3}{4}$ " x 4 $\frac{7}{8}$ " x 15"	WO	
1	DF2	Front	$\frac{3}{4}$ " x 4 $\frac{7}{8}$ " x 28 $\frac{1}{8}$ "	WO	
6	DS1	Sides	$\frac{9}{16}$ " x 4 $\frac{7}{8}$ " x 14"	P	
2	DBK1	Backs	$\frac{3}{4}$ " x 4 $\frac{3}{8}$ " x 15"	P	
1	DBK2	Back	$\frac{3}{4}$ " x 4 $\frac{3}{8}$ " x 28 $\frac{1}{8}$ "	P	
1	DF3	Front	$\frac{3}{4}$ " x 5 $\frac{1}{2}$ " x 28 $\frac{1}{8}$ "	WO	
2	DS3	Sides	$\frac{9}{16}$ " x 5 $\frac{1}{2}$ " x 14"	P	
1	DBK3	Back	$\frac{3}{4}$ " x 5" x 28 $\frac{1}{8}$ "	P	
1	DF4	Front	$\frac{3}{4}$ " x 5 $\frac{7}{8}$ " x 28 $\frac{1}{8}$ "	WO	
2	DS4	Sides	$\frac{9}{16}$ " x 5 $\frac{7}{8}$ " x 14"	P	
1	DBK4	Back	$\frac{3}{4}$ " x 5 $\frac{3}{8}$ " x 28 $\frac{1}{8}$ "	P	
1	DF5	Front	$\frac{3}{4}$ " x 7" x 28 $\frac{1}{8}$ "	WO	
2	DS5	Sides	$\frac{9}{16}$ " x 7" x 14"	P	
1	DBK5	Back	$\frac{3}{4}$ " x 6 $\frac{1}{2}$ " x 28 $\frac{1}{8}$ "	P	
2	DBT1	Bottoms	$\frac{1}{4}$ " x 14 $\frac{1}{8}$ " x 14 $\frac{5}{16}$ "	Ply	
4	DBT2	Bottoms	$\frac{1}{4}$ " x 14 $\frac{1}{8}$ " x 27 $\frac{7}{16}$ "	Ply	

WO=White Oak, WO/Ply=White Oak edge on Plywood, P=Poplar, Ply=Plywood, TBE=Tenons both ends, TOE=Tenon one end



holes through the bottom for the screws to attach the partitions to the bottom.

The next step requires a little juggling and an extra pair of hands. Glue the rails between the two partitions, then screw the partitions to the bottom. Now put the front rail in place in the partition's bridle joint and glue and tap the bottom tenons in place in the side panel mortises. Leave the top splayed open to glue the biscuits and tenons for the rear top rail and the long drawer rail. Tap it all into place, check for square and clamp it up.

Doors and Drawers

I used half-blind dovetail joinery for the drawers, using poplar as a secondary wood for the side and backs of the drawers, and 1/4" birch ply for the bottoms. The drawer bottoms slide into 1/4" x 1/4" grooves cut 1/2" up on the sides and drawer front. The backs are cut 1/2" shorter than the sides to allow the bottom to slide into place.

I went with a traditional drawer slide method and cut 5/8"-wide x 5/16"-deep grooves in the drawer sides before assembly. Once the drawer was assembled, I notched the drawer backs to continue the groove the

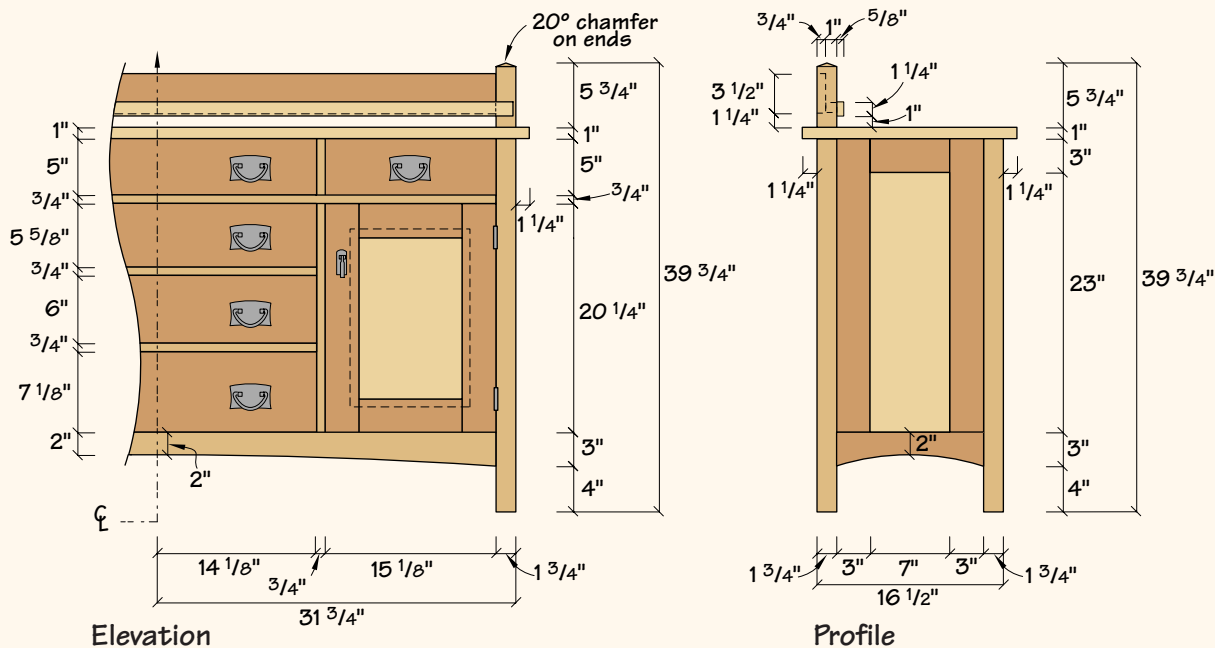
length of the drawer. I then mounted oak drawer runners to the inside of the cabinet. The captured drawer runners (with a little paraffin) prove a fine drawer slide and keep the drawer from drooping when opened to full length. The size and location of your runners is critical and should be checked carefully before mounting.

To mount the drawer runners, start with the top three drawers. Measure the opening space, subtract the height of the drawer, split the difference then add that number to the distance from the top of the drawer groove to the top of the drawer. In locating the front of the runner, remember that the legs extend 3/8" beyond the drawer section.

ARCHES WITHOUT A COMPASS

If you've taken a moment to try and figure out the radius necessary to make the arch on either the side or front rails, you'll know you're looking for a compass with about a 20 foot beam. Since this is a little silly, here's an easier way: Find a piece of hardwood fall-off measuring about 1/4" x 1" x 72". Tap a couple of brad nails into the rail at the extreme ends of the arch. Then bend the strip from the center up 1" and clamp it in place. Take a pencil and trace the inside of the strip, and there's your arch. Obviously a shorter strip will work just as well for the side rails.





Use a Forstner bit to recess the smaller end of the fasteners into the top edge of the partitions and side panels. Then take a chisel and notch the inner half of the recess to form a "V" which will allow the fastener to swivel front-to-back. This allows for wood movement and will keep the solid top from pulling the cabinet apart.



Hardware and Finish

Now mount the hardware. The pulls shown are impressive, and they should be. The pulls are Stickley reproductions and priced at \$30 each. While they're worth the money, you may choose to use more affordable pulls.

Finishing an Arts & Crafts piece is always a challenge. The trick is to get the right color and still get the ray flake to "pop" from the wood. Start by applying an alcohol-soluble aniline dye. There are many available, but chose one with a reddish-brown cast, such as a brown mahogany. Because it's alcohol based, this dye will dry quickly and can soon be recoated with a warm brown glaze. While wiping the excess glaze from the piece you can control how dark the finish will be. After allowing the glaze to dry overnight, the final step is a couple of coats of satin lacquer. If you use shellac or varnish, be careful as the alcohol carrier can allow the stain to run.

This is an impressive piece, and I'm pleased with its scaled-down proportions. There's only one drawback to building your own Arts & Crafts sideboard — the next logical step is a dining table and chairs. Maybe next year. **PW**



With everything ready to finish, there's something satisfying in seeing the drawer dovetails surrounded by great hardware. If you want to keep the dovetails highly visible, carefully tape off the sides of the drawers before staining.

The doors are built pretty much the same way as the cabinet's side panels, though I used a 3/4"-deep groove and tongue for extra strength. I mortised the hinges into the doors only (half the thickness of the hinge) and it provided good spacing for the door in the opening.

Top and Plate Rail

I've included a plate rail on my sideboard that is a traditional touch. However you may opt to leave it off. The plate rail piece is biscuited between the two posts, while the front rail is nailed in place to the front of the posts (see diagram). I used a 23-gauge air pinner that left almost no hole to putty.

The two post tops are beveled on four sides to a 20-degree angle to form a "point." I did this on the table saw with a stop mounted on the miter gauge. Four quick cuts and you're done. With the plate rail assembled, mark the drilling location on the top and drill the dowel holes in the top, but leave the rail loose until after applying the finish.

Attach the top using figure-eight fasteners. They require very little space, and allow the top to move during changes in humidity. The last pieces to cut are the backs and the shelves for the door sections.

SOURCES

From Rockler Woodworking
800-279-4441, or www.rockler.com
10 - #62943 Stickley V-pulls - \$29.99 ea.
2 - #26815 Vertical pulls - \$17.99 ea.
2 - pr #27979 Stickley hinges - \$6.99 ea.
Desk top fasteners # 21650 - \$3.99 for a pack of eight

Economy Option: Woodcraft
800-225-1153

10 - #123874 Mission pulls - \$9.99 ea.
2 - #123876 Vertical pulls - \$5.99 ea.
Use the same hinges.

WOODWORKING on Death

Take a look inside—deep inside—Death Row for a glimpse of how inmates make amazing projects with only a handful of hand tools.

One of the greatest pleasures in woodworking is getting to use the piece of furniture that you built. Not so for Charles Justice, a wandering broom maker from Ohio. While incarcerated in 1897 for burglary and larceny, Justice built Ohio's electric chair. After serving the rest of his sentence, Justice was released, only to return later to the penitentiary for slaying John Shoupe, a Greene County farmer.

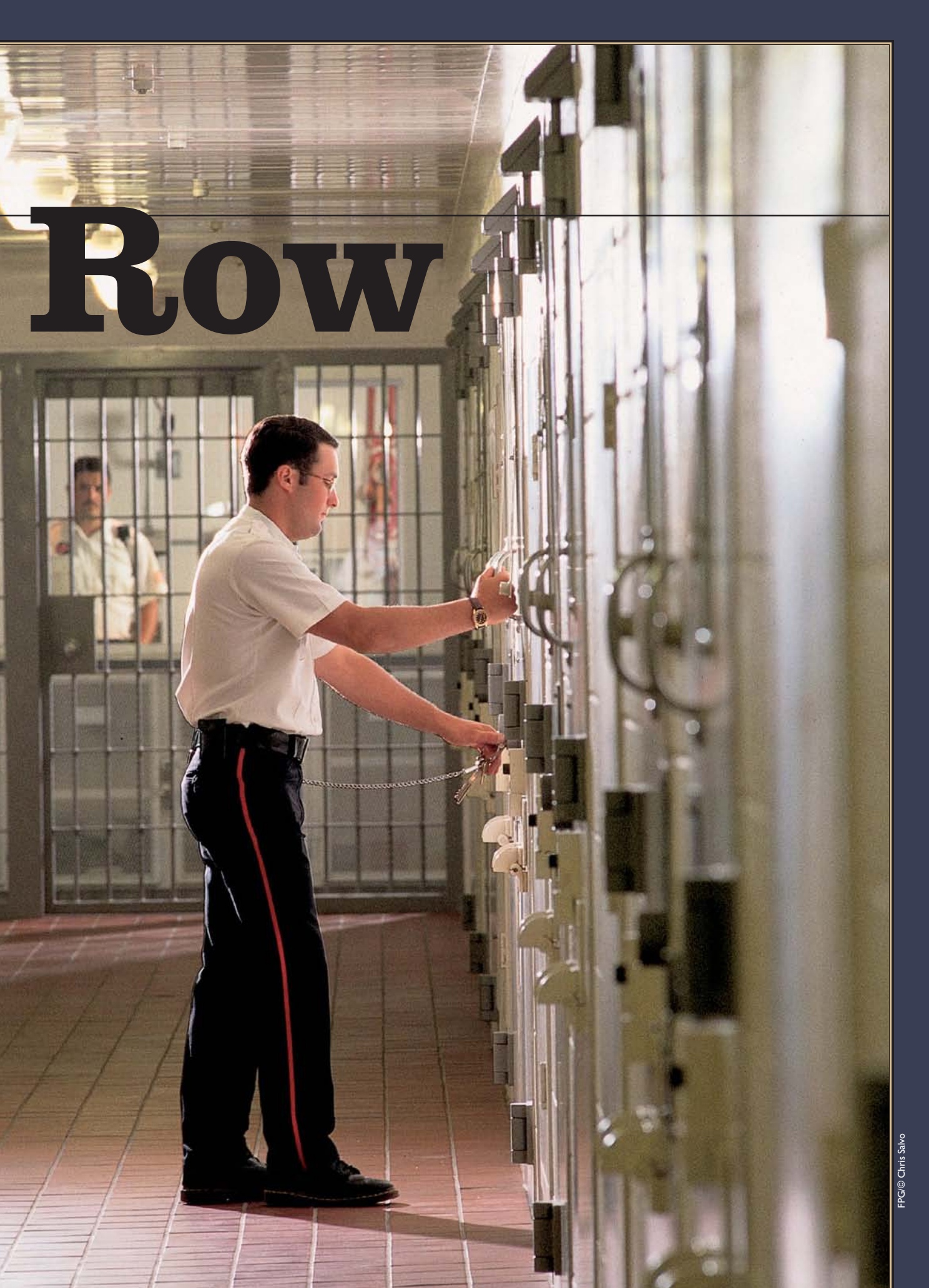
Justice was electrocuted for his crime in the chair he built on Oct. 27, 1911, according to Joe Andrews, the communications chief for the Ohio Department of Rehabilitation and Correction. And though Justice is long gone, the chair he built is still in use today by Ohio's correctional system.

Justice wasn't the only woodworker on Death Row. Though it might seem unlikely, a good number of the more than 3,300 residents of Death Row in this country somehow manage to build everything from simple wooden crosses and cases for cigarette lighters to inlaid humidors and detailed replicas of wooden sailing ships. Their tools are limited, usually a safety razor and rubber bands. But what they lack in machinery they make up for in ingenuity and the one thing every home woodworker wants: lots and lots of free time.

This replica of Kentucky's electric chair was built by a death row inmate and now is on display in the warden's office at the Kentucky State Penitentiary.



by Christopher Schwarz



Row

During the last two years, we've been corresponding with two Death Row inmates in Kentucky and Texas about their construction methods, their projects and woodworking in general. Though the crimes these men have been convicted of are terrible to think about, they talk about woodworking with the same passion as a home hobbyist. And the way they go about their craft is a fascinating study in the extremes people will go to in order to enjoy woodworking.

Inside Death Row

There's a light rain falling on the Kentucky State Penitentiary at Eddyville, Ky., a small town in the western tip of the state. The prison's towers are only a few hundred feet from scenic Lake Barkley, so when you climb

the small road between the prison and lake you can't help but be overcome by both the beauty and the dread around you.

The Penitentiary holds many of Kentucky's toughest prisoners, but it's best known for being home to the state's Death Row facility. Getting inside the prison is easy. Guards quickly and politely search our bags and photo equipment and within a few minutes we're in Warden Phil Parker's office staring at a scale replica of Sparky, the state's electric chair.

About six years ago, employees at the prison were permitted to purchase items made by inmates. Parker bought the model of the electric chair for about \$10 from a death row inmate named Parramore Sanborn.

"He didn't make it for me specifically,"

Parker says. "It was just another item in the (display case)." But there it sits in Parker's office near another craft item: a fake gun made and used by a prisoner in an escape attempt. Right outside Parker's office is a display case filled with other items confiscated from crafty inmates: knives fitted with the familiar red handle you see on F-clamps in every woodshop. Tattoo machines made from radio parts. Shanks made from files.

It's an apt time for a visit since Parker has just decided to stop all woodworking and other crafts on Death Row because prison officials got a tip that some inmates were plotting a jailbreak.

"The arts and crafts program was very therapeutic," Parker says. "They would spend hours in their cells working. But if

one of these individuals escaped, there would be no excuse. I feel very justified in my decision. I cannot afford to take chances with that sort of population."

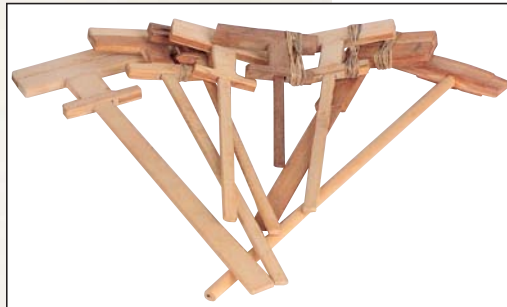
Ralph Baze and His Tools

Death Row in Kentucky is located deep inside the Penitentiary, surrounded by the building's castle-like walls. From the outside, Kentucky's Death Row looks almost like a modern school. Inside, cells surround a large common area where inmates are hanging out. Someone above us drips water on our heads. At least, we hope it's water.

This is where inmate Ralph Baze lives and works. Baze was convicted in 1994 of murdering the Powell County sheriff and a deputy in 1992 who were trying to arrest him on an outstanding warrant. Baze's attorney argued Baze shot in self-defense after one of the officers shot him in the leg as he tried to surrender.

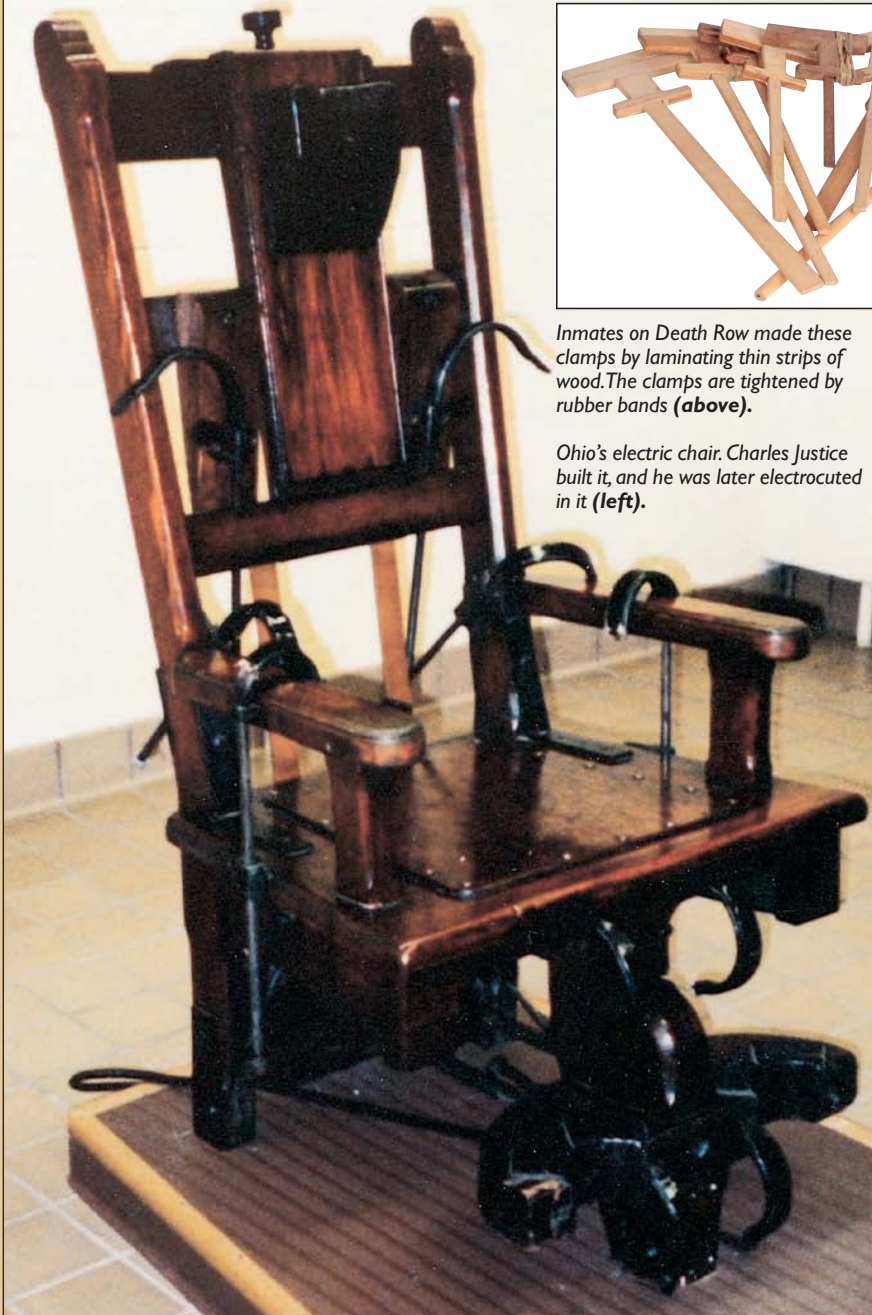
Until recently, Baze was a hard-core woodworker on Death Row. However, he's never used a router for his craft, or even a chisel. Because security is tight on Death Row, inmates were allowed only a few items to practice their craft.

The few tools that were allowed limited what was possible to build. However, inmates are ingenious. Just ask the guards. There's a saying among the staff at the penitentiary that goes like this. Say you've got



Inmates on Death Row made these clamps by laminating thin strips of wood. The clamps are tightened by rubber bands (above).

Ohio's electric chair. Charles Justice built it, and he was later electrocuted in it (left).





Though it might not look like much, this safety razor is the table saw for Death Row inmates. They used this tool to cut thin pieces of wood to size and then laminated them. The rolled up stuff is sandpaper.

two inmates, each chained to opposite ends of a 50-foot pole. One has a cigarette. Turn your back for five minutes. When you turn back around, each of those inmates will be smoking half of the cigarette.

The primary cutting tool on Death Row was a safety razor blade mounted in a scrap of wood that served as a handle. Baze also had a sharp round gear from an alarm clock that was mounted to a piece of scrap wood.

Because you cannot rip a $\frac{3}{4}$ "-thick board with a straight razor, inmates would work with thin stock, usually $\frac{1}{8}$ " or $\frac{1}{4}$ " thick,

that they purchased from catalog suppliers. A 24"-long rip cut in $\frac{1}{4}$ "-thick walnut could take five to seven minutes to do. To create a thick board, Baze would cut several thin pieces to size with the razor and then laminate the pieces into a thicker board.

To laminate the boards, you need glue. Inmates on Death Row were allowed to use Elmer's glue and Titebond. Polyurethane glues and epoxies were not allowed.

"If you cannot eat it, you cannot have it," Baze explains.



Two projects by Alvin Kelly

WOODWORKING ON DEATH ROW IN TEXAS IS SIMILAR

Alvin Kelly, an inmate on Death Row in Texas, builds clocks, music boxes and other projects in his cell and sells much of his work. He spends about six to eight hours a day working on his projects.

"I work wood because I like working with it," Kelly writes. "I never did any crafts like I do now before coming here, but I build and sell my crafts as a means of support here for me. I do not have to place my family in a burden to do so."

Kelly and other inmates are allowed only a single-edged razor blade as a cutting tool. "You can guess that when you are cutting wood such as cocobolo or purple-heart it is a major job," he writes.

Inmates there are allowed only water-based finishes and glue for their projects.

A typical project such as a clock or a music box takes about 10 days to complete from start to finish.

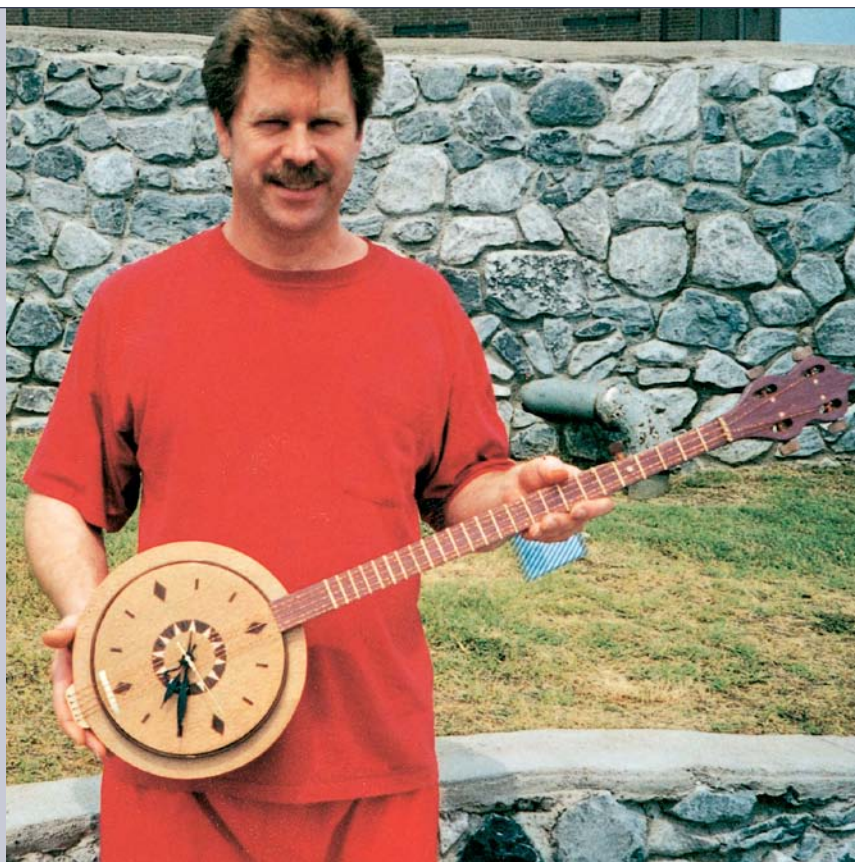
Kelly was convicted in connection with the 1984 shooting deaths of three people in Longview, Texas, including an 18-month-old child, according to state documents. Kelly has maintained he is innocent of the crime he was convicted of.



One inmate built this wooden cage with a sculpture inside of an inmate (made from toilet tissue). On the inmate's shoulder is a devil. At his feet is a perfectly painted pack of cigarettes. On the back wall of the cage is a clock.

“Most of the tools I use I’ve dreamed up myself but not all. Fact is, you’ve just got to use what’s around you, and even that can get you hole time. For the most part, however, the guards know it keeps me busy and I don’t make things to hurt other people with so they leave me alone. In that I am blessed.”

—Ralph Baze



Ralph Baze holding a clock made to look like a banjo. The dial is lacewood with wenge and maple inlaid on the dial. The neck is red cedar with a fretboard of purpleheart and maple for the frets. The tuning keys are walnut.

Then comes the issue of clamping your lamination. Baze and other inmates constructed clamps that look like the traditional F-style clamps in every woodshop. However, these clamps were made from laminated wood, and instead of a metal screw, the clamp closed tightly thanks to rubber bands on the backside of the clamps. Baze had even built some 24" bar clamps for larger work.

The other clamping method was to use binder clips — those beefy black spring clips that can hold a federal budget together. The $\frac{3}{4}$ "-long clip has a $\frac{5}{16}$ " opening, the $1\frac{1}{4}$ " clip opens to $\frac{1}{2}$ " and the 2"-long clip opens to just over 1".

Drill bits were not allowed. So how do you make holes? Baze used pieces of broken “rabbit ears” TV antenna for drilling holes $\frac{1}{8}$ " to $\frac{3}{8}$ " in diameter. After drilling a starter hole, Baze used dowels and sandpaper to increase the hole’s size. For smaller holes, Baze used heavy-duty staples from boxes to drill his holes, twisting the sharp end in the wood to bore through it.

To smooth the wood, inmates could use sandpaper. Baze also made a miniature hand plane using the razor from a Bic shaver.

Finishing was a problem because the



The humidor built by Ralph Baze with an inlaid eagle on the lid. The eagle is made with more than 400 pieces of wood.

prison prohibited items that were toxic or flammable. "For the most part I used an acrylic floor sealer they use here at the prison," Baze writes. "It did a fair job."

Joints

You might think that cutting a mortise-and-tenon joint is a real pain with limited tools. It's not. Baze and other woodworkers on Death Row used their laminations to their advantage. Say he was building a stile that needed three layers of wood to be the correct thickness and it needed a mortise in the middle. Baze would merely leave out part of the middle layer of wood in the place where the mortise was supposed to go. To make a tenon, Baze would merely make the middle layer longer. Instant tenon. Half-lap, bridle and rabbet joints were all made this way.

The Projects

Some of the work produced on Death Row is amazing considering how few tools the makers had. Baze sent us a full-sized humidor (6½" x 9½" x 12") he'd built with an eagle inlaid into the top.

"Of course, some of the guys here say it's more like a pigeon when (they're) teasing me," Baze says.

Baze spent about 50 hours doing the inlay using more than 400 pieces of wood (each feather is four pieces). Baze also built clocks, jewelry boxes, a Pennsylvania spice box and replicas of cars.

Some projects he would give away to friends. Others he would sell through organizations opposed to the death penalty.

The End of Woodworking

Baze's years of woodworking came to a quick end in July 1998, according to Warden Parker. Prison officials received a tip that a prison break was in the works, so they searched the cells and ended the prisoners' privilege of owning tools and materials. Baze was sent to an isolation cell.

"We found knives and some escape materials, including an abundance of hair to make a wig or dummy," Parker says. "They could say it was for



arts and crafts, but we had a tip that it was for an escape attempt. I was left in no position but to eliminate (woodworking)."

Baze, of course, was disappointed.

"Last Friday they came through in a shakedown and took most of my tools," Baze writes. "After four years of use they are now considered dangerous contraband. Every one from the warden down knew I had them. However, as I've told you in the past, according to the written rules they are (contraband)."

Sprung From the Joint

After we leave Death Row we cross the prison yard in the center of the penitentiary that's filled with inmates milling about. It looks a lot like a schoolyard — if you ignore the inmates who are tattooed on every part of their body and the lone

Some of the projects built by inmates at the Kentucky State Penitentiary (top).

A 1/12-scale replica of a 1931 Cadillac that Baze built in his cell. "It may not look like much, but I put well over 200 hours into it," according to Baze (above).

crossdresser who saunters slowly by.

We leave the yard and enter the administrative offices of the prison. As the cell door slams behind we let out a heavy sigh. It's like we've been underwater for an hour.

We go to a small office where prison officials have brought some of the inmates' projects for us to photograph, including sculptures made from toilet paper. The detail work is amazing, especially one deer that looks like it could blink and scamper away through the offices at any moment.

It's hard to believe that men who can make your gut tie in a knot when they look at you could produce these things. And as I look square into the eyes of a sculpture of a mutant University of Kentucky wildcat — complete with tiny UK logos on the pupils — I realize that inside and out, this a place filled with both beauty and dread. **PW**



In addition to woodworking, some inmates produced sculpture out of toilet tissue, such as this mascot for the University of Kentucky.



Built to hold
hoses, store
garden tools
and to last
for years.



garden Storage Bench

Outdoor Arts & Crafts furniture was almost always made from wicker or hickory sticks, so when it came to designing a garden bench in that style I had almost no examples to turn to. However, after collecting and building this type of furniture for almost a decade, I knew one thing had to be true: it would have to be built to last.

Fact is, I could have glued and screwed this whole thing together in a few hours. But because this bench was built for my sister-in-law as a gift for her new home (and because I don't want to be haunted by the ghost of Gustav Stickley), I decided to take the most traditional approach I could. That meant pegged mortise-and-tenon joints.

All Tenons, All the Time

Begin by cutting all your parts to size and laying out the $\frac{1}{2}$ "-thick x 2"-wide x 1"-long mortises on the four legs. Each $7\frac{1}{4}$ "-wide slat in the lower case gets four tenons — that's two on each end. If I'd put only one wide tenon on each end, I would have had to remove too much material in the legs for the mortises. The detail drawing on the next page shows you how the mortises and tenons are spaced. Now cut your mor-

by Christopher Schwarz

tises. You'll notice that the mortises on the two adjacent sides meet in the middle of the leg. This means you'll have to miter your tenons on down the road.

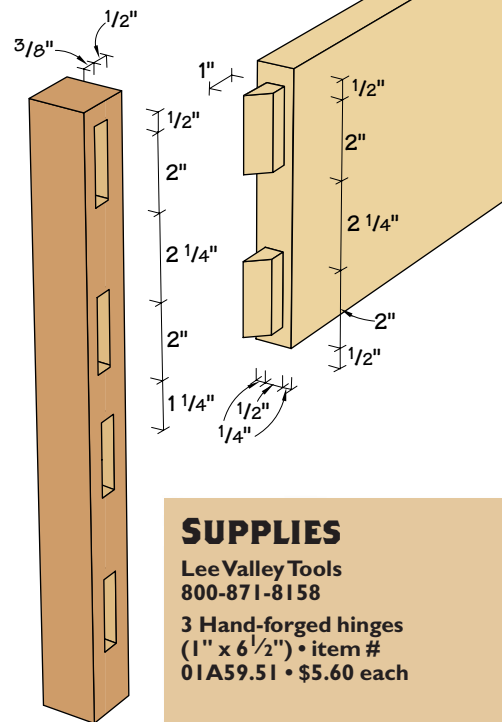
Now lay out and cut the through-mortises on the back legs. The through-mortises for the top rail measure $\frac{1}{2}$ "-thick x $5\frac{1}{4}$ "-wide. The through-mortises for the bottom rail measure $\frac{1}{2}$ "-thick x 2"-wide. Now cut your tenons and miter the ones for the lower case. To clean out the area between the two tenons on the lower case

pieces, use a backsaw and a coping saw.

Cut the 2" arches on the front, sides and back pieces using a band saw. Clean up your work with sandpaper. Now locate where the center seat support will go and cut biscuit slots to hold it in place. Sand everything to 150 grit.

Assembly

After first dry-assembling your bench, glue up the bench in stages. First glue up the front pieces between the front legs and the back pieces between the back legs. I recommend polyurethane glue here for two reasons. One, it's quite weather-resistant; and two, it has a long open time, which helps with this glue-up. Put glue in the mortises only, and be stingy. You don't want a lot of foamy squeeze-out. After the glue has cured, glue the side pieces and center seat support between the front



SUPPLIES

Lee Valley Tools
800-871-8158

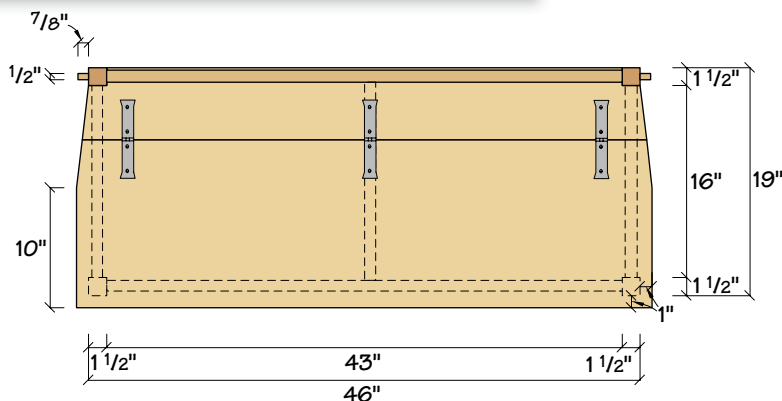
3 Hand-forged hinges
(1" x $6\frac{1}{2}$ ") • item #
01A59.51 • \$5.60 each

SCHEDULE OF MATERIALS: GARDEN STORAGE BENCH

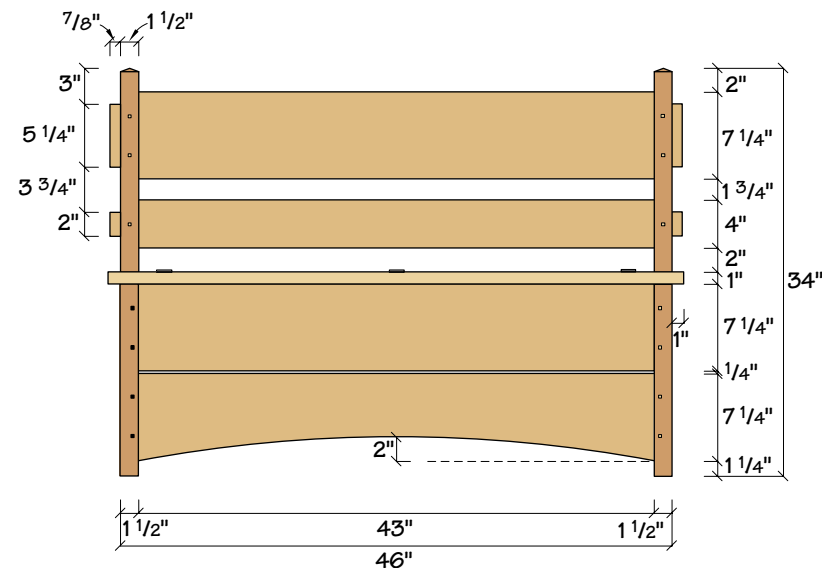
No.	Item	Dimensions T W L	Material
2	Front legs	$1\frac{1}{2}$ " x $1\frac{1}{2}$ " x 16"	Redwood
2	Back legs	$1\frac{1}{2}$ " x $1\frac{1}{2}$ " x 34"	Redwood
2	Front/back pieces*	1" x $7\frac{1}{4}$ " x 45"	Redwood
4	Side pieces*	1" x $7\frac{1}{4}$ " x 18"	Redwood
1	Top rail**	1" x $7\frac{1}{4}$ " x $47\frac{3}{4}$ "	Redwood
1	Bot. rail**	1" x 4" x $47\frac{3}{4}$ "	Redwood
1	Rear seat piece	1" x 6" x 48"	Redwood
1	Front seat piece	1" x 14" x 48"	Redwood
1	Seat support	1" x 3" x $16\frac{3}{4}$ "	Redwood
2	Slat supports	$1\frac{1}{2}$ " x $1\frac{1}{2}$ " x 42"	Cedar
8	Slats	$\frac{3}{4}$ " x 3" x $16\frac{3}{4}$ "	Cedar

* 1" mitered tenon on both ends, included in measurement

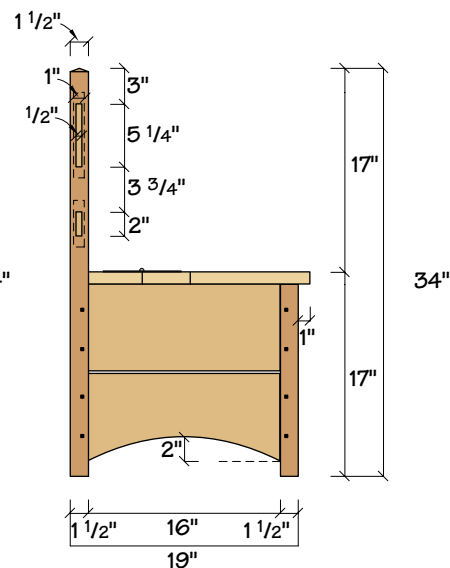
** $2\frac{3}{8}$ " through-tenon on both ends, included in measurement



Plan



Elevation



Profile

and back leg assemblies.

Screw the two slat support pieces to the inside of the frame (one on the front, one on the back). Then screw the eight slats to the supports with about $2\frac{1}{2}$ " between each slat. Once that's done, peg all the mortises. I used $\frac{1}{4}$ " x $\frac{1}{4}$ " x $1\frac{1}{4}$ " strips of walnut. First drill a $\frac{1}{4}$ " hole that's $\frac{1}{8}$ " deep. Carve the walnut strips round on one end, then hammer them home. Cut the waste flush.

Now work on the seat. Notch the rear seat piece around the legs. Attach it to the frame using cleats and screws. Then attach the front seat piece to the rear seat piece using the hand-forged hinges from Lee Valley. These are rustic, inexpensive but of excellent quality. You'll need to scare up some equally rustic screws to attach the hinges. I used some old #7 x 1" flathead screws. **PW**



magic

The magic of
engineering that is.
Where ultra-light
construction and a wall
attachment trick create
a seamless illusion.



shelves

go ahead. Take a guess. Just what do you think one of these shelf units weighs? I'll give you a hint. The thickness is $1\frac{3}{8}$ ", the length of the longest part is 78" with the other leg 61". The height is 24" and the depth is 11". Some serious cherry timbers, you think? Say 40 or 50 pounds? Well, guess again friend 'cause you're off by a factor of two. Yes, 23 pounds for the big unit and just 20 pounds for the smaller one.

What you're looking at are three torsion boxes for each unit that use a solid cherry front edge, a top and bottom of $\frac{1}{4}$ " cherry plywood and several pine ribs that run cross grain to the cherry ply, or perpendicular to the front edge. It's all glued together to make a strong, flat and lightweight panel.

So how is it fixed to the wall? I'm not revealing that trick until the second act!

And by the way, if you think you've seen these shelves before, chances are you have. Our version was inspired by those shown in an Ace Hardware advertisement. I wasn't surprised to learn from Ace that they'd had hundreds of requests for plans to build this project. When I suggested we feature it here, they jumped at the chance.

Photo by Al Parrish

by Steve Shanesy



The shelf panel torsion box is made up of a solid cherry front edge, a top and bottom $\frac{1}{4}$ " cherry plywood skin, and a series of built-up ribs. All the parts are glued together to make a strong, lightweight, torsion-resistant panel (left).

After gluing and pinning the cherry plywood skin to one side, flip the partial assembly and glue all the parts. Then pin together both sides. If you don't have a pinner, you can clamp all the parts, although this method should be done in several stages (bottom left).

collecting your materials, begin by cutting the parts. Cut the plywood to length and width and mill the solid cherry for the front edges. At this stage, leave the solid cherry just a little long and keep the edges square, but do cut the $\frac{1}{2}$ " x $\frac{1}{4}$ " rabbet where the plywood will be joined to the solid front edge. You should make sure that the rabbet's depth leaves the solid edge flush or just proud of the plywood.

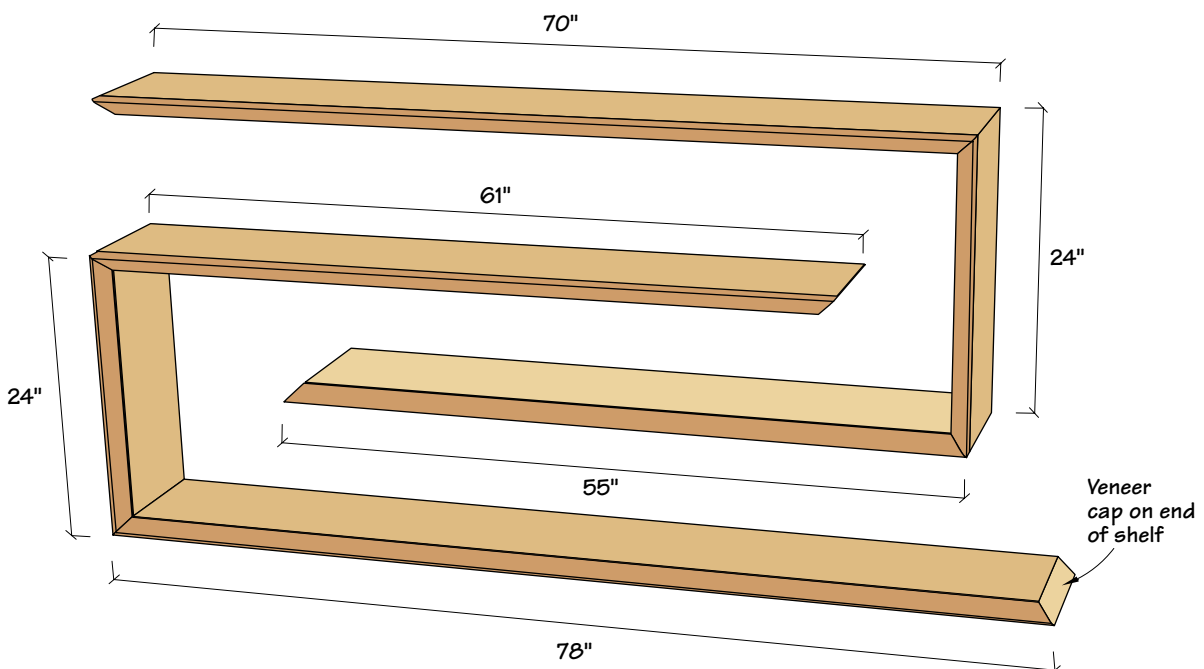
Build the Ribs

Now cut the pieces you'll need to provide the build-up between the two plywood faces. It should be exactly the thickness of the dimension created by the two rabbet cuts. Note there are, however, two different widths and lengths. The pieces that are assembled at each end are both longer and wider than the intermediate ones. Lastly, cut out four strips of plastic laminate to the dimensions given. If you don't have a plastic laminate such as Formica handy, you could substitute $\frac{1}{16}$ " x 1" pre-cut strips of aluminum or steel.

Torsion (or anti-Torsion) Boxes

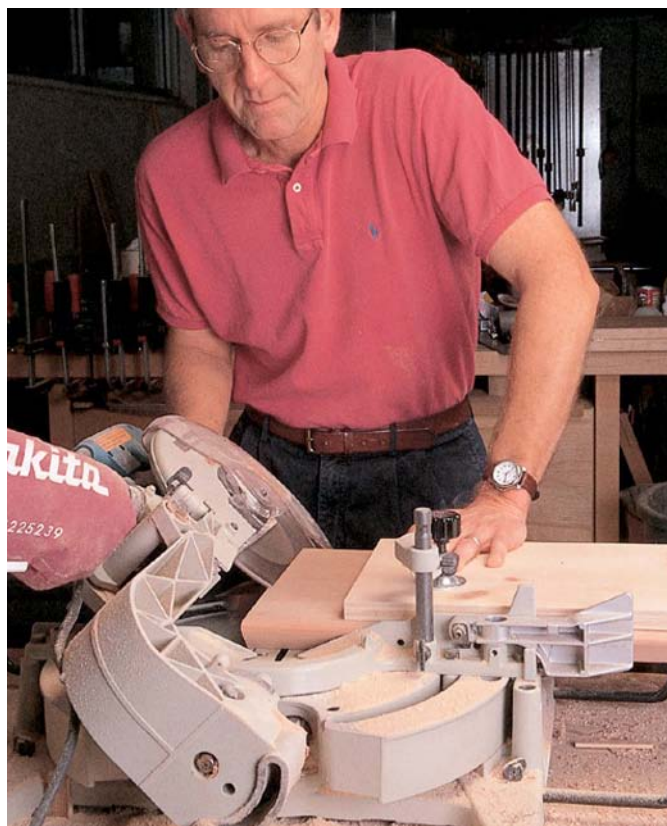
Before heading to the shop, understand that what you are essentially making are a series of torsion boxes. Now why they are called "torsion" boxes and not "anti-torsion" boxes I'll never know (unless one of you would be kind enough to help me). To me, "torsion" means "twisted, or twisting," and what this construction technique does is prevent that from happening. Everything from aircraft wings and fuselages to hollow-core doors use this principle to keep their shape, even under a lot of stress. If you do much woodworking, you'll find torsion boxes a terrific solution to construction "problems" that come up from time to time.

After looking over the drawings and





After the glue has cured and a 1/4" radius has been routed on the correct long edge of the front, cut the big chamfer detail on the table saw.



Each of the six panels must be mitered on both ends. Take special care to make sure your cuts are properly oriented to the panels' final assembly position.

Before starting assembly of the shelf panels, glue the plastic or metal strips to the inside back edge of the plywood that will be the top side of the four long shelves. This material will reinforce the plywood when you attach the shelves to the wall. If you use plastic laminate, use either white or yellow woodworking glue. If you use metal, use an epoxy or polyurethane glue.

Panel Assembly

Depending on how your shop is equipped, assembly could go relatively quickly, or it could take a while. It'll be quick if you

have a pneumatic pinner/nailer; slower if you have to rely on clamps exclusively. Regardless, the process will be the same.

First, glue one plywood piece to one of the rabbets in the cherry edge. Make sure you have a nice tight joint. For this, white or yellow glue is fine. Next, glue the end and intermediate ribs in place, spacing them about a foot apart. For this cross-grain gluing, use polyurethane glue. Also, use glue where the end of each rib butts to the solid cherry. Lastly, glue the second piece of plywood as before.

Even if you use a pneumatic pinner, clamp the ends and the rabbit joints. Also, keep your nails out of the way of the 45-degree end cuts to come later. Don't forget to pin or clamp the pine pieces on both sides of the shelf. Continue assembling panels until all four horizontal and two vertical panels are done.

After the glue has dried, sand or use a scraper to flush up the surfaces where the plywood and front edge meet. Now you are almost ready to cut the big chamfer on the front edge of each panel. Carefully mark each

panel so that the reinforced plywood back edge is facing up for correct orientation to the chamfer. Next, use your router to form a 1/4" radius on what will be the outside edge of each panel's front edge. When done, cut the chamfer using your table saw so the cut blends into the radius detail.

The ends of each panel now get a cross-grain miter cut. Again, before cutting, note the orientation of the cut relative to the reinforced plywood. It's best to put the three parts that make up one unit together, mark the edges to be glued later and — for the horizontal pieces — the end which is strictly decorative. Make the cut with a table saw, sliding compound miter saw or a radial arm saw.

The last bit of preparation before assembly is to cut biscuit joints in the miters that will be glued together.

Assembly

Dry assemble the parts to check fittings and figure out a clamping strategy. I fashioned an "I-beam" type piece from 3/4" plywood that 1) held the long panels up and in position while assembling; 2) gave me a surface to clamp to that didn't require long

SCHEDULE OF MATERIALS: MAGIC SHELVES

No.	Item	Dimensions T W L	Material
2	Front edges	1 3/8" x 2" x 24"	Cherry
1	Front edge	1 3/8" x 2" x 78"	Cherry
1	Front edge	1 3/8" x 2" x 70"	Cherry
1	Front edge	1 3/8" x 2" x 61"	Cherry
1	Front edge	1 3/8" x 2" x 55"	Cherry
2	Shelf skins	1/4" x 9 1/2" x 55 5/8"	Cherry ply
2	Shelf skins	1/4" x 9 1/2" x 70 5/8"	Cherry ply
2	Shelf skins	1/4" x 9 1/2" x 78 5/8"	Cherry ply
2	Shelf skins	1/4" x 9 1/2" x 61 5/8"	Cherry ply
4	Shelf skins	1/4" x 9 1/2" x 24 5/8"	Cherry ply
12	End bldups	7/8" x 2 1/2" x 9 1/8"	Pine
30	Bldups	7/8" x 1 1/2" x 7 5/8"	Pine

Approx. 22' hardwood cleat material 7/8" x 2 1/8".



The long panels are joined to the short vertical panels using biscuits in the miter joint. The biscuits strengthen the joint and help hold alignment during glue up (**left**).

What could be an unwieldy glue-up is simplified using an "I-beam" shaped plywood fixture. The fixture clamps to the long panels, holding them in place, provides a clamping surface for pulling the end in position and helps keep the whole assembly square (**bottom left**).

The shelves hang on cleats that are carefully positioned and then screwed to the wall (**below**).



clamps; and 3) went a long way toward holding the entire assembly square during the process.

After the glue has set up and before removing the "I-beam" brace, make a simple support that attaches to the back side that will support the long "legs" through the rest of the work and until you install the units. Just make simple blocks that can be screwed into one of the interior pine pieces, then screw a brace between them.

Now cap the other long ends that are chamfered with some homemade cherry

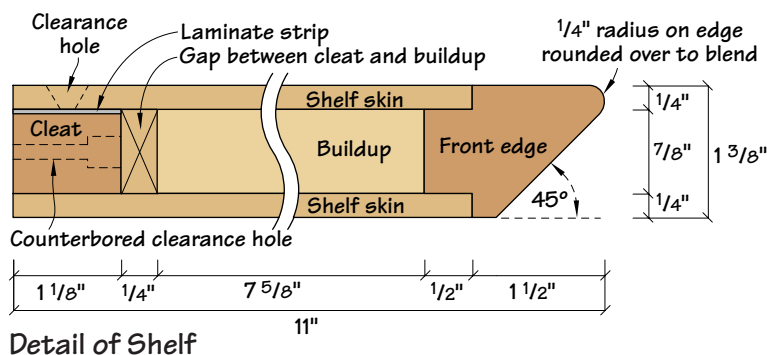
"veneer." Slice four pieces that are about $\frac{1}{16}$ " thick off a piece of cherry of sufficient width. Size the pieces so that there is about $\frac{1}{8}$ " extra all around when applied. A simple way to attach these is to use contact cement. Trim and sand off the overhang after applying.

In preparation for installation, cut lengths of a sound hardwood, such as oak or maple, milled to the exact thickness of the opening in the back of each long shelf. The width should be about $\frac{1}{8}$ " less than the depth of the opening. These pieces will be securely

fastened to the wall studs and positioned so that the openings in the rear of the shelves will sleeve over them. Screws will then be used to fasten each shelf to its wall cleat. You can pre-drill and countersink holes in the top rear edge of shelf, spaced about 14" apart. Now you understand why the plastic laminate or metal was used to reinforce the thin plywood. Wait until you are ready to install the shelves before drilling pilot holes in the cleats. That way, you can mount the cleats on the wall, then position and mark the locations for pilot holes.

To complete the shop portion of this project, thoroughly sand and be careful to remove any dried glue, especially near the miter joints. Sand to 150 grit. For this project, I clear coated the units with lacquer. Just take the time to sand between coats to help achieve a nice, smooth finish.

Ultimately, this is a simple project that is a terrific primer on torsion box construction and produces a striking end result. You might say that for all but beginning woodworkers, it's a project you can ACE. **PW**







Modern Console

Build one eye-catching unit or all three to create the perfect place to display art, pottery or a book collection.

As a woodworker there is a certain freedom in being able to design and build anything for yourself that you want. Sometimes you see a piece that you like and it sets your design juices flowing. Other times it takes only an amazing piece of wood or a really great looking door handle to make you put pen to paper and start drawing. But the freedom is there. When you decide to turn your talents towards making a living, however, some of that freedom disappears. Now it's the customer's freedom that you respond to. They see the piece of furniture or the door handle, not you. I consider myself lucky when a customer gets that urge, then turns to me to turn his or her "sighting" into a piece of furniture just for them.

by Mark Kessler

Mark Kessler is a graduate of the Genoa Institute for Furniture Design and Construction and owns Furniture by Design in Cincinnati, Ohio, which specializes in custom contemporary designs.

Photo by Mark Alexander Photography

That's how these shelving units were born. A customer showed up with a picture from an interior design magazine. He liked the way some shelves were spaced randomly and provided open space. The rest was up to me. Now that's a good customer. In a few days I had a sketch he liked. All I had to do then was figure out how to build it.

Slab Construction

To keep the shelving open, random and stout I came up with the idea of gluing pieces of $\frac{3}{4}$ "-thick plywood together to make $1\frac{1}{2}$ " thick slabs. I then cut $\frac{1}{2}$ "-long tenons on the ends that fit into $\frac{1}{2}$ "-deep grooves in the sides. Iron on veneer tape to the exposed plywood edges, and the whole piece has a clean look and is stout as a bull.

To make the piece even more interesting, I added the "stubs" to make it appear that the shelves (and one partition) extend through the other piece.



With the dado locations laid out, clamp the jig in place and make a few passes with a router. Note that my jig was made from scraps of doubled-up ply. Yours doesn't need to be as stout.

A Slab of Ply

The upper shelving sections are 12" deep, have no back and veneer-taped fronts. This is a great size if you can find 49"-wide plywood, which isn't all that strange. If you can find only 48" ply, you may want to reduce your shelf width to $11\frac{3}{4}$ " or waste 11" off the edge of each sheet.

Start by ripping the plywood into 12"-wide pieces. Each upper unit needs six 12" x 96" pieces, so if you're building two units you'll need three sheets, plus material

for the lower units.

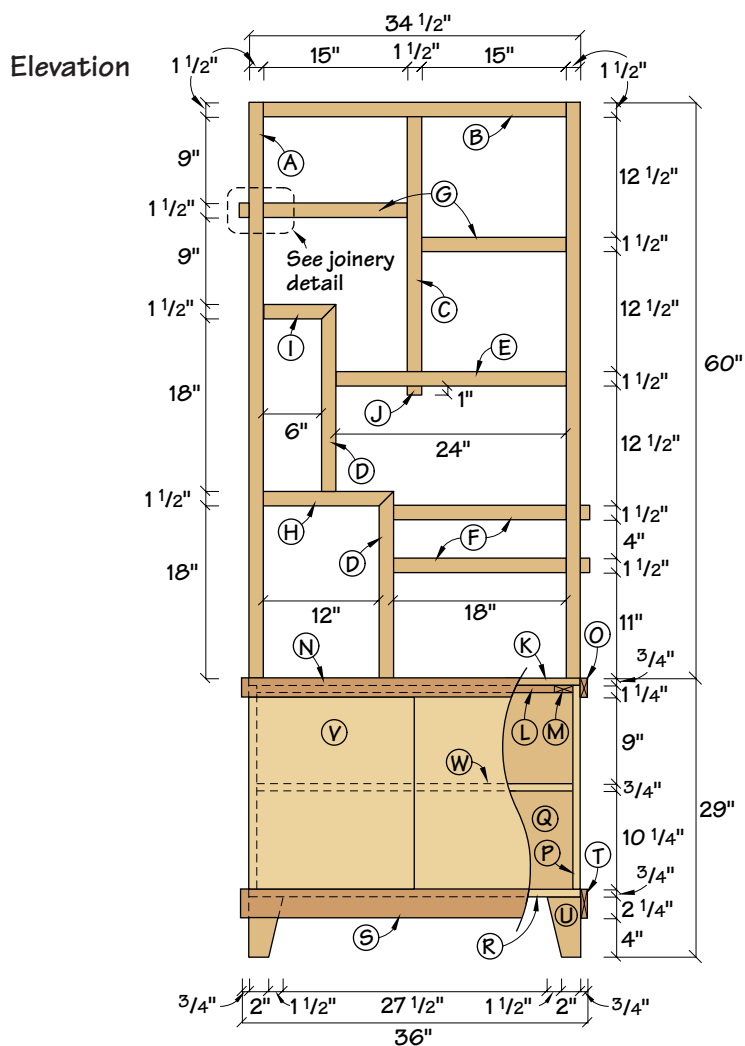
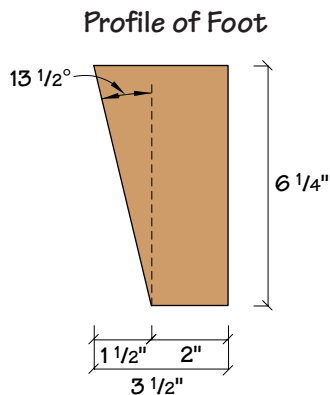
Glue the slabs together, trying to keep the edges as flush to one another as possible. A jointer pass on each long edge after the glue is dry should fix any inconsistencies, but more than that and the shelves won't be 12" deep.

Simple Dado Jig

With the slabs prepared, use the Schedule of Materials to cut the slabs to the lengths given. Note that the lengths include the $\frac{1}{2}$ "-long tenons, so you won't have to add that to the dimensions for cutting. Separate all the pieces into piles that require dados, and those that don't, then use the diagrams to mark all the dado locations.

I built a simple jig to use with my plunge router to make cutting the dados quick and reasonably foolproof. Stop dados are necessary here, so I made a jig to hook over the back edge of the partition or shelf, and added a stop at the front of the jig set to stop my router $\frac{1}{4}$ " from the front edge of the shelf. Dimensions for the jig are determined by the base on your router. Using a plunge router and a guide bushing, I was able to do each dado in two or three passes, lowering the depth of the router bit with each pass until I reached the full $\frac{1}{2}$ " depth. The width of the template was set to allow a 1"-wide dado. The rest is routing.

The tenons are cut in two passes on each side to reduce the stress on the bit. Here I'm running the last pass on one of the stubs. I used a backing piece for all the passes to reduce chip out.



Tenon Time

With the dados complete, the next step is to cut tenons on the appropriate ends. I did this with my router table, using a two-pass process. I set my router fence to take a $\frac{1}{4}$ " x $\frac{1}{4}$ " pass for the first cut. Run both sides of each tenoned end, then reset the fence for $\frac{1}{4}$ " x $\frac{1}{2}$ " and run the pieces again. Make sure you cut a test piece or two to get the best fit in the dados possible. This mechanical joint and some glue are the only things holding the upper section together.

To make the tenons blind, use this same setup to run the shorter pieces on edge through the router table. The longer pieces need to be cut by hand for safety.

The last cutting step is a bit of mitering. Some of the pieces meet at a miter joint. I used a $\frac{1}{4}$ " x $1\frac{1}{2}$ " x 11" spline at each miter, cutting the groove with a slot cutter in my router. Four #20 biscuits at each miter would also work well.

Veneer Tape and Clamps

You're now ready to fire up your iron and do some veneer edge taping. Two-inch-wide veneer tape isn't cheap, but if you compare it to the cost of solid lumber, you'll find it a bargain.

With the edges taped, it's time to see how many clamps you own. The upper assemblies are difficult to glue at one time, so glue and clamp them in sections.

Start with one side, and glue the pieces together to form the two $12\frac{1}{2}$ " x 15" upper sections (B, C, E & G) to that side. As a next step (or at the same time if you've got the clamps) glue the two 19" shelf pieces (F) to the side, and the mitered 20" piece (D) to them.

Next, glue the mitered pieces that form the 6" x 18" space (D, H & I) to the other side piece. Now glue the two sides together,

SCHEDULE OF MATERIALS: MODERN CONSOLE

Upper Shelving (for one unit)

No.	Ltr.	Item	Dimensions T W L *	Material	Comments
2	A	Sides	$1\frac{1}{2}$ " x 12" x 60"	Plywood	
1	B	Top	$1\frac{1}{2}$ " x 12" x $32\frac{1}{2}$ "	Plywood	$\frac{1}{2}$ " TBE
1	C	Partition	$1\frac{1}{2}$ " x 12" x $27\frac{1}{2}$ "	Plywood	$\frac{1}{2}$ " TBE
2	D	Partitions	$1\frac{1}{2}$ " x 12" x 20"	Plywood	$\frac{1}{2}$ " TOE/MOE
1	E	Shelf	$1\frac{1}{2}$ " x 12" x 25"	Plywood	$\frac{1}{2}$ " TBE
2	F	Shelves	$1\frac{1}{2}$ " x 12" x 19"	Plywood	$\frac{1}{2}$ " TBE
2	G	Shelves	$1\frac{1}{2}$ " x 12" x 16"	Plywood	$\frac{1}{2}$ " TBE
1	H	Shelf	$1\frac{1}{2}$ " x 12" x 14"	Plywood	$\frac{1}{2}$ " TOE/MOE
1	I	Shelf	$1\frac{1}{2}$ " x 12" x 8"	Plywood	$\frac{1}{2}$ " TOE/MOE
4	J	Stubs	$1\frac{1}{2}$ " x 12" x $1\frac{1}{2}$ "	Plywood	$\frac{1}{2}$ " TOE

*Length includes tenons

Lower Cabinets (for one unit)

No.	Ltr.	Item	Dimensions T W L	Material	Comments
1	K	Top	$\frac{3}{4}$ " x $17\frac{1}{4}$ " x $34\frac{1}{2}$ "	Plywood	
1	L	Cleat	$\frac{3}{4}$ " x 1" x $34\frac{1}{2}$ "	Birch	
2	M	Cleats	$\frac{3}{4}$ " x 1" x $14\frac{1}{2}$ "	Birch	
1	N	Front edge	$\frac{3}{4}$ " x 2" x 36"	Birch	
2	O	Side edges	$\frac{3}{4}$ " x 2" x 18"	Birch	
2	P	Sides	$\frac{3}{4}$ " x $16\frac{1}{2}$ " x $20\frac{1}{4}$ "	Plywood	
1	Q	Back	$\frac{3}{4}$ " x $33\frac{1}{4}$ " x 21"	Plywood	
1	R	Bottom	$\frac{3}{4}$ " x $16\frac{1}{2}$ " x $34\frac{1}{2}$ "	Plywood	
2	S	Long edges	$\frac{3}{4}$ " x 3" x 36"	Birch	
2	T	Side edges	$\frac{3}{4}$ " x 3" x 18"	Birch	
4	U	Feet	$3\frac{1}{2}$ " x $3\frac{1}{2}$ " x $6\frac{1}{4}$ "	Birch	
2	V	Doors	$\frac{3}{4}$ " x $17\frac{1}{8}$ " x 20"	Plywood	
1	W	Shelf	$\frac{3}{4}$ " x $15\frac{1}{2}$ " x 33"	Plywood	Use shelf pins

TBE= tenon on both ends • TOE=tenon on one end • MOE=miter on one end

adding the top piece and the last shelf at this time. Lastly, glue the stubs in place.

After every clamping step, check your work for square. It doesn't take much to throw off the next step and make the whole finished piece looked wopperjawed.

The Lower Cabinet

The base unit uses fairly simple construction, but I used book-matched veneer on the doors for a dramatic affect. If you purchase your plywood carefully you might be able to find good veneer patterns without having to actually veneer the doors. I wasn't that lucky.

The cabinet is simply two plywood sides with $\frac{1}{2}$ " x $\frac{3}{4}$ " rabbeted back edges to capture a $\frac{3}{4}$ "-thick back. I chose a thick back for three reasons: One, it added support for the weight of the upper unit. Two, it made the lower cabinet stronger overall. And three, it allowed me to cut ventilation slots through the back for electronic components without affecting the struc-

tural support.

Start by building the base. Cut the bottom piece to size, then cut, miter and glue the 3"-wide solid birch edging to the front, back and both sides of the bottom piece, holding the edging flush to the top edge of the bottom.

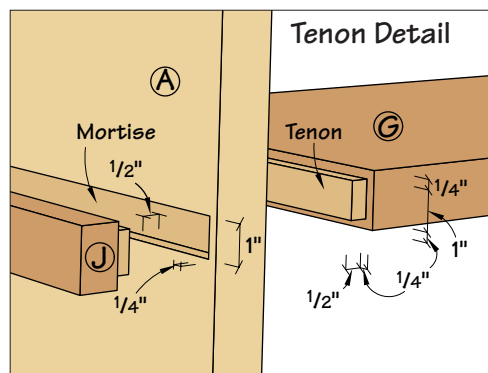
Next, veneer the front edges of the two sides, then mark the location of the sides on the bottom (holding the sides flush to the back edge of the bottom) 1" in from each side. Drill $\frac{3}{16}$ " clearance holes through the bottom, then screw the sides in place, using the back to confirm the spacing. Then attach the back to hold the sides in place.

The top is made much like the bottom, with solid birch edges mitered and glued in place to the plywood top. But since it's unattractive to put screws through the top, add $\frac{3}{4}$ " x 1" cleats to the top edges of the sides and back. The top shelving is attached by screwing up through the cleats into the top.

To raise the cabinets off the ground I made solid feet, beveled on two sides, and doweled them into the underside of the bottom. I used

With all the dados and tenons run, the next step is veneer tape. Buy big rolls and save money.

Fitting the tenons is extremely important as they hold the top section together. When assembled, the shelf and stub make it look like the shelf runs straight through the upright.



a solid piece of wood because I had it handy, but you could also make two-sided corners from $\frac{3}{4}$ "-thick material that would mimic the look of solid feet.

Except for shelving that you may want in the cabinets, the doors are the last pieces. Again, choose the look you want for the front of the doors, then add veneer tape to the edges. I used free-swinging European hinges to mount the doors, and added touch latches to the doors to avoid using pulls.

With a couple of coats of clear lacquer, the cabinets were ready to deliver. My customer was delighted to see his image turned into reality, and I was happy to keep an easy-to-work-with customer happy. **PW**

SUPPLIES

Constantine's - 800-223-8087

1 - 2" x 250' roll of iron-on birch veneer edge tape, item # K222 \$83.00, or 2" x 8' strips, item #WE13, \$5.25 per strip (6 required)

1 - $\frac{13}{16}$ " x 50' roll of iron-on birch veneer edge tape, item #K522, \$12.45

Constantine's also offers veneer tape for this project in red oak, white oak, mahogany or walnut. Prices will vary.





Discover what it was like to work wood 200 years ago when all you had was a few well-tuned saws, a couple chisels and a steady hand.

Shaker Stepstool

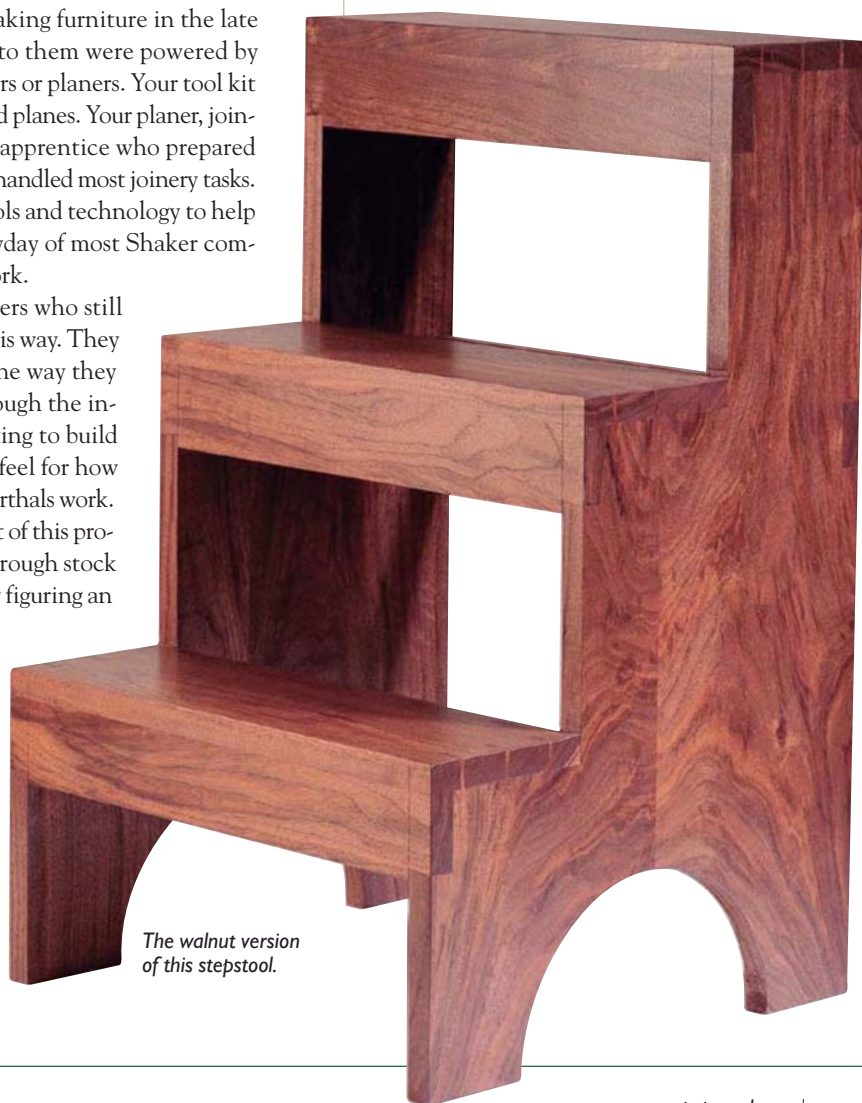
Back when the Shakers started making furniture in the late 18th century, the only tools available to them were powered by people. No table saws, no electric jointers or planers. Your tool kit consisted largely of hand saws, chisels and planes. Your planer, jointer and table saw were usually a young apprentice who prepared stock by hand. The skilled woodworkers handled most joinery tasks.

Shakers eagerly sought out power tools and technology to help them do their work. But during the heyday of most Shaker communities, hand tools did most of the work.

Today there is a group of woodworkers who still pride themselves in building furniture this way. They call themselves “Neanderthals.” And the way they communicate is, ironically, usually through the internet. We thought it would be interesting to build a project using only hand tools to get a feel for how early Shakers and electronic-age Neanderthals work. Admittedly, we copped out on one aspect of this project: We didn’t surface the lumber from rough stock using hand tools. We rationalized this by figuring an apprentice would have done this work.

I think you’ll enjoy unplugging your router for a few days to tackle this modest but satisfying project. And if you cannot give up your power tools, you can rest easy knowing that the early Shakers would have paid almost any price for that precision plunge router on your bench.

by Jim Stuard



The walnut version of this stepstool.

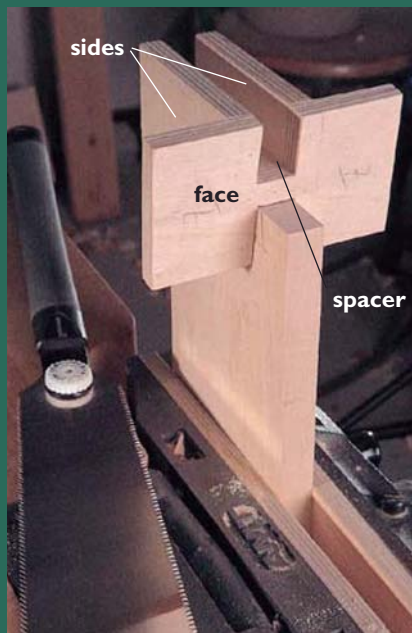
THE 10 CENT DOVETAIL JIG

In the midst of laying out the dovetails for these stools, I decided I wanted a way to make the cuts for my tails as clean, accurate and quick as possible. There are 44 angled cuts for the dovetails alone. So I made this jig, and I think it will help the first-timers out there. Look at this jig as training wheels for cutting tails.

Basically, the jig is an "H" that fits over your work and guides your saw at the perfect angle. Flip the jig over, and it cuts the other way. Tails have never been easier to do. Begin by cutting two sides pieces $\frac{1}{2}$ " x 3" x 4" from plywood. Then cut the spacer that goes between the two using falloff from your stool. This will ensure your jig sleeves tightly over your work. The spacer should be $\frac{3}{4}$ " x $\frac{3}{8}$ " x 4". I glued and nailed the spacer between the two sides and then cut one end at a 7- or 9-degree angle. I cheated and used a chop saw for this cut.

Then cut out a face piece ($\frac{1}{2}$ " x 3" x 5") out of plywood. Glue and nail the face on the angled ends of the "H." Now use a Ryoba and a coping saw to cut the notches out of the face and fit the jig to your dovetailing stock with a rasp. When you've got a snug fit, try a couple of test cuts. Gently hold the Ryoba against the jig as you begin to make your cut. The guide will do the rest of the work.

It's pretty easy to hold the blade in position and cut down to the gauge marks. As a bonus, you can use the other end of the jig to make square cuts. With practice, you won't even have to trim the tails when fitting.



Clamp a straightedge to the back line of the stool, gently press the saw against it and rip the back edge (left). Use the ripping teeth on the back of the Ryoba.

After cutting the bottom, lay out the radius (below).

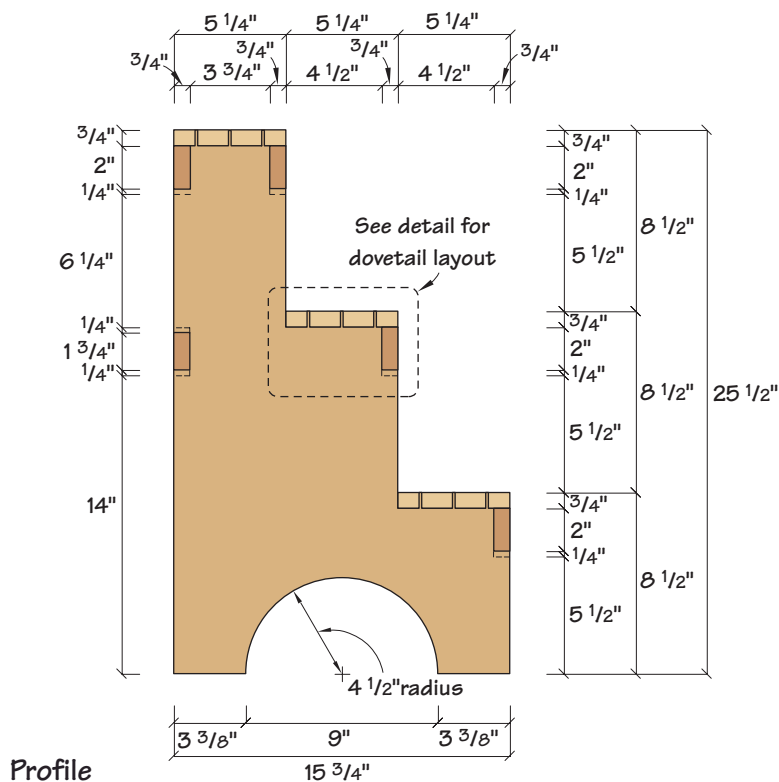


These stools were used in Shaker housing to get to the upper drawers in the enormous chests built for communal use. The stool was placed against the lower part of a chest for support. If you want to use this as a freestanding stool, add a hand rail.

The tools needed are as follows: clamps, a block plane, jack plane, a couple Japanese saws, two sharp chisels, a coping saw and a hand drill. For marking dovetails, I use a sharp knife, a square and a sliding t-bevel.

Begin construction by laying out the panels for the sides. Use a cardboard tem-

plate to lay out the best yield from your panels. Because you aren't going to make these cuts with a table saw, you will have to make stopped cross-cuts and rips in the middle of the panels to cut out the steps using hand saws. I've found the best way to do this is with Japanese saws.



Profile

After laying out the steps, start making the plunge cuts in the panel for each rise and run on the steps. Remember to use the larger ripping teeth for the long grain and the shorter crosscutting teeth for the cross grain. Start each cut by gently pressing the saw against the straightedge and use a rocking motion to use the entire length of the blade to make the cut.

When you've penetrated the other side of the panel, cut a slot large enough for the Ryoba. Finish the cuts into the inside and outside corners, but be sure to use the correct teeth for the direction you are cutting.



Courtesy of Japan

There is a style of saw called an Azebiki-Nokogiri. In short, it's a saw with a curved blade for doing a "plunge" cut in the middle of a panel. The other saw I used was a Ryoba style. It's a two-edged blade with rip teeth on one edge and crosscut teeth on the other. There are other Japanese saws designed for dovetailing, but I appreciate the utility of the two-sided blade.

Begin by laying out your cutting lines in pencil on the sides. The object is to first cut the back edge of the side, then cut the bottom edge square to that. Then lay out the steps from these two perpendicular lines.

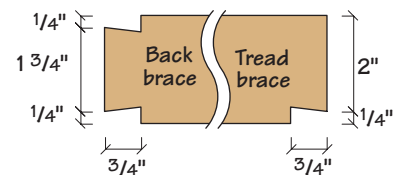
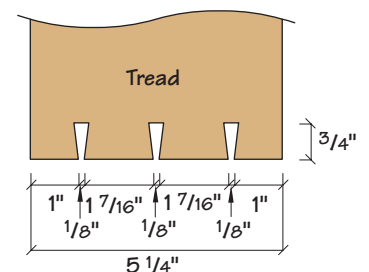
Cutting a straight line isn't difficult, especially if you clamp a piece of wood to your work to serve as a guide. Simply clamp the guide to the work and begin making the cut with your Ryoba. Use your fingers to gently hold the blade against your guide. Take it slowly and your cut will be true.

Set up another straightedge and, using the finer crosscut teeth of



The results speak for themselves. With a kerf less than $\frac{1}{16}$ ", it's possible to do some fine cutting. Notice the radiused cuts that resemble cuts from a table saw. These marks are from the Azebiki-Nokogiri saw.

Dovetail Layout Detail



7° angle on tails for hardwood (shown)
9° angle for softwoods

After cleaning up the edges of the side panels, begin laying out the tails on the treads. Use the diagram to help. If you're going to use the training-wheels jig mentioned at left, don't lay out the sides of the tails on the top and bottom of the tread. Simply lay out the $\frac{1}{8}"$ spaces between the tails on the ends. Use the jig to define the tail shape. Braver souls will start with a marking gauge and then, using a sliding t-bevel set to 7 degrees, make knife cuts into the wood to mark the tails. If you can't see the cut lines, use a sharp pencil to put a little "make-up" on them.



Those of you using the training-wheels jig can now cut all of the tails on the treads and braces. You'll have to figure out which way the jig works best on each cut. If you're not sure, mark the tails with a pencil so there's no confusion. I like to use the rip side of the Ryoba to cut dovetails. This might rankle some of the hardcore Neanderthals out there, but I've found it's aggressive and the cut needs little or no trimming after.

the Ryoba, cut in about 4" from the front and back edges of the stool. Mark the center of the bottom and lay out a 9"-diameter semi-circle. Now cut the half circle on the sides using a compass saw. Clean up your cuts with sandpaper.

The best way to cut the steps is to make a plunge cut with the Azebiki saw and finish with the Ryoba, crosscutting against the grain and ripping with the grain. Again, clamping a piece of straight wood to your work will ensure your cuts are straight.

There's nothing fast about this process. Slow and deliberate will do the trick. Once the sides are complete, cut the treads and risers to size. Clean them up with a plane and make sure everything's square.

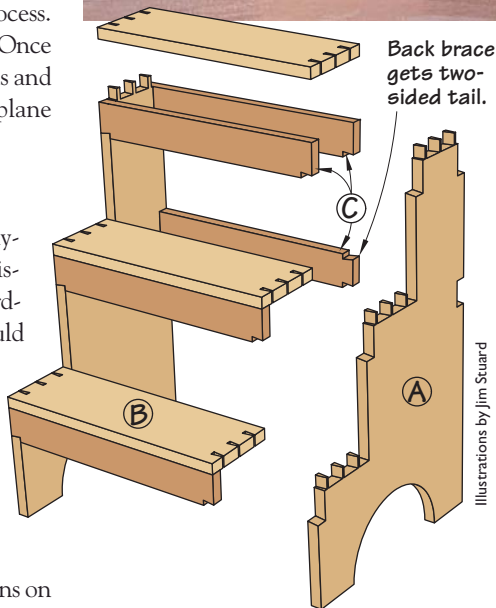
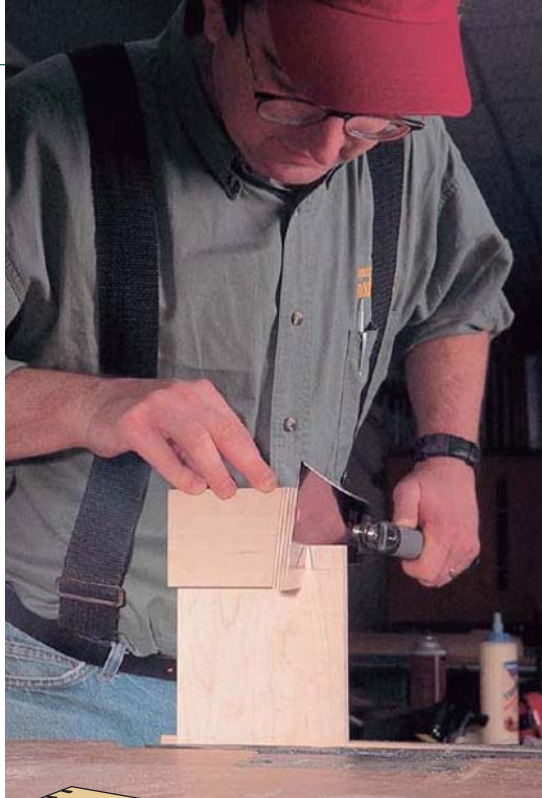
Dovetails

Start cutting the dovetail joints by laying out the tails on the treads and risers according to the diagram. On hardwood joints, the dovetail angles should be at a 1:8 ratio (7 degrees). On softwoods the ratio is 1:6 (9 degrees). Cut the tails, then number each joint for reference.

I built a couple little jigs to make cutting my tails easier. See the accompanying story for details.

Now use the tails to lay out the pins on the side pieces. Cut the tails by making the first cuts with the Ryoba and clean out the waste with a coping saw. Now try to fit the joints. If they are too tight, use a chisel to clean up the joint. If they are too loose, you can glue thin shavings into the joint to fill it out. Most people will never notice.

When cut correctly, the joints should tap together and be snug without beating on the stool. When you're satisfied with the fit, glue all the joints and mating edges together. Sand and apply three coats of your favorite finish. I used Watco, an oil and varnish blend. **PW**



SCHEDULE: SHAKER STEPSTOOL

No.	Ltr.	Item	Dimensions T W L	Material
2	A	Sides	3/4" x 15 3/4" x 25 1/2"	Maple
3	B	Treads	3/4" x 5 1/4" x 16"	Maple
5	C	Braces	3/4" x 2 1/4" x 16"	Maple

Clamp a panel into a vise and use the tails on the tread ends and braces to mark the locations for the pins and brace notches. Use a knife to get a more accurate layout. Since they're easier to fit, I don't use a jig for the pins. Just lay them out from the tail marks, using a knife and sliding t-bevel set to 7 degrees. Fit the pins to the tails with a four-in-hand rasp, removing material from the pins until the tread can be lightly tapped onto the side.

Use a backer block to do this so you don't split the tread.

After defining the tails, remove the little triangle of wood between them with a coping saw. The 1/8" gap is big enough for a small chisel to fit into for trimming.



HAND TOOL WEBSITES

The Electronic Neanderthal
www.cs.cmu.edu/~alf/en/en.html

Shavings.net
www.shavings.net

Museum of Woodworking Tools
www.antiquetools.com

Ralph Brendler's Old Tools Page
www.mcs.net/~brendler/oldtools/oldtools.htm

Spring Safe



Band saw puzzle master **JEFF VOLLMER** shows you the secrets to building one puzzling box.



This unusual box is called a “spring safe” because the puzzle pieces unlock a safe-like compartment inside. The “spring” part of the name comes from the fact that once you get into the safe, there’s a little switch that allows you to pop open a spring-loaded box on one end.

When most people look at this box, they’re bemused by how to open it. Ask them how it’s built, and they give you a glassy-eyed stare. But you know what? These are easy. I cut out these boxes in about 5 minutes flat on my band saw. And though I’ve been doing this for a decade, these boxes really are simple to build once you understand three key principles. Then the photos will guide you through the cuts I made to make this particular box.

by Jeff Vollmer

Jeff Vollmer is the owner of Royal Woods in Cincinnati, Ohio. His boxes appear in galleries all over the United States and overseas.

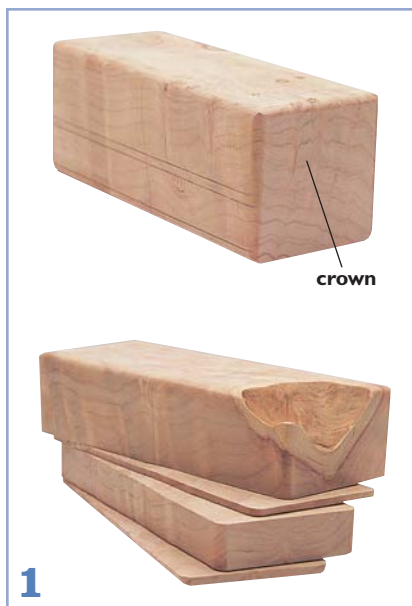
Photos by Al Parrish



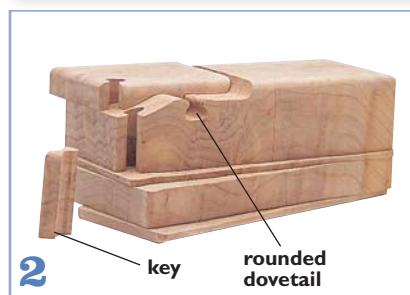
TIP: YOUR WOOD MUST BE AS DRY AS POSSIBLE

I make many of my boxes out of many species of burl that I get from the West Coast. The burl is beautiful, but it comes with a high price. I have to allow it to dry in my climate-controlled basement for three years before I can make a single cut. Don't try to make these boxes with burls that are still wet. They will warp horribly, and your hard work will be destroyed. I recommend you build them from redwood or cedar 4 x 4s.

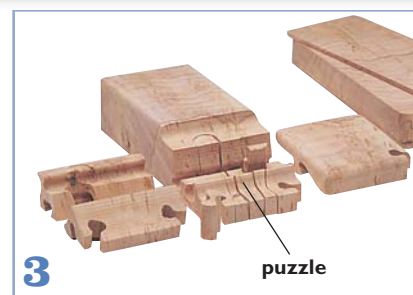
Even these woods need to be brought into equilibrium with the environment in which they will be cut and worked, or they will warp. Cut the 4 x 4s into 8" lengths and stack them on top of one another—end grain to end grain. Then place a piece of 1"-thick scrap on top of your tower and allow the wood to dry in a heated shop for 30 days. Now you're ready to begin.



The first step is to find a blank with a crown like the one shown in the top photo. Mark the layers on the blank with a marking gauge and slice it up.



Cut the top section first. First cut the key on the corner of the top layer. Then cut the lid using the rounded dovetail shown in the photo.



Make your next cut with the box on its bottom. Flip it on its side for the second cut. When you've completed the puzzle, cut the second lid from the back half of the box.

If you've never made a band sawn box, check out my basic band sawn box from issue #97. You can read the article (plus a tutorial on tuning up your band saw) at www.popwood.com/features/puzzle.html.

1. Make Cavities by Making Layers

Think of your box blank as a layer cake. Your first cuts on this box slice it into layers. First you cut off the 1/4"-thick bottom. Then you cut out the 7/8"-thick section that holds the spring boxes. Then you cut out the 1/4"-thick layer that separates the spring drawer from the box section above. You create the cavities by cutting out the stuff inside the thick layers, leaving a thin wall, and having your band saw blade enter and exit from the same point. Then glue the walls to the bottom you sliced off and glue up the blade's entry point. Then glue the top layer to the bottom layer.

2. Puzzle Pieces are the 'Key'

These boxes are held together using pieces that slide up and down, or side to side. The first step to creating the puzzle section is to cut out a corner key, which is sort of a rounded dovetail or puzzle piece. Set the key aside. Then turn the box on its side and cut out a wide flat lid that also has a rounded dovetail on it. Turn the box back on its bottom and make another key in the opposite corner. Turn the box on its side and make another lid-like cut. And so on. One question people have about making these boxes is when to turn to cut the rounded dovetail key. Begin to make your turn as soon as the blade has cleared the key from your previous cut.

3. Use Heavy Weights

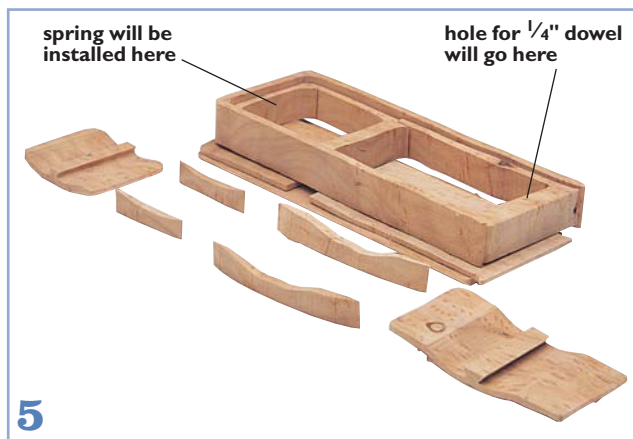
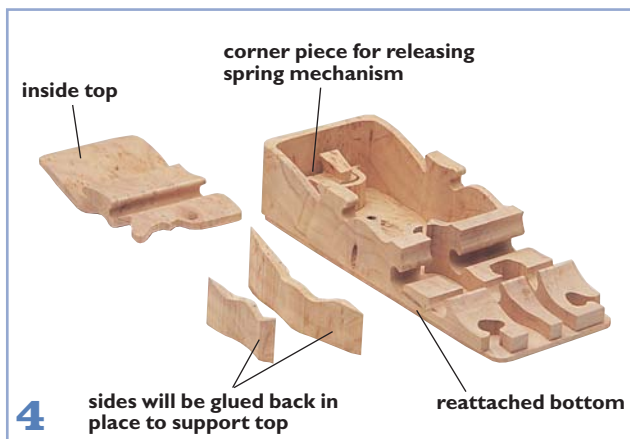
When you glue your boxes together, don't use clamps. I use heavy metal blocks to reglue the sides to their bottom pieces.

After 10 years of doing this, I can tell you that this is the best way to keep even pressure on the box and prevent it from twisting out of shape during glue-up.

How to Cut a Box

Begin with a blank that's 4" x 3" x 7 7/8". As you can see in the first photo, you want a piece where the end grain creates a crown on top. Now draw the lines for the different layers of the box using a marking gauge.

Slice the blank into layers. Set all the pieces aside except the top chunk. Cut out a dovetail key in one corner. Then turn the box on its side and cut out a lid that is about 4" long with a rounded dovetail. Turn the piece back on its bottom and cut another key. Then put it back on its side and cut another smaller lid. Do this one more time and set the puzzle pieces aside. Take the top piece that's left and cut another lid off of it.



Cut out the inner lid and shoulders from the waste block you removed from the interior of the top chunk. You'll later glue those shoulders back into the cavity to support the lid.

Now make the cavities. First cut out the inside of the top block leaving a $\frac{3}{8}$ " wall. Enter and exit the block from the same point — preferably at a rounded dovetail hole from the puzzle side of the box. Then take the inside chunk you just cut and slice the top off to make an interior lid for the cavity. Then slice off $\frac{1}{8}$ "-thick sides off the inside chunk. You'll glue these back into place in the cavity (use clothes pins or clamps) to support that interior lid. Also cut out a corner of the inside block that's against the rear wall of the cavity. This will eventually be the mechanism for releasing the spring boxes below.

Now turn your attention to the lower cavity. Mark off $\frac{3}{8}$ "-thick walls on three sides of the lower block. Cut out the drawer and set the wall aside. Cut the drawer block into two pieces (there are two boxes in the lower cavity) and slice off a $\frac{1}{4}$ "-thick bot-



It's the same drill on the lower boxes. Cut the bottom off the interior. Cut out the walls. Then cut the lid and shoulders from the inside chunk.

tom off each block. Now cut out the inside of each of these boxes (be sure to make the box front on the outer drawer 1" thick and the rear $\frac{1}{2}$ " thick — you'll see why later) and set the walls aside. On each inside block, cut out a lid and then cut some strips from the sides that will be used to support the lid.

Glue your boxes together in stages. Don't try to glue the whole thing together at once. You won't be able to keep everything lined up. Glue the spring-loaded boxes together. Then glue up the lower level and upper level separately. Then glue the two layers together. Sand everything.

To make the lower boxes "spring loaded," drill a $\frac{1}{2}$ " hole ($\frac{1}{8}$ " deep) in the back end of the large box to accommodate a $\frac{1}{2}$ "-diameter spring (available at most hardware stores). Glue the spring in place. Put the boxes in place and clamp them in the position you would like them to be when



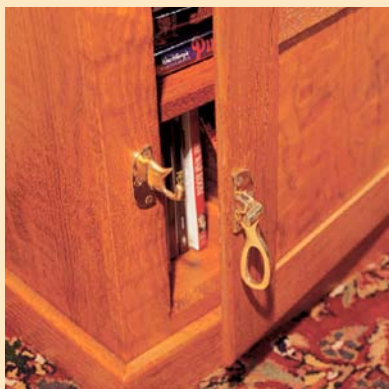
RULES FOR YOUR BAND SAW

When I cut out these boxes, there is only one band saw blade to use: a $\frac{1}{8}$ "-wide x .025"-thick blade with 11 to 15 teeth per inch. Also, make sure your blade is 90 degrees to your band saw's table. If it's not, your box will be a disaster. Things that should slide apart will not.

the box is closed. Using your drill press, drill a $\frac{1}{4}$ " hole through the top cavity and into the front edge of the lower box. Place a $\frac{1}{4}$ " dowel in the hole to hold the boxes in place. Remember that corner block you cut out from the top cavity? Drill a $\frac{1}{4}$ " hole in that piece and glue it to the dowel. Now when you pull this block out, the lower drawer springs out. The second smaller box shakes out of the bottom cavity. Very nice.

Finish everything with clear lacquer. Flock the interior if desired. This box makes a nice gift that is inexpensive and easy to make — once you get your mind wrapped around the way the puzzle box works. **PW**

ICEBOX *entertainment center*



This media unit has got lots of room for your TV, VCR and videos.

Sadly, you'll still have to keep your favorite Saturday-afternoon beverage in the kitchen.

Before the time came when Americans traded up to an electric fridge, they often kept perishables in an insulated oak box that was cooled by ice. The small versions of these well-built but now-useless boxes survived the early 20th century to become TV stands for young couples or impoverished students. Now they fetch \$300 to \$600 in antique stores, and oak furniture outlet stores sell reproductions for hundreds of dollars.

This is truly a case where you can save some serious dough by building one yourself. This icebox is the first furniture project I built using the Little Shop That Could Mark II, a rolling workshop on wheels featured in the September 1999 issue. This is a great project for beginners because construction is simple and you don't need a lot of fancy machinery.

A Case for Storage

I used curly oak for this project, which is a difficult species to find. White or red oak will do fine and is available at lumberyards already surfaced, so you don't need a planer. Begin construction by gluing up smaller boards to make the wide panels for the sides, top and shelves. If you don't have a jointer, you can edge-joint the boards using the router fence featured in the February 2000 issue (#113). Use biscuits to index the boards' edges. After the glue is dry, remove your panels from the clamps and cut them to finished size.

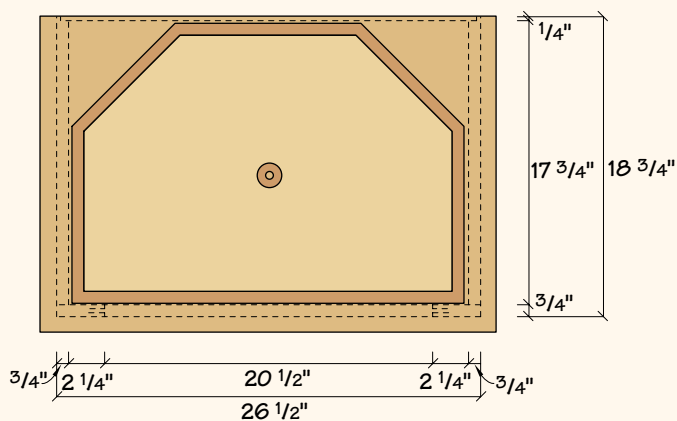
Now lay out the $\frac{3}{4}$ " x $\frac{1}{4}$ " dadoes in the sides that will hold the shelf and bottom and cut them using a dado stack in your table saw or with a router. Cut a $\frac{1}{4}$ "-deep x $\frac{1}{2}$ "-wide rabbet on

by Jim Stuard

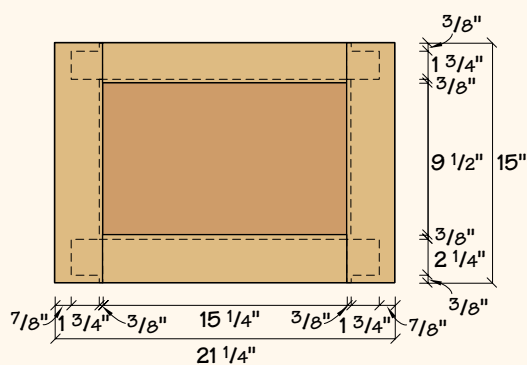
Photo by Al Parrish

inment

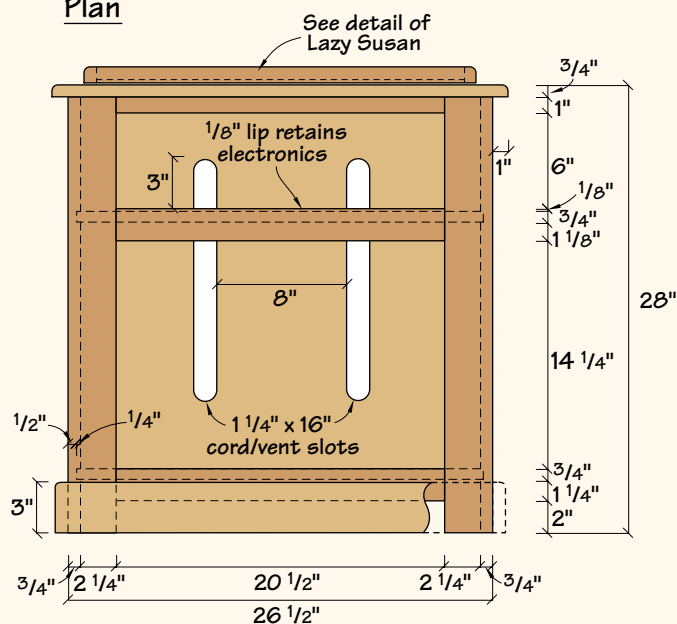




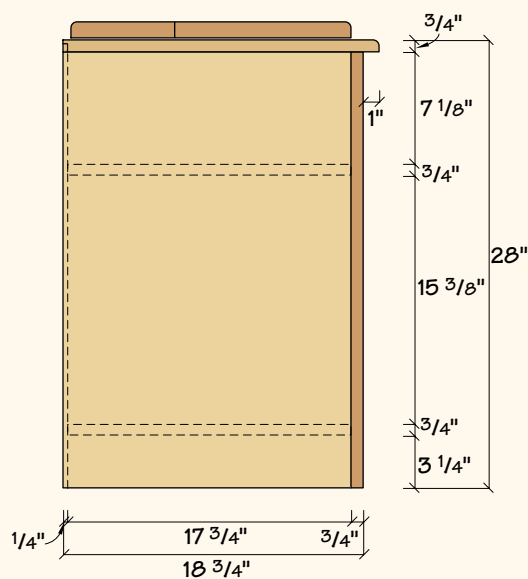
Plan



Door elevation



Elevation



Profile



Cut a stopped rabbet in the rear edge of the top for the back. Then cut the $\frac{1}{2}$ " x $\frac{1}{4}$ " rabbet in the rear edge of the sides for the back. Do this with a clamped-on straightedge and a router.

the back edge of the sides to hold the $\frac{1}{4}$ " plywood back as shown in the photo. You'll also need to cut this same stopped rabbet in the back edge of the top piece. Because your router is set up for this cut, now is a good time.

Glue up your case. Note that the top is attached later with cleats so don't worry about that now. Glue the shelf and bottom in place in their dadoes and clamp the case together.

A Frame Makes it Stout

Build the face frame using mortise-and-tenon joinery. The face frame consists of two stiles that run from the floor to the top, and three rails that you'll mortise at the dimensions given in the diagram. First lay out the mortises. The mortises are $\frac{1}{4}$ " wide, 1" deep and as long as the tenon cut on each rail. Drill out the waste in each mortise with a $\frac{3}{16}$ " drill bit and clean up

the sides (or cheeks) with a 1/4" chisel.

Cut the tenons next. All the tenons have a 1/4" shoulder, except the top rail, which has a shoulder on the bottom side of the rail only. Try Glen Huey's simple but useful tenon jig that was featured in the January 2000 issue (#112). Always cut a test joint from scrap before cutting expensive wood. Glue the frame together after you're satisfied with the fit of the joints. Attach the face frame to the case using biscuits and glue. When the glue is dry, flush up any overhangs with a plane and scraper.

Top it Off

The last assembly step on the case is to attach the top and back. For the top piece, I used oak that didn't have a lot of figure because it will be obscured by a rotating Lazy Susan.

Attach the top with two cleats that are screwed to the sides and to the top. First, cut your 3/4" x 3/4" cleats and drill slotted holes in the cleats to accommodate wood movement. Screw the cleats to the sides and the top to the cleats. Make sure the rabbet in the top lines up with the rabbets in the sides. If everything is square, screw the back to the case.

The Door

The door is a frame-and-panel job using haunched mortise-and-tenon joints to join the stiles and rails. The panel is "raised" on the table saw and floats in a groove in the rails and stiles with the flat side out

and the raised side in.

Begin by cutting a 3/8"-deep by 1/4"-wide groove for the panels in the stiles and rails. Lay out and cut the mortises in the ends of the stiles and the center of the rails. Cut the 1/4" x 2"-long tenons on the rails. Then cut a 1/2" x 1" notch out of the outside end of each end of the rail, creating the haunch in the tenon. After dry-fitting the joints, measure the inside dimensions of the area for the panel. Before gluing the door together, sand the panel. When you're happy with the fit of the door, glue it together, using glue only on the tenons. Keep glue off the panel so it will expand and contract with the seasons.

When the glue is dry, rout a 3/8" radius on the front edge of the door using a router. Then cut a 3/8" x 3/8" rabbet on the entire back edge of the door. Put a strip of

wood that's an 1/8" thick on the front edge of the case bottom. Use this to support the door in its opening on the cabinet. Temporarily attach the cabinet door to the face frame with masking tape. Now mount the hinges on the right side of the door and the latch on the left.

Lazy Susan

This part is optional, but it adds versatility. Most Lazy Susans are built for large televisions and are either

Start assembling the case by setting a panel on its outer side and setting a shelf into its dado. From underneath, glue and nail into the shelf and side at the corner where the shelf meets the side. Repeat for the other side and check the case for square.



The mortises in the top of the stiles are 1/4" x 1" x 2" and are 1/2" down from the end. The mortises in the stile bottoms are 1/4" x 1 1/4" x 2", and are 1/2" up from the end.

too clunky or not big enough around to completely support a TV. My homemade Lazy Susan can be made to any diameter and supports quite a bit of weight (even me). The part that rotates is the platform. It's simply an oak veneer plywood panel cut according to the Schedule of Materials with curly oak edging. The back corners of the top are clipped so it doesn't bump the wall when rotating. Check the footprint of your TV to make sure it fits. The edging is 3/4" x 1", goes all the way around the panel and is mitered at the corners.

SCHEDULE OF MATERIALS: ENTERTAINMENT UNIT

No.	Item	Dimensions T W L	Material
1	Top	3/4" x 19 3/4" x 28 1/2"	Oak
2	Sides	3/4" x 18" x 27 1/4"	Oak
2	Face frame stiles	3/4" x 3" x 27 1/4"	Oak
1	Face frame rail*	3/4" x 1" x 22 1/2"	Oak
2	Face frame rails*	3/4" x 2" x 22 1/2"	Oak
2	Shelf/bot	3/4" x 17 3/4" x 25 1/2"	Oak
1	Back	1/4" x 26" x 24 1/2"	Oak
3	Cleats	3/4" x 3/4" x 16"	Oak
1	Base front	3/4" x 3" x 28"	Oak
2	Base sides	3/4" x 3" x 19 1/2"	Oak
2	Door stiles	3/4" x 3" x 15"	Oak
1	Upper door rail*	3/4" x 2 1/2" x 19 1/4"	Oak
1	Lower door rail*	3/4" x 3" x 19 1/4"	Oak
1	Door panel	3/4" x 15 3/4" x 10"	Oak
1	Lazy Susan top	3/4" x 16" x 23"	Plywood
1	Lazy Susan trim	3/4" x 1" x 96"	Oak

*Includes tenon length.

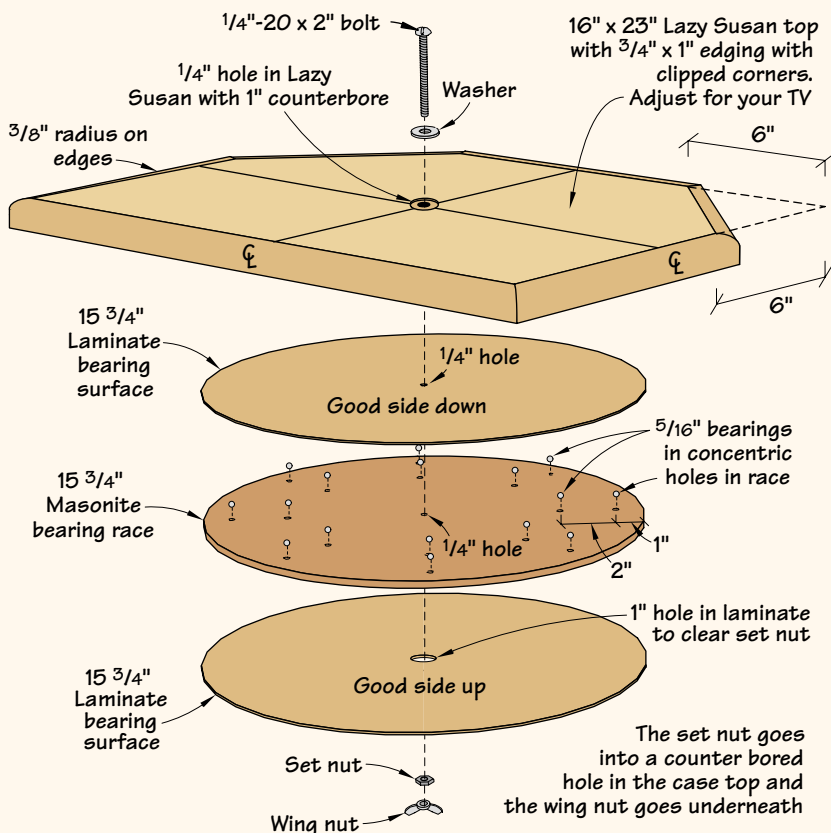
Source of supply: Van Dyke's Restorers (800-558-1234). Hinges AF-S3892 (\$7.35/pr.), catch AF-SB02-R (\$5.85), nameplate AF-S3735 (\$2.49). Bearing Distributors Inc. (513-761-0866), 5/16" ball bearings (16 @ 4 cents/apiece).

The mechanism is a simple sandwich, the center of which is a piece of Masonite with holes drilled to hold $\frac{5}{16}$ " ball bearings. It acts as a ball bearing race. The "bearing" surface is plastic laminate applied to the top of the cabinet and the bottom of the Lazy Susan. A $\frac{1}{4}$ " bolt ties it all together and serves as a pivot point.

First find the center point on the pieces of your Lazy Susan and a point 10" back from the front edge of the case top that's centered on the top. With a Forstner bit, drill a 1" hole that's $\frac{1}{4}$ " deep for the bolt head in the plywood top. In the center of that hole, drill a $\frac{1}{4}$ " hole the rest of the way through the top.

Repeat the process on the case's top. These holes will hold a bolt that secures the Lazy Susan assembly. To assemble the mechanism, start by placing a $\frac{1}{4}$ "-20 x 2" round head bolt with a washer through the plywood top. Place this upside down on a blanket or cardboard. Place the first piece of laminate (colored side away from the top) on the bolt and mark its outline.

Using contact adhesive, attach the laminate to the top using the bolt as an indexing pin. Attach the laminate to the case top in the same manner except that you will need to drill a 1" hole through the laminate



to accept a set nut that will secure the bolt. Because the case top is solid wood, you'll need to attach this laminate by applying the adhesive in a strip oriented with the grain at the center to allow for wood movement.

After attaching the laminate to the case top, drill $\frac{5}{16}$ " holes in the Masonite for the ball bearings (ream them out a little). Place a set nut on the bolt down to the Masonite. Leave it a little loose so you can lock it down later from underneath the case top with the wing nut.

Finish

The finish on these old refrigerators was fairly light. I wanted to add a little age to my finish and show off the spectacular figure in the curly oak. After finish sanding the entire cabinet, begin finishing by applying an aniline dye (J.E. Moser's Light Sheraton Mahogany W1330/ water soluble dye). When this is dry, apply a coat of brown stain (Benjamin Moore-Early American 234-55) to "kill" some of the orange from the dye. Three coats of clear lacquer and a light rubbing out with some steel wool and wax will give this entertainment unit some entertainment value of its own. **PW**

"The Little Shop that Could" is a rolling compact workshop equipped with only \$1,000 in tools and machinery. In almost every issue, we build a project using only these tools to demonstrate how anyone can get professional results on a budget. To order a copy of the January 1999 issue (#110) that contains complete plans for the "Little Shop" workshop for \$4.50, call our customer service department at 800-289-0963. Ask for item #58120. Supplies of this issue are limited.



Set your table saw to about 12 degrees to cut the bevel on the door panel. Leave a little less than $\frac{1}{4}$ " thickness on the edge of the panel. The panel should be $\frac{1}{16}$ " from bottoming out in the groove.



Put the ball bearings in the holes in the Masonite and place the top onto the assembly. Tie the whole unit together with a washer and wing nut. You should be able to rotate the Lazy Susan and not see the bolt move.

TOOL TEST

HOW WE RATE TOOLS

We test a lot of tools at *Popular Woodworking*, and while we don't often test tools until they fall apart, we do give them an honest, real-world workout. Each issue we share the results of our hands-on experience with you and offer insights to help guide your shopping decisions. The ratings reflect the opinion of the magazine's editorial staff.

Here's how our rating system works. **Performance:** A rating of "five" indicates we think this tool is a leader in its category — for now. (You won't likely see performance ratings of "one" or "two" in these reviews because we wouldn't publicize an inferior tool.) **Value:** "Five" is a great tool for the money; "one" isn't the mark of a value. However, a low "value" rating shouldn't prevent you from buying that tool. Some tools might be worth a little more because they're one-of-a-kind or just a really great tool.

If you have a question about a tool — whether it's been reviewed or not — you can contact me at (513) 531-2690, ext. 255, or by e-mail at DavidT@FWPubs.com.

And by the way, many of our past tool reviews appear on our website at www.popwood.com, including data on entire categories of tools (such as table saws). Check it out.

—David Thiel, senior editor

Delta's Miter Sled Outperforms Aftermarket Miter Gauges

We all know that the miter gauge that comes with a table saw should be replaced or upgraded. As a result, some companies have been selling new precision miter gauges that use a fence and stop system so you can cut lots of parts to identical size. It's a great feature. They also are a lot more accurate when it comes to miter cuts. Delta's new miter sled (the 36-205), which is just a few dollars

more than the high-end gauges (\$180 or less), outperforms them in two important areas. First, you can crosscut really long pieces, up to 60" long. In comparison, Osborne's new miter gauge is limited to pieces 27" long; Incra's handles work up to 24½" long. If you make small boxes, that's OK. But when you want to trim four table legs to size, you're going to want at least 30". Second, when you crosscut panels to size, Delta's large sled and the T-slot retaining washers on the miter bar allow you to cut panels up to 27" wide, something that's more difficult to do with any miter gauge.

There are a few things that could be improved. I wish the sled came with a tape measure on the fence, though that's inexpensive to add yourself. Second, adjusting the fence to 90 degrees to the blade is a fussy procedure that took several attempts to get just right. Finally, it's no fun getting the sled to work on Jet or Powermatic table saws. But if you own a Delta table saw and can't afford a sliding crosscut table, look no further.

For more information, circle #180 on the Resource Directory Coupon.



Performance: ●●●●○
Value: ●●●○

Delta: 800-438-2486, or
www.deltawoodworking.com



Performance: ●●●●○
Value: ●●●○

Makita: 800-462-5482,
or www.makita.com

Makita Takes a Good ROS a Step Further

When Makita introduced the BO5010 random orbit sander, we were impressed with the aggressive nature of the lightweight 2.0-amp palm-grip tool. Makita's latest sander is based on the same design but adds variable speed and handles that give you more control over the motor's raw sanding power. With the simple turn of a thumb dial, you can vary the speed of the BO5021K between 4,000 and 12,000 orbits per minute. This is a great feature for when you want to take it nice and slow on a piece of veneer, for example. The BO5021K also offers the same outstanding "through-the-pad" dust collection system as the BO5010. These sanders collect dust better than any other sander we've tried without a vacuum attached. Other bonuses include the trigger and front handle. If you have to sand in tight places, you can quickly remove the handle. The trigger locks on with the push of an extra button so you can sand in short bursts or settle in for a long sanding session. If you want more control than you get with a palm-grip sander, but don't want to lug around one of the large right-angle machines, here's your tool.

For more information, circle #181 on the Resource Directory Coupon.

Continued on page 70

TOOL TEST

Continued from page 68

Performance: ●●●●○

Value: ●●●●○

Porter-Cable, 800-487-8665, or
www.porter-cable.com



Porter-Cable Revamps its 12-volt Cordless Drills for Improved Comfort and Performance

Porter-Cable has redesigned and repackaged its line of 12-volt cordless drills to offer greater run time and torque.

In an independent lab test commissioned by Porter-Cable, the new 12-volt unit sank 153 wood screws in a single charge (25 more than the closest competitor), 49 3" lag screws (16 more than the closest competitor) and drilled 42 holes with a 7/8" auger bit (eight more than the closest competitor).

Boasting 330 inch-pounds of torque, the 9866 offers two speed ranges (0-400 rpm and 0-1200 rpm), a 20-position clutch and an electric brake.

Powered by high-capacity 2-amp-hour NiCd batteries, the 3/8" drill is available in three kits. The 9866 includes a drill, charger, two batteries and a case for \$140. The 9866F includes all of the above plus the model 869 cordless flashlight for \$150. The 9866S replaces the flashlight with a 3.6-volt cordless in-line screwdriver for \$155.

Porter-Cable changed the shape and battery of the drill as well, improving the grip and converting the battery to a slide-on-from-the-rear attachment, which we like. The drill feels great, performs like a trooper and quite honestly, the 3.6-volt screwdriver is the best we've tried. It performs like a tool, not a toy. This is a great redesign and makes it a smart tool for workbench or job-site applications.

For more info., circle #182 on the Resource Directory Coupon.



Cut Your Curves Instead of Sanding Them

I've always wanted to buy an oscillating spindle sander to shape curves that I've cut with my band saw. But I've never had the cash. So I bought one of those inexpensive drum sanders that attaches to your drill press. It works OK, but now there's something better.

Microplanes look like the drum sander you chuck into your drill press, but instead of sandpaper, there are rows of tiny sharp teeth that look like a cheese grater. These teeth slice the wood instead of abrading it. The result is there's no dust flying in your

face. Instead, tiny chips fall to the floor. And you also don't have to worry about burning the sandpaper on the drum by staying in one place for too long.

In all fairness, it seemed to me that the Microplane Rotary Shaper cuts slower than an oscillating spindle

Performance: ●●●●○

Value: ●●●●○

Microplane 501-968-5455
www.microplane.com

sander. Plus, the finished surface still needs some finish sanding, especially on end grain. But the lack of dust (and the inexpensive price) more than makes up for these small faults. Microplane Rotary Shapers are available in three sizes: 1", 1 1/2" and 2" diameters. You also can buy rasps, hacksaw blades, Surform soles and yes, even kitchen graters for hard cheeses and garlic that use the Microplane technology. So if you've cooked one too many sanding sleeves, it's time to take a look at the Microplane. At about \$20, you can't lose. **PW**

For more information, circle #183 on the Resource Directory Coupon.

TOOL SCOOP

Model 3807 10" Sliding Compound Miter Saw



PORTER-CABLE ADDS NEW MITER SAWS TO LINE

Planned for release in March are two new miter saws from Porter-Cable. This category has been small and intermittent in the company's product line, but with the new 12" #3802 compound miter saw and the 10" #3807 sliding compound miter saw (shown above) we expect to see products with mass appeal and staying power in the marketplace. While not available for testing yet, here are some of the specifics: Selling for about \$530, the #3807 features a 15-amp, 5,000 rpm motor with electric brake, dual-rod linear ball-bearing guide system and will miter a 2 x 12 at 90 degrees and a 4 x 4 at 45 degrees. The 12" model 3802 (costing about \$350) offers a 15-amp, 3,500 rpm motor with electric brake and will miter a 2 x 8 at 90 degrees and a 4 x 4 at 45 degrees. As soon as we get our hands on these tools we'll let you know how they perform.

HEIRLOOM STA-SHARP TOOLS

A newly announced metallurgical advance from Heirloom Tools is reported to increase the life expectancy of carbide-tipped blades and bits by at least 50 percent. This improvement comes from an eight-step process that bonds the molecular structure of materials more tightly. The treated saw blades still get dull, but not as quickly, and with proper instruction, less material needs to be removed during sharpening. This extends the life of the blade, as well as the useful life of the sharpening. Heirloom Tools does not manufacture blades, but rather performs the Sta-Sharp process on existing quality blades and bits. The cost for the process is the difference between retail price and list price for currently available blades and bits. For example, a Sta-Sharp-treated Wisconsin Knife Works (WKW) 60-tooth triple-chip 10" saw blade would cost about \$75. We have one of the blades and are anxiously testing it for future publication. We'll let you know what we find. For more information, visit www.heirloomtools.com or call 513-576-0336.

Four-Way Screwdrivers

For a long time we've been advocates of four- (and five-) way screwdrivers. These economical tools provide four interchangeable screw tips, and the empty bit holder often works as a $\frac{5}{16}$ " nut driver. All this for about \$5, and the tool fits in your pocket. However, we decided some testing beyond the normal daily wear-and-tear was necessary to qualify these tools as truly remarkable.

We ordered some four-way screwdrivers from the Four-One Group (a leading supplier to U.S. hardware stores) and put them through the most rigorous tests we could think of. Here are the results:

Toughness Test

We wanted to see how tough the entire tool was – the handle as well as the screw tips and metal holder. So we had Cincinnati Milacron (which builds machines to make atom bombs) construct a “toughness tester” that uses the same principle as a steam-driven pile driver. We chucked a screwdriver into the tester and repeatedly rammed the screwdriver into graphite-impregnated polycarbonate with a Rockwell hardness of 62. The test proved dramatically that this really isn't a good way to test a screwdriver.

Tip Wear

To test the durability of the screw tip, we drove 1,000 2"-long Phillips-head deck screws and 1,000 slotted sheet metal screws into $\frac{1}{4}$ " white oak and discovered that the tips got buggered after a while, not to mention the enormous stress and strain on our tool tester (poor Chris). Our conclusion: While the four-way screwdriver is good for occasional use, we recommend you use a corded, or a good cordless drill/driver when you have this many screws.

Before the tests



After the tests



Photos by Al Parrish

Temperature Extremes

A screwdriver has to perform without flaw under extreme weather conditions – such as the heat of a summer noonday sun (we do have sub-Saharan readers). So we subjected a couple four-ways to the intense heat of our “Extreme Weather Simulator” (OK, it was an oven set on “broil”). We're not sure how they performed after this test because the handles melted.

Metallurgical Test

Next we took one of our test tools, cut the screw tip in half longitudinally and examined it under an electron microscope. We discovered a twisted double-helix pattern, which led us to the conclusion that the screw-

RESULTS

FOUR-WAY SCREWDRIVERS

NICE FEATURES

- Cheap
- Versatile
- Handy

RECOMMENDED MODIFICATIONS

- None, except for maybe finding a way to add a bottle opener to the handle

drivers were actually alive, or that we had been drinking. After this we decided against any more testing.

Conclusion

After our series of exhaustive and expensive tests, we knew way too much about four-way screwdrivers. To sum up, we've determined that they are affordable and tend to provide quality performance under normal conditions. But because the tools couldn't stand up to our rigorous and unbiased test, we just had to fail them. So much for the Four-One Group. **PW**

ABOUT OUR ENDURANCE TESTS

When a new tool hits the market we do our best to tell you what the benefits and pitfalls are with that tool. While this is good information, we know that the question you really want answered is, “How long will the tool last?” That's what this column is for. We regularly pick a tool we've used in our shop for at least a year that has stood up to our regular use. We make sure the tools we've tested here are virtually unchanged from the versions in the store today. So when you see a tool written up in here, it has been through the *Popular Woodworking* Endurance Test. —David Thiel, senior editor

Glazes and Glazing Techniques

One of the oft-forgotten tools in finishing is glazes. Here's how to get started with this handy technique.

Glazing is the act of applying, and then manipulating, color over a sealed surface. The color can come in many forms, including common stain, oil color, Japan color, universal-tinting color or a specially made product called "glaze." A glaze is simply a stain that is thick so it stays where you put it, even on a vertical surface. Gel stain, for example, makes a good glaze.

Note that it's the position of the colorant in the order of finishing steps — over at least one coat of finish, but under a topcoat — that defines glazing. You don't have to be using a glaze to be glazing. On the other hand, even if you are using a glaze, you are staining, not glazing, if you apply it directly to bare wood.

Though it's easy to do, glazing is still a sophisticated decorating technique because of the many effects you can create. These include adding depth to three-dimensional surfaces such as raised panels and mouldings, faking the wear and dirt accumulation associated with age, adding definition to painted surfaces, adjusting color after the actual finishing has begun, and creating faux (fake) grain or other decorative patterns.

Besides its ease, glazing is also one of the most forgiving steps in finishing. You can actually practice on the wood you're finishing, and if you don't like the effect you get, you can remove the glaze and start over without damaging any of the finish.

Though the application of glaze is not difficult, there is skill involved in knowing the look you want to create (having an artistic sense), and in maintaining consistency when glazing multiple objects, such as all the doors on a set of cabinets.

Glazing Products

There are two types of glaze: oil-base and water-base. Oil-base glaze gives a deeper,

By applying glaze between coats of finish you can add the appearance of age to furniture. Here, I applied and left glaze in the recesses on the right side of a ball-and-claw foot.



Photos by Jim Roberson

richer appearance and is easier to control because of the longer working time. You can remove oil-base glaze for up to an hour or more by wiping with paint thinner or naphtha, neither of which will damage any paint or finish.

Water-base glaze is more difficult to work with because it dries so fast. But it has much less solvent smell, so it is less irritating to be around. Once you've applied a water-base glaze, you have only a few minutes to remove it using water before it dries too hard.

Oil-base glaze is best for cabinets and furniture when the finish is lacquer, varnish or shellac, and you're applying the glaze in a shop with good ventilation. Water-base glaze is best for faux finishing on large surfaces like panels and walls in buildings where there is very little air movement, and on furniture and woodwork when you're topcoating with a water-base finish. To use a water-base finish successfully over an oil-base glaze, you have to let the glaze cure completely, which could take a week or more depending on

the weather conditions.

Brands of glaze vary in thickness and drying time, but all brands produce good results. Some manufacturers provide glazes in a range of colors. Others provide only a clear glaze base to which you or the paint store add the pigment. Dark browns and whites (for pickling) are the colors most often used on furniture and cabinets.

If you need to thin a glaze to lighten its color, it's usually best to thin it with clear glaze base instead of common thinner so you don't lose the run-resistant quality. If you need to adjust the color of a glaze, you can do so easily by adding pigment ground in oil or Japan (which means varnish) to oil-base glaze, and pigment ground in glycol solvent or acrylic to water-base glaze.

Applying Glaze

You can use any finish, sanding sealer or paint under the glaze. You can sand this first coat if you want. But sand lightly with fine sandpaper so you don't sand through, or the glaze will become a stain and color

Continued on page 78

FLEXNER ON FINISHING

Continued from page 76



*You can use glaze to accentuate the three-dimensional construction of raised-panel cabinet doors. This door was stained and sealed before the glaze was applied and wiped off from the raised areas. Then the door was topcoated (**above**). Glaze is particularly effective at creating an antique appearance when brushed out thin over a painted surface. Continue brushing out and removing excess glaze until you get the look you want (**at right**).*

the wood. Sanding or steel wooling has the benefit of roughening the surface so the glaze can bond better to it.

You can stain the wood under the sealed surface, leave the wood unstained or fill the pores of the wood. But in all cases, you should apply the glaze close enough to the wood so you can still apply one or more topcoats of finish to protect the glaze from being rubbed or scratched off without getting the overall finish build too thick.

Because there's no build with oil finishes or wax, you can't glaze successfully between coats of these finishes. You must use one of the film-building finishes.

To apply glaze, wipe, brush or spray an even coat onto the surface. Then manipulate the glaze with the following methods.

- Wipe off the unwanted glaze while it's still wet. In most cases, this means wiping the glaze off raised surface areas and leaving it in recesses on carvings, turnings, mouldings and raised panels. But it can also mean wiping off flat surfaces in a way that imitates grain or other decorative effects.

- Wipe off the unwanted glaze right after the thinner has flashed off and the glaze has become dull. This is the same as wiping off while still wet, but the glaze is usually a little easier to control at this point.

- Using fine steel wool, abrade off the unwanted glaze after it has dried. There is a risk that you might abrade through to the wood, but it's nice to know that you can always use steel wool to remove glaze if you



don't get enough off with a cloth before the glaze gets too hard.

- Using an almost dry brush, spread the glaze out thin to achieve the appearance you want. All this amounts to is continuing to remove glaze with a brush you keep fairly dry by wiping with a clean cloth until you achieve the effect you want.

- Adjust the color of the object you're finishing by brushing glaze out thinly and evenly over the surface. As long as you keep the glaze thin, you won't muddy the wood much. This is an excellent technique for creating a more perfect color match.

- Using tools such as rags, sponges, brushes, grainers and toothbrushes (to create a spatter effect), create a decorative faux pattern. Here, the techniques and colored patterns you can achieve are endless. Many books explain these techniques. Most are focused, however, on decorating walls rather than woodwork.

As long as you keep the glaze very thin, you can use it to adjust a color after you've sealed the wood without causing significant muddying. Here, I've added glaze to the left side of this cherry board to redden the color.



- Instead of manipulating glaze you've already applied, use a "dry" brush to apply the glaze to raised areas of carvings or turnings, or to flat surfaces to create the appearance of dirt accumulation. Begin with a totally dry brush and swirl it in some thick oil or Japan color you've applied to paper, cardboard or wood so that some of the color is transferred to the bristles without making them wet. Then brush lightly.

Glazing Problems

Most glazing problems occur because you've applied the glaze too thick or not allowed it to cure enough before applying the topcoat of finish. The two are related because a thick layer of glaze takes significantly longer to cure.

Too thick a layer of glaze (most common in crevices and recesses) weakens the bond of the finish to the wood because the glaze layer itself is not strong. The finish applied on top of the glaze could separate if knocked or abraded and this would pull some of the glaze with it and leave some attached to the surface underneath. This problem is even more likely to occur if the glaze hasn't thoroughly cured.

Not allowing the glaze to thoroughly cure can also lead to the topcoat wrinkling or cracking. If this happens, you'll have to strip the finish and start over. **PW**

Bob Flexner is a nationally known finishing expert in Norman, Oklahoma, and the author of "Understanding Wood Finishing."

CARTOON

Illustrated by Bob Rech
www.bobrech.com

#40



Mark Slotto, from Lakota, North Dakota, is the winner of our Cartoon Contest from the January issue and recipient of the fine set of Quick Grip clamps. The following runners-up each receive a one-year subscription to *Popular Woodworking*:

"OK hot shot, double or nothing. Router a square hole."

Kelly Wyatt, Wilmington, North Carolina

"That's fantastic! Does it come in a cordless model for ice fishing?"

Doug Goebel, Calgary, Alberta

"I knew you couldn't saw a straight line with your eyes closed!"

Dan Reeve, Belfast, Maine



#42

Submit your caption(s) for this issue's cartoon on a postcard to *Popular Woodworking*, Cartoon Caption #42, 1507 Dana Ave., Cincinnati, OH 45207 by March 20. Winners will be chosen by the editorial staff.

The winner will receive a selection of Quick Grip clamps from American Tool Co. Inc. Newly redesigned, these one-handed clamps are a must-have tool. Winners will receive five 12" clamps and five 24" clamps. A \$170 value!

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

Sponsored by **AMERICAN TOOL**



The Art of Making Mistakes

My woodworking was so incredibly bad, it was genius.

My father was a home repair genius. What else do you call a man who needs only one tool for every household repair?

Of course, that tool was the telephone. He'd call a carpenter to put up a towel rack or a furniture maker to assemble a spice rack kit. No mess, no fuss, no ability required. And I inherited all his skills.

So when I decided to pursue a career in woodworking, it was a surprise to everyone, including myself. Even more surprising was that I actually got a job as a woodturner in a shop that made reproduction Windsor chairs.

During my interview, the boss asks if I know how to use a table saw, tapping the machine sitting on the shop floor next to us. Well, I'd never used a table saw. But I can see on the machine a green button that says "Start" and a red button that says "Stop."

So I say, "Well, I know you press the green button to start it and the red button to stop it."

"That's the jointer," he says. He hired me anyhow. I never asked him why.

My boss was really good at what he did. He tells me, "Cut this off at $9\frac{3}{16}$," and then he makes a casual mark on the wood.

So I pull out the tape measure to mark the cut. After 45 minutes of struggle, I get the tape measure pointing the right direction. Along the way I whip myself three times with the retracting tape. Worried that I'd measured $\frac{2}{8}$ " plus one of the little marks by accident, I try to hold both ends of the tape and a pencil at the same time. I whip myself in the face one more time and finally get a mark on the wood. It turns out my boss's mark is exactly 9" plus $\frac{1}{8}$ " plus one of those little marks.

After he hired me, the first thing he did was take me to the lathe and point to the green and red buttons. "You press the green to start it and the red to stop it," he says. He never could understand why I'd make mistakes. I'd be turning a detail on a chair



leg, the skew would catch, gouge the leg and fling it off the lathe.

My boss was curious. "Why did you do that?"

"Sorry. It was a mistake."

"Well, it's better if you don't catch the skew like that."

"Oh, I know that. It was an accident," I say.

"OK. But you shouldn't ram the tool in there."

"Yes, I know, but it slipped."

"Oh, I see," my boss says. "Well, don't let it slip, then."

"Right. I didn't mean to. I mean, it was unintentional," I say.

"It's just that if you gouge a huge divot out of the leg and it careens across the shop, we can't use it."

"It was a mistake!" I say.

He looks at me like I'm speaking in tongues. He simply can't understand why I make mistakes.

So I think of a compromise. Whenever I ruin a leg, I hide it in the corner. At the end of the day, I toss all the legs into the

dumpster outside.

Then everyone will be happy.

Six months later, I still don't know $\frac{3}{16}$ " from $\frac{3}{4}$ ", but at least I'm ruining fewer legs every day.

But then an artist whose studio is next door invites my boss and me to look at her new art. We go to her studio. We assume expressions of polite interest. She points at her art.

There, wrapped in velvet, are six months worth of ruined chair legs, painted, glued, shaped, assembled and framed. My mistakes had become her medium. She fished legs I ruined out of the dumpster and had the complete collection. All the legs were there: the irreparably gouged, the stupidly misshapen, the absently severed, the overly bulbous, the structurally unsound and the indescribably ugly.

Ask not for whom the phone rings, it rings for you. It's me. "I need help putting this spice rack together." **PW**

Joel Naftali is a writer who on occasion gets his mouse stuck in his keyboard, gouging the keys out and sending the external drive careening across the office.