

TAUNTON'S

Fine Woodworking

Perfect hinges every time, p. 44

Craftsman display case

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Dos and don'ts**

**How pros sand
their finishes**

**Fundamentals:
Get cleaner cuts
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April 2010 No. 211

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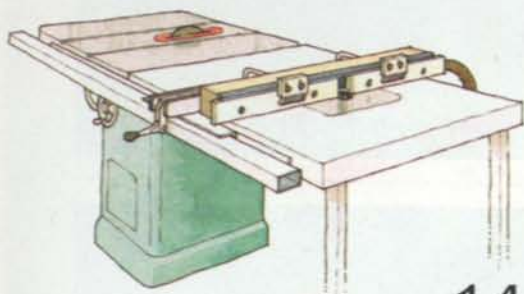
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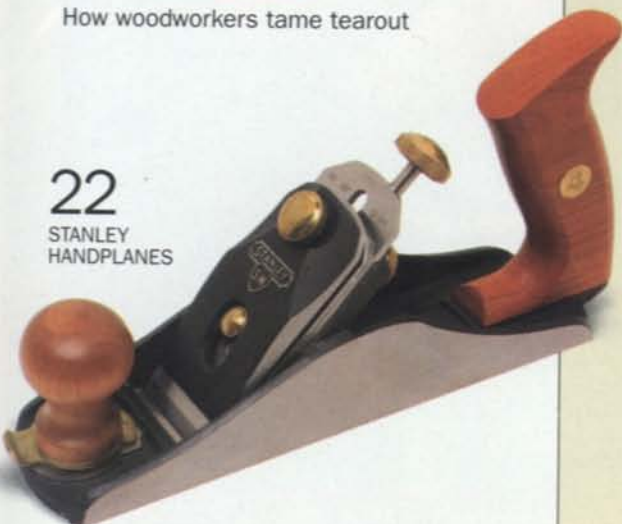
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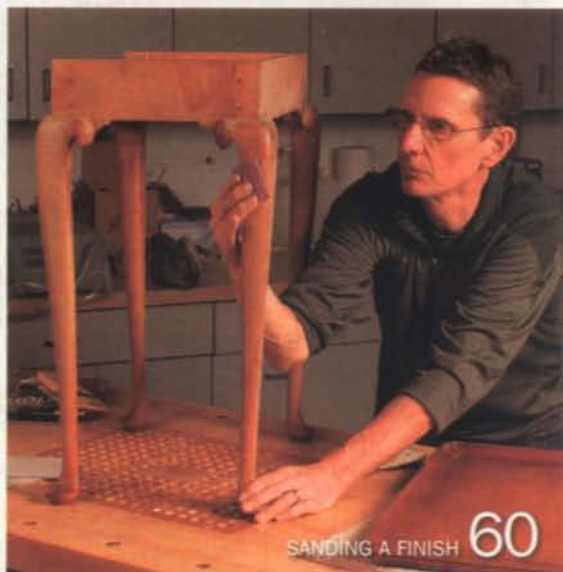
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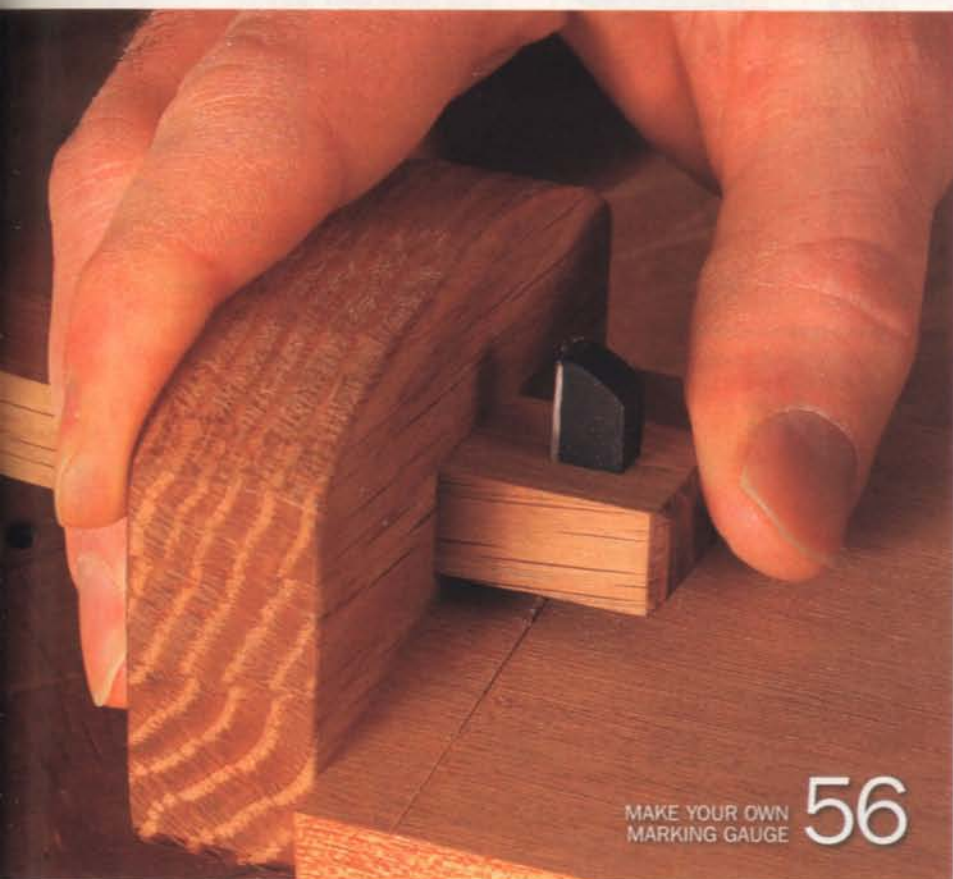
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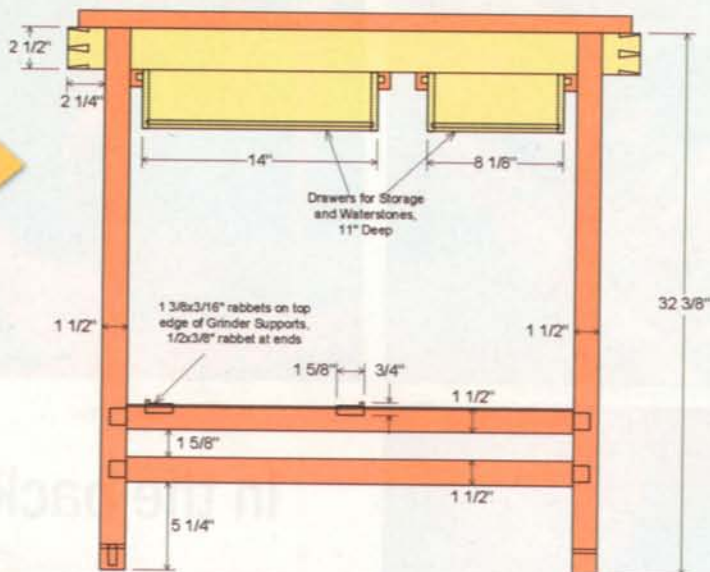
on the web

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VIDEO WORKSHOP

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- Feb. 11: Queen Anne-style cabriole leg
- Feb. 25: Flame finial
- March 11: Sheraton-style leg with reeding



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contributors

Michael Pekovich ("Arts and Crafts on Display" and Master Class) studied furniture making in college, but he says his real education didn't begin until he arrived at FWW 13 years ago. Since then, he has built scores of pieces and has been on an unending quest to improve his skills. "I've had the tremendous fortune of learning from all the experts who have written for the magazine," he says. As art director, Pekovich uses his broad understanding of woodworking to help communicate the craft to readers.



Doug Stowe ("Perfect Hinges Every Time") has been woodworking since 1976 and has written six woodworking books, including *Rustic Furniture Basics* (The Taunton Press, 2009). He was recently named an Arkansas Living Treasure for his contribution to traditional crafts. Stowe also teaches woodworking to children at Clear Spring School, and to adults at schools around the country. Read his blog at www.wisdomofhands.blogspot.com.

Jeff Headley ("How to Add Quarter Columns to Your Furniture") has made furniture for The White House, along with many other historic buildings and museums, for more than 25 years. The fourth generation to run the family business, Headley now offers classes for woodworkers who want to furnish their own less-famous residences. You can find details at www.wwotv.com.



Tim Pastore ("4 Ways to Make Panels Pop: Woven Panels Made Easy") developed his patience for woodworking while renovating his 1735 Colonial outside Boston. A program manager for American Science and Engineering by day, he enjoys nights in his shop with his 7-year-old son, Lucas, who is now the primary panel weaver. Pastore is a member of the American Association of Woodturners. To see his work, go to www.inthedetailgallery.com.

Longtime readers may worry that **Jeff Jewitt** ("Sand Between Coats for a Flawless Finish") is wasting away, but his new, lean look is testament to a rediscovered love for cycling. He took up cycling to work when gasoline prices soared in 2008 and now also rides regularly on weekends and after work with a cycling club. There is nothing he likes better than to hear the gasps of a rider 20 years his junior trying to keep up with him.



For more information on our contributors, go to FineWoodworking.com/authors.

We are a reader-written magazine. To learn how to propose an article, go to FineWoodworking.com/submissions.

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Spotlight

ISSUE NO. 210

January/February 2010 p. 42

MAN VS. MACHINE

While I was reading the article, "Tenon Shootout: Hand vs. Power," the "Ballad of John Henry" kept going through my head.

—ROBERT SOLOMON, Brooklyn, N.Y.

Editor replies: You didn't specify a verse, and there are lots of versions of the classic folk song, but I'm guessing you were humming this stanza:

*"John Henry was on the right hand,
But that steam drill was on the left;
Before your steam drill beats me down,
Hammer my fool self to death,
Lord, I'll hammer my fool self to death."*

John Henry did just that, if you recall, but he did beat the machine, unlike our hand-tool enthusiast.

No substitute for a mock-up

I appreciated art director Michael Pekovich's short piece (Q&A, *FWW* #208) on modeling a piece of furniture. For 34 years, I worked for Walt Disney Imagineering, designing and producing Disney theme parks and attractions. The foundation of our design process was



model building, be it concept, study, or presentation. This process applied equally to architecture, interior design, and the attractions.

People today put way too much confidence in the computer, allowing it to make design decisions. If it's necessary to see a piece of design work in three dimensions, there is only one way to do it. Model it. Make your changes in the model and refine it, then move on to the work in full size.

—TED SEBERN, Cambria, Calif.

Editor's note: An exciting, though pricey, new tool for computer-based designers is the 3-D printer, which turns a CAD drawing into a 3-D scale model by stacking thin beads of plastic. Check out my blog at FineWoodworking.com/extras about the 3-D modeling on display at last year's Furniture Society Conference in Boone, N.C.

Silicone caulk seals ducting

As one reader recently pointed out, the article "Step Up to Whole-Shop Dust Collection" (*FWW* #209) was off base in recommending duct tape over foil tape. If you want an even better and

more permanent seal, you should use silicone caulk. The article also pictured an adjustable elbow, but didn't point out that these elbows need to be sealed at each of their many joints. A standard rule of thumb in the sheet-metal industry is that if water would leak out of it, so will air.

—ROBERT WEBER, Hancock, N.Y.

Your 3 shops lacked 4 things

I was especially interested in the various shops featured in "3 Paths to a Stand-Alone Shop" (*Tools & Shops*, *FWW* #209) as I have yet to build my own. However, none of the shops highlighted the four essential articles every workplace must have: 1) coffee maker; 2) boom box (CDs, NPR); 3) fridge; 4) loo.

—ROGER APTE, Milton, Wis.

Warning for dovetailers

I have a tip for readers planning to build Christian Becksvoort's "Shaker Classic" table (*FWW* #210). When fitting the dovetail that joins the top rail to the legs, you'll find the top of the leg to be very fragile and prone to splitting. Place a clamp across the opposing faces of the leg as you fit the pin. This will prevent the leg from splitting as you tap the dovetail into the socket.

—CRAIG MASCOLO, Paradise Valley, Ariz.

Short tenon or tall?

In a Q&A in *FWW* #210, Steve Latta says that "the walls of one long mortise will have a tendency to spread over time," advocating two shorter tenons. But on p. 31 of the same issue, Christian Becksvoort ("Shaker Classic, 2 Ways") puts a similarly tall tenon in a leg that isn't much wider. Any comments?

—JACK HUTTON, Port Townsend, Wash.

Editor replies: Good eye. We missed that one. In their defense (and ours), the situations varied, though only slightly. Becksvoort left a larger bunched area

About your safety

Working wood is inherently dangerous. Using hand or power tools improperly or ignoring standard safety practices can lead to permanent injury or even death. Don't perform operations you learn about here

(or elsewhere) until you're certain they are safe for you. If something about an operation doesn't feel right, find another way. We want you to enjoy the craft, so please keep safety foremost in your mind.

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letters continued

at the top to strengthen his table leg, and as you point out, his leg was 1/8-in. thicker than the one in Latta's example. And of course, opinions will always vary, especially among woodworkers!

Fluorescent bulbs are fragile

The article, "Let There Be Light" (FWW #209) did not address a safety issue when using open strip lights. Some months ago a piece of stock flew up from my tablesaw and struck a fluorescent tube, showering me with broken glass. Fortunately, I survived my stupidity unscathed. If you use strip lights that have no diffusers (wraparound covers), you should install protective sleeves over the tubes. These plastic sleeves come with tight-fitting end caps that contain the bulb if it should shatter.

—STEVE ZORBAS, Hickory Township, Pa.

Clarification on quadrant hinges

I ordered the Brusso hinges and mortising template recommended by Adrian

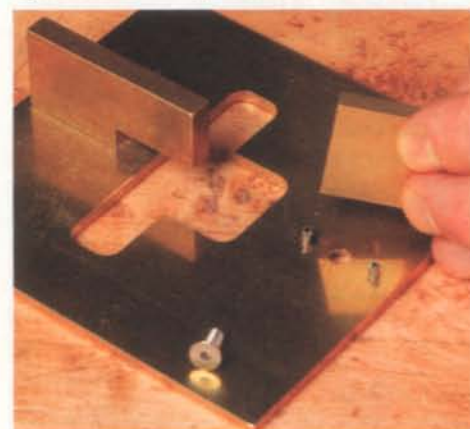
Ferrazzutti in Master Class, FWW #207. However, the fence on the template causes the hinges to be set back 3/16 in. farther than the author's were, making them protrude farther from the back of the box.

—BILL FILMER, South Australia

Adrian Ferrazzutti replies: *You're right. When I installed the hinges, I used an acrylic template that an engineering student had made for me. As this was not available to readers of Fine Woodworking, we used the Brusso template afterward to re-create the installation, but didn't go far enough to discover the problem you describe. The good news is that the fix is easy. Unscrew the factory fence, leaving its locator pins in place. Using the pins as the fence will ensure that the hinge only extends by half the width of its barrel, just as mine did in the article. I recommend doing a dry run on some scrapwood first.*



Simple fix. To get the hinges aligned as seen in the article (above), you must remove the fence from the template (below) and bump the parts against the locator pins instead.



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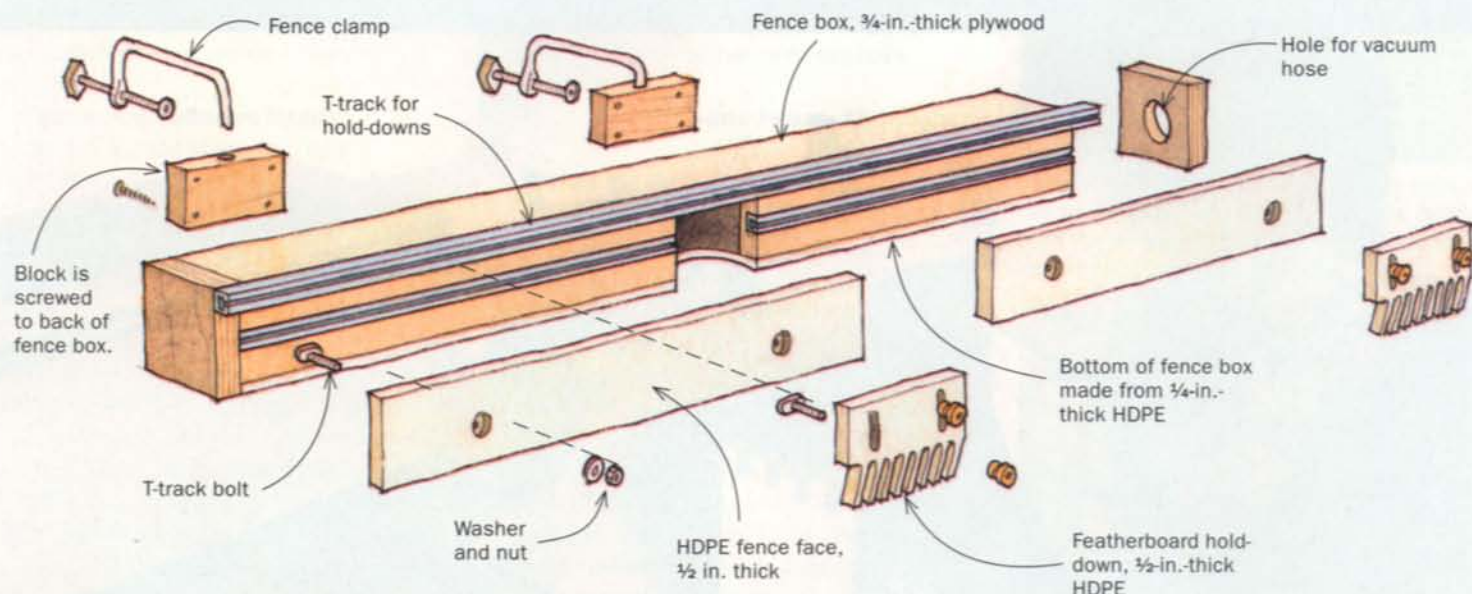
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Best Tip Fence transforms tablesaw into a real router table



David Diaman is a period furniture maker who builds mostly Queen Ann and Chippendale pieces, but he also enjoys building from the William and Mary and Federal periods. Some of his work can be seen at www.Diamanwoodcrafters.com.

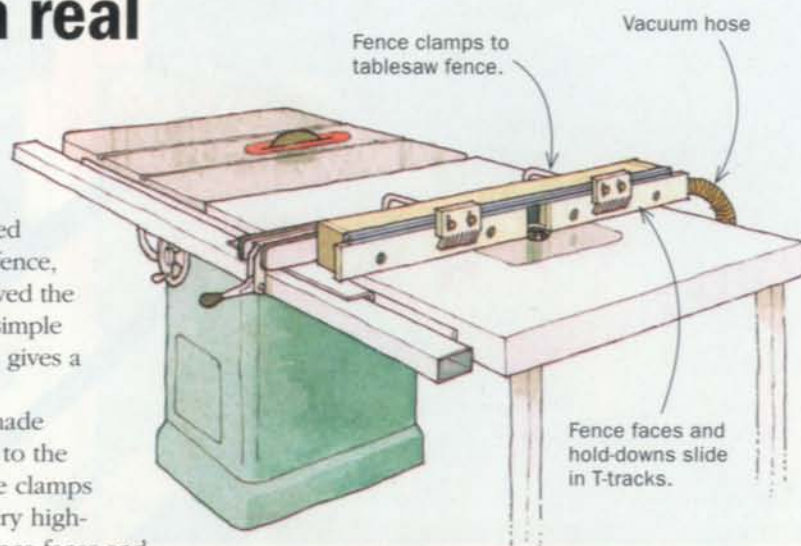
Installing a router table in my tablesaw's extension table saved a huge amount of shop space, but I needed to turn the rip fence into a router-table fence, and figure out how to collect dust. I solved the problem with an auxiliary fence that is simple to build, fast to put on and take off, and gives a neat way to collect dust at the source.

The fence is basically a hollow box made from 3/4-in.-thick plywood that attaches to the tablesaw fence with two universal fence clamps (Rockler.com; No. 31373). I used slippery high-density polyethylene (HDPE) for the fence faces and bottom, but melamine or plywood would work, too.

The faces are mounted on T-tracks so they can be slid back and forth to create an opening for different-size bits. They can also slide together to create a zero-clearance effect, if desired. The T-track above the fence faces is for hold-downs and stops.

I drilled a hole in one end of the fence to match my shop-vacuum hose, which draws air through the opening in the fence and almost eliminates dust. The entire setup works great.

—DAVID DIAMAN, Abingdon, Md.



A Reward for the Best Tip

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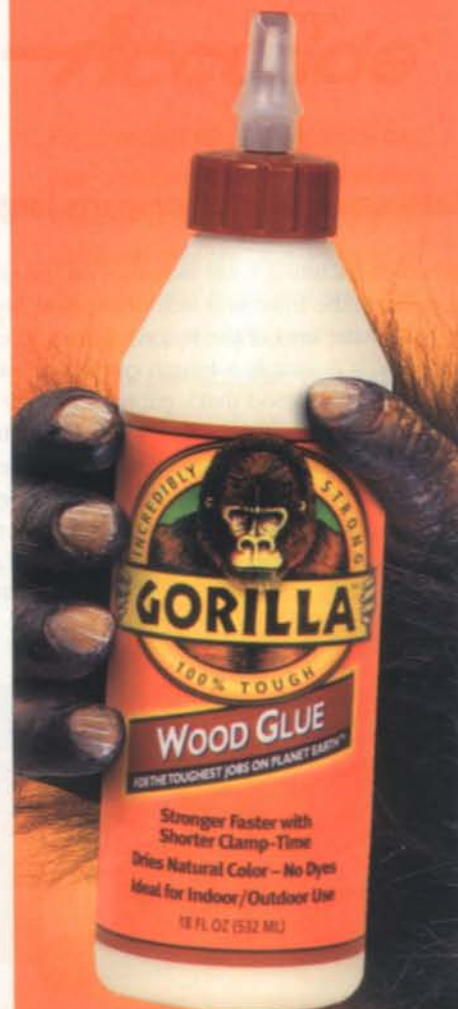
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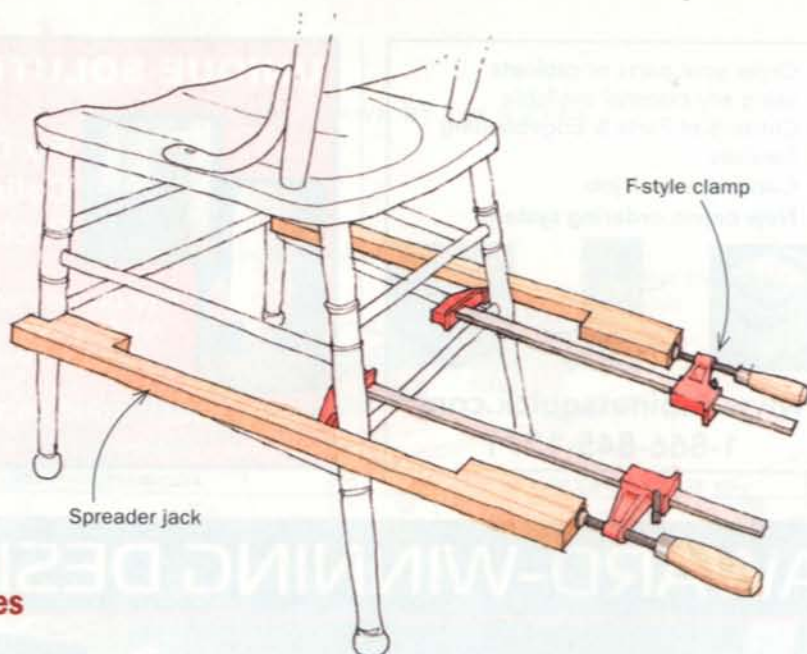
MARCH/APRIL 2010 15

methods of work continued

Chair-repair jacks

In the time needed to reverse the heads on your pipe clamps, you can make a pair of these simple spreader jacks from scrapwood. When used with two F-style clamps, the jacks will gently spread the joints on a chair for disassembly and repair.

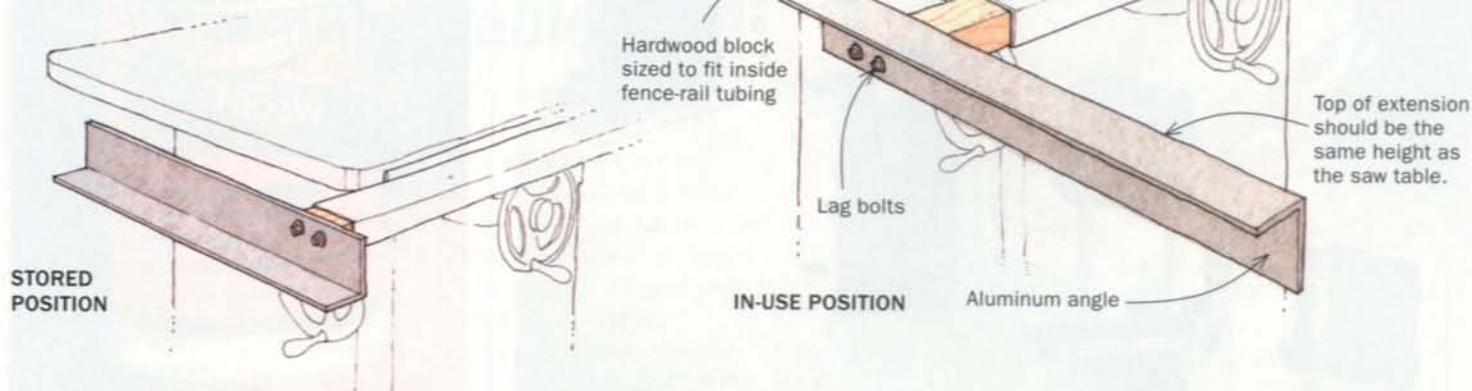
—T. D. CULVER, Cleveland Heights, Ohio



Tablesaw extension supports large workpieces

When crosscutting wide materials on the tablesaw, you need extra support at the front and side of the saw. My support extension slides right into the end of the fence tubing and can be used or stored in seconds. It is simply a length of aluminum angle lag-bolted to a length of hardwood that's cut to fit snugly against the top and bottom of the tube. When the extension is in position, the aluminum angle should be the same height as the top of the table. When it's not in use, I pull out the extension, rotate it 180°, and reinsert it. It is easily accessible yet out of the way at the same time.

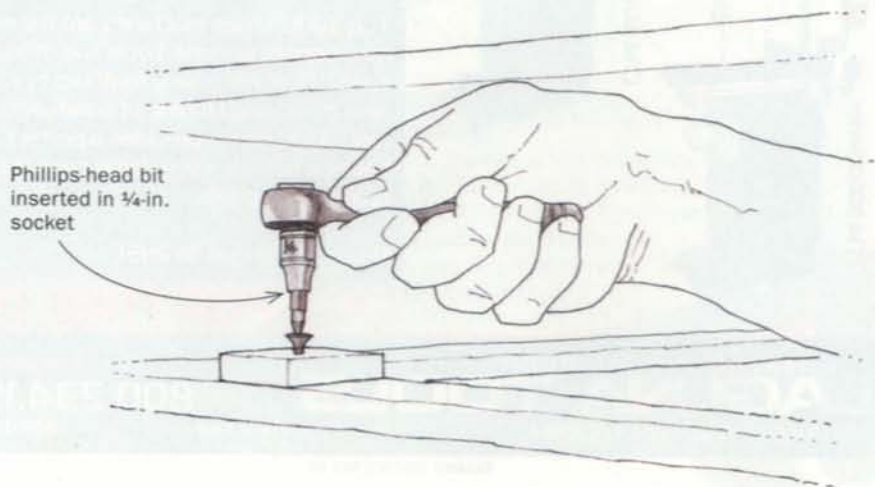
—BOB HARTIG, Sheboygan, Wis.



Handy screwdriver for tight quarters

When my shortest conventional Phillips-head screwdriver was still too long to fit the space I had to work in, I used a different approach. I installed a $\frac{1}{4}$ -in. socket on a drive ratchet and then inserted a short Phillips-head bit into the socket. The arrangement not only fit the tight space, but it also gave me increased leverage to drive the screws.

—WILLIAM G. ADAMS, Richmond, Ky.



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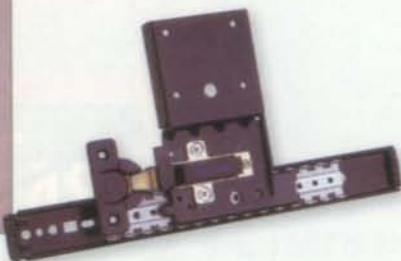
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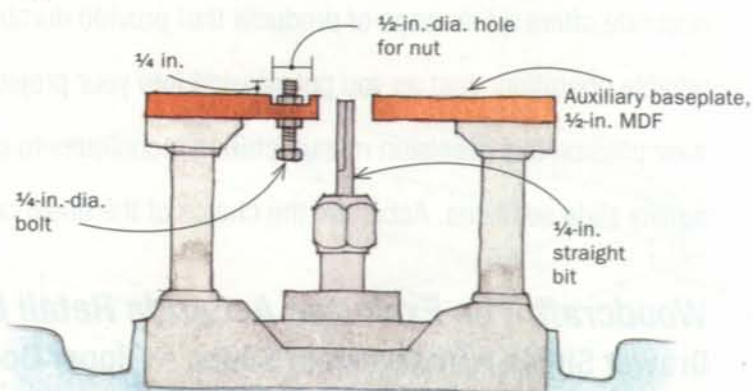
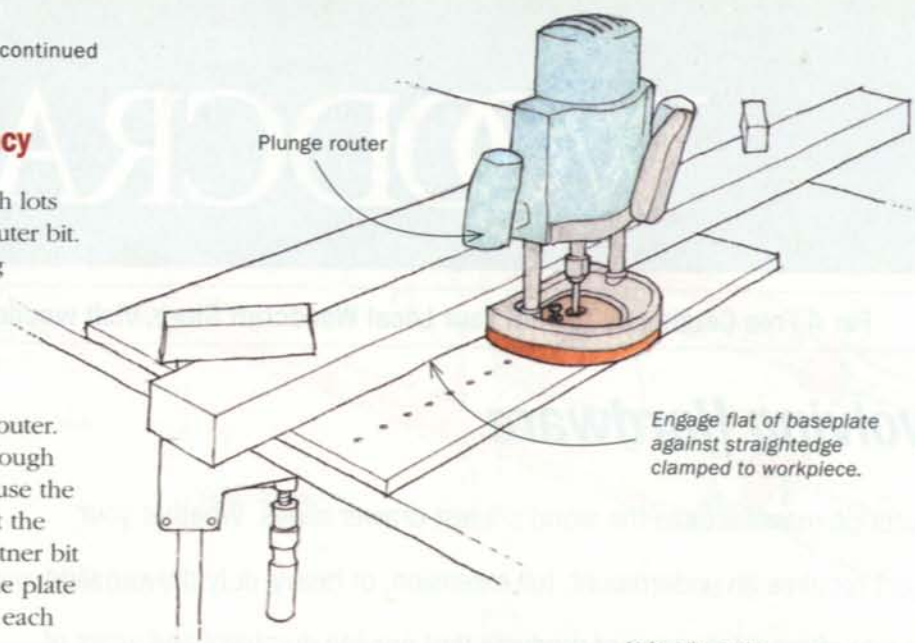
Locate shelf pins with ease, accuracy

Most shelf-pin jigs are simply long boards with lots of evenly spaced holes to align the plunge-router bit. But making one means a lot of drilling. My jig attaches to the router baseplate and uses a 1/4-in.-dia. bolt as an index pin; what's best is that you have to drill only one hole to get the same accuracy as the other methods.

First attach an auxiliary baseplate to your router. To install the index pin, drill a 1/4-in. hole through the baseplate. Locate the hole carefully because the spacing of the pin from the router bit will set the shelf-pin spacing. Next, use a 1/2-in.-dia. Forstner bit to drill an extralarge hole in the bottom of the plate for the nut. Fasten the bolt using one nut on each side of the plate.

To create the shelf-pin holes, clamp a straightedge across the workpiece. Install a 1/4-in. straight bit in the router, and set the depth according to the requirement of the pins. Next, position the index pin against the edge of the workpiece and slide the router base against the straightedge. Plunge down to drill the first hole. Slide the router over and insert the index pin into the first hole. Drill subsequent holes using the same procedure. You can make a jig for different shelf-pin spacing or for different-size pins.

—BAS PLUIM, Cary, N.C.



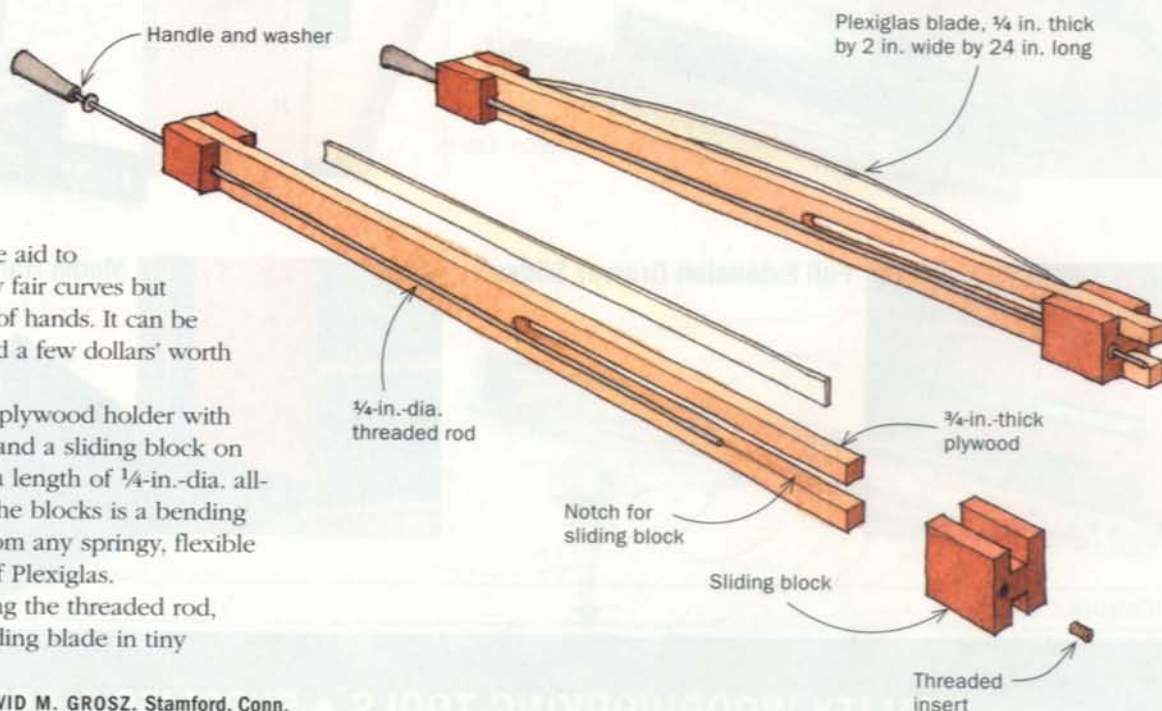
Micro-adjustable drawing bow dials in the curve

This device is an invaluable aid to anyone who wants to draw fair curves but doesn't have an extra pair of hands. It can be made from shop scraps and a few dollars' worth of hardware.

The device consists of a plywood holder with a fixed block on one end and a sliding block on the other connected with a length of 1/4-in.-dia. all-thread. Wedged between the blocks is a bending blade that can be made from any springy, flexible material. Mine is a piece of Plexiglas.

By tightening or loosening the threaded rod, you can fine-tune the bending blade in tiny increments.

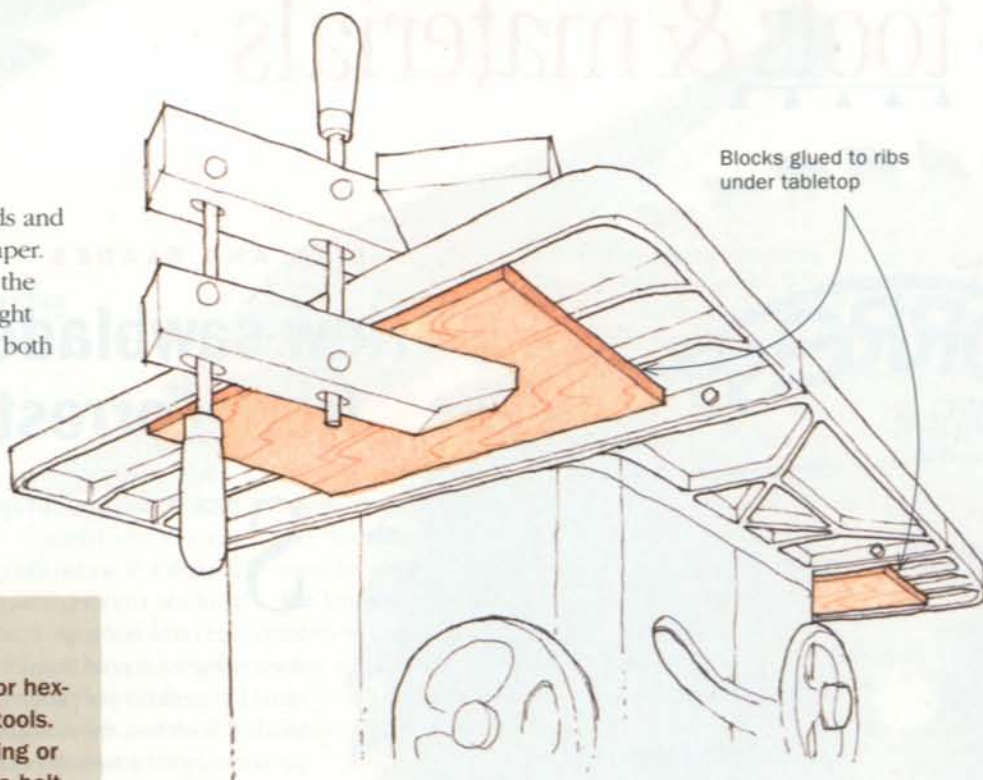
—DAVID M. GROSZ, Stamford, Conn.



Blocks improve clamping area under cast-iron machine tops

From time to time, I need to clamp featherboards and other devices to the top of my tablesaw and shaper. Both tools have cast-iron tabletops with ribs on the underside, which makes it difficult to find the right place for a large clamp. The simple solution for both machines is to glue blocks of wood to the underside of the tops to provide a level clamping surface. I used construction adhesive as the glue.

—LARY SHAFFER, Scarborough, Maine



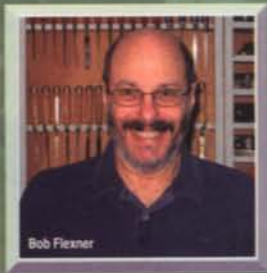
Quick Tip

I use a permanent marker to write wrench or hex-key sizes next to all the bolts on my power tools. This saves lots of time whenever I'm adjusting or maintaining the tool. I also note whether the bolt is SAE or metric so that I go for the right set of wrenches the first time.

—ANDY MISCO, Salt Lake City, Utah



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SINCE ITS INTRODUCTION in the early 1980s, Forrest's Woodworker II blade (model WW 10407125) has become something of a gold standard for general-purpose blades. So when the company announced a new Woodworker II (WW 10487125), I was anxious to try one out.

At about the same time, Delta introduced 16 new sawblades, so I ordered its new 50-tooth combination blade (model 35-1050R) and tested the two new blades together. I pitted them against the older Woodworker II for comparison.

Tooth patterns vary—The new Woodworker II has 48 teeth, compared to the 40 on the old one, and they are pointier. The alternating top bevel (ATB) profile has been increased from 15° to 25°, with the steeper angle meant to reduce chipping during crosscuts and when cutting veneer plywood and melamine.

Delta's blade has four ATB teeth followed by a flat-topped raker. The raker leaves a nearly flat-bottomed kerf, useful for grooves and dadoes. The Delta's ATB tooth angle looks closer to the profile on the old Woodworker II.

Testing—I used the blades to rip 8/4 and 4/4 poplar, hard maple, and mahogany, and to crosscut 6/4 maple. I also crosscut some birch plywood and some double-sided melamine particleboard. All cuts were made with a regular throat plate to make tearout more likely.

I found that the new Woodworker II is much more of a crosscut blade than a combination or general-purpose blade. It excelled at crosscutting maple and melamine, but struggled to rip 8/4 stock. The Delta combo blade is a solid, all-around performer, and while it didn't quite match the cuts of the old Woodworker II, represents a good value at \$80. For my review of Delta's new 80-tooth crosscut blade, go to FineWoodworking.com/extras.

—Mark Schofield is the managing editor.

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35-1050R

■ HAND TOOLS

Beefy marking knife fits the hand well

THE LARGE AND SOMEWHAT AWKWARD-LOOKING Vesper Joinery Knife demonstrates how function can win out over form. The thick, flat body will not roll off a benchtop, and it nestles well in the hand for a comfortable pencil-style grip.

Chris Vesper makes no-compromise hand tools a few at a time in his shop in Australia, using beautiful local woods. With its substantial brass ferrule and nicely executed finish, this marking knife is no exception. The thick blade is the double-bevel, spear-point type, which marks in both directions.



Top marks. The thick, spear-tipped blade cuts beautifully, and the figured Tasmanian blackwood handle is shaped to fit the hand.

The knife worked well for laying out a large set of dovetails, leaving a crisp line that was deep and clean. The flat-sided handle helped me orient the knife in my hand to keep the flat side of the blade against the tails. The tool also marked hinge mortises easily, tracking nicely with or against the grain. It's a bit large for fine inlay work, but it isn't intended for that. The only real downside is the \$60 price. To order or see more offerings from Vesper, go to www.vespertools.com.

—Steve Latta is a contributing editor.

■ ACCESSORIES

New Bessey pipe clamps raise the bar

BESSEY IS MAKING GLUE-UPS EASIER with its new "H" series pipe-clamp hardware. With a base that's taller and wider than on standard pipe clamps, these high-rise clamps provide more room for the handles and prevent you from scraping your knuckles. Plus, they're less likely to tip.

I tested 1/2-in. and 3/4-in. versions using both black-steel and galvanized pipe. The sliding jaws slid fine but didn't lose their grip when the clamps were tightened as tight as I could make them.

The clamps include plastic slip-on pads to protect the work from dents. The pads worked well in my tests with

cherry, maple, and pine. Only on butternut, an especially soft wood, did I find dents consistently.

Expect to pay about \$18 per pair for the 3/4-in. set and \$16 for a 1/2-in. set. Go to www.besseytools.com for more information.

—Retired associate editor Tom Begnal is a woodworker in Kent, Conn.



No more banged knuckles. With greater stability and an elevated handle, Bessey's new H-series pipe clamps eliminate much of the frustration associated with panel glue-ups.

HAND TOOLS

Retooled Stanley Sweethearts vary in quality

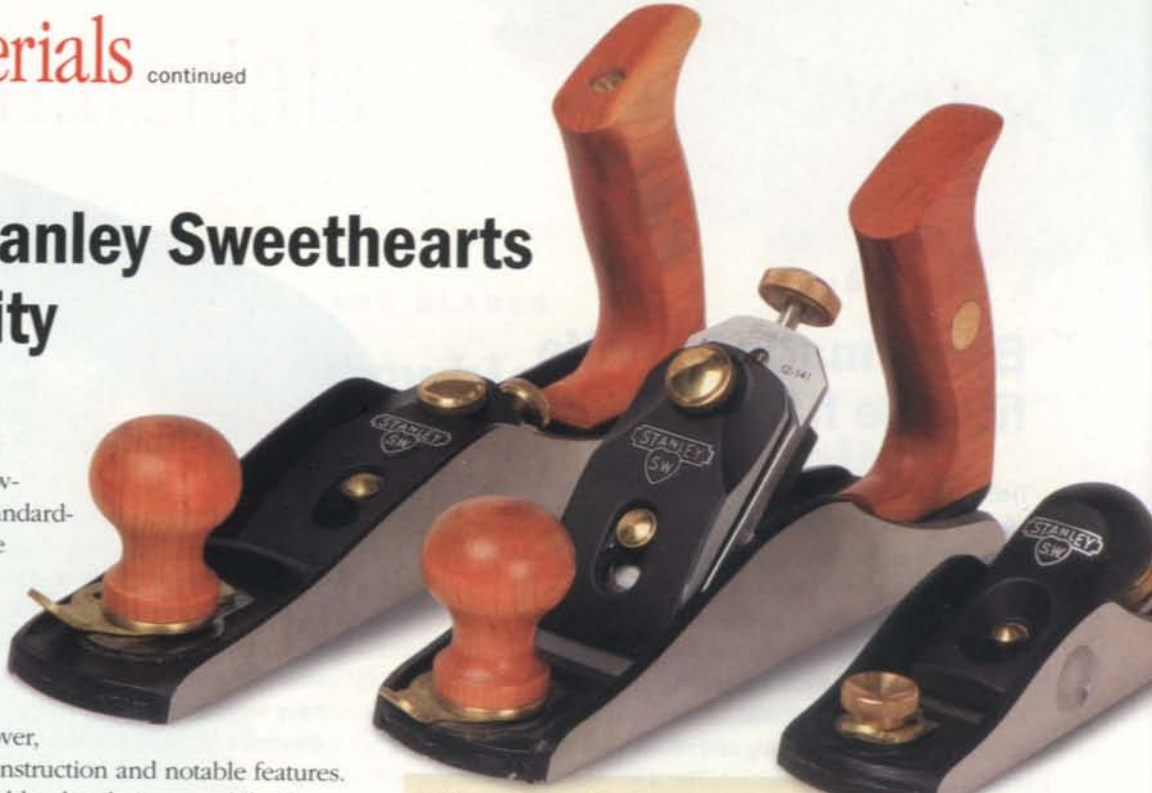
STANLEY'S NEW LINE OF PREMIUM HANDPLANES includes smoothing, low-angle jack, low- and standard-angle block, and shoulder plane models. Stanley sent me all but the shoulder plane and I put the No. 4 and low-angle jack planes through their paces. I didn't use the block planes much, but I gave them a once-over, paying particular attention to construction and notable features. All the planes are cast from durable, ductile iron, and the frog and body are made in one piece, creating a rock-solid body. The precisely milled A2 blades are ground to a 25° bevel.

No. 4 smoother—The blade and chipbreaker are a full 1/8 in. thick and make flawless contact with each other.

The plane I received had a sole that was slightly concave from side to side, but a quick lapping fixed it.

With two full revolutions of backlash in the mechanism, I found the Norris-style adjuster fussy and imprecise. A bright spot is the adjuster's innovative lateral lock, which prevents the blade from shifting during use. While the cherry knob is comfortable, the tote is large with flat sides, making for an uncomfortable grip. The

No. 4 sells for about \$180.



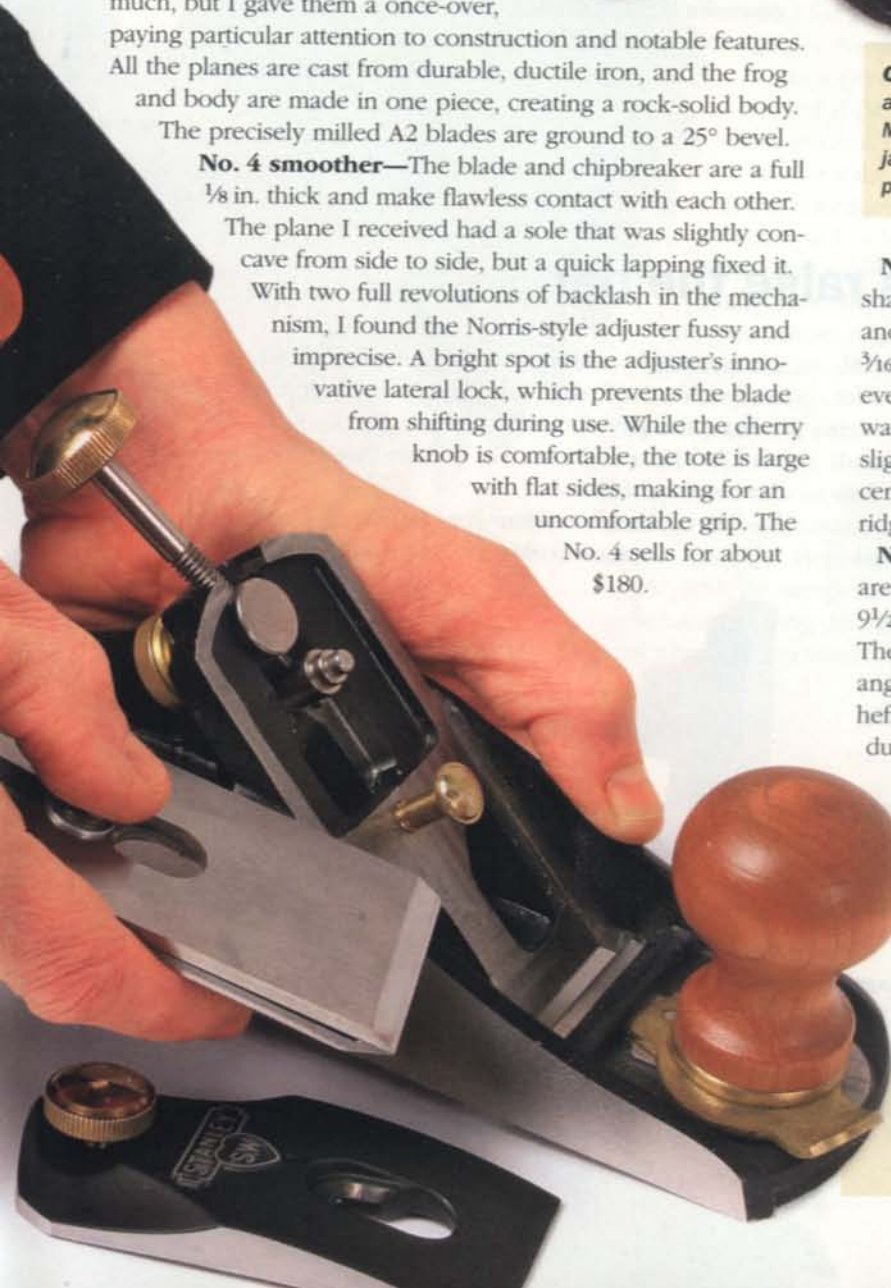
Old meets new. Stanley's new planes are trademarked with a vintage Sweetheart logo. Models include a No. 4 smoother (center), low-angle jack (left), and low-angle block plane (right). A shoulder plane and standard block plane are also available.

No. 62 low-angle jack—The low-angle jack plane (\$180) shares many of the features of the No. 4, including the handles and the Norris-style adjuster. The 12° bed receives a massive 3/16-in.-thick blade. I had difficulty getting this plane to take an even shaving the full width of the blade. Part of the problem was the bed wasn't fully machined across its width, which left slight ridges at the corners and a 0.0025 in. gap between the center of the bed and the blade. You might be able to file the ridges flat, but the process would be tedious.

No. 9 1/2 and No. 60 1/2 block planes—The block planes are available in low-angle (No. 60 1/2) and standard-angle (No. 9 1/2) models. Both have 1/8-in.-thick A2 blades and sell for \$100. The low-angle model has a 12° bed angle and the standard-angle has a 20° bed. The planes' most notable feature is their heft (2 lb.) which could reduce chatter and boost performance during smoothing tasks, but it also makes rounding edges and other typical uses more tiring. Another problem was a large gap at the throat, even when the adjustable mouthpiece was closed all the way.

Stanley's new planes have great potential, but poor machining hinders their performance. If Stanley could improve its quality control, they'd have a set of reasonably priced planes to rival the original Sweethearts. I hope they make the effort.

—Chris Gochnour is a woodworker in Murray, Utah.



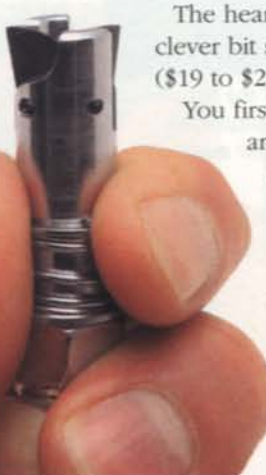
Blade is thicker than the original. The long-wearing 1/8-in.-thick A2 blade is mated to a nicely fitting, 1/8-in.-thick chipbreaker.

ACCESSORIES

Round tenons that won't let go

THE JOINT WHERE A CHAIR LEG MEETS A STRETCHER gets a lot of stress and when it breaks, a long-lasting repair is challenging. But the Insty Bit Tenon-Lok promises to make this high-stress joint stronger from the start as well as fixing old chairs for good.

A certain flare. When the Tenon-Lok bit is pushed against the bottom of a previously drilled hole, winged cutters deploy, creating the dove-tail shape that locks in the tenon.



The heart of the system is a clever bit sized from 1/2 in. to 1 in. (\$19 to \$22) with two spring-loaded cutters.

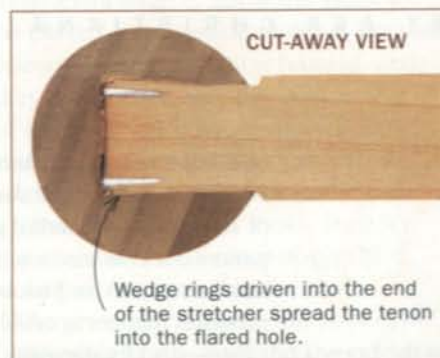
You first drill a straight, flat-bottomed hole, and then use the Tenon-Lok bit to flare the bottom. A sharpened piece of steel tubing, called a Wedge Ring (\$5 to \$8 for 12), is driven in as the stretcher is pounded home, creating a dovetailed tenon that locks inside the flared hole. Seating the wedge ring requires some force, but once you do, your chair will stand up to just about anything.

—Ernie Conover is a woodworker in Parkman, Ohio.



INSTY BIT TENON-LOK

Bits: \$19–\$22, Rings: \$5–\$8 per dozen; www.rockler.com



CUT-AWAY VIEW

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READER SERVICE NO. 52

How woodworkers tame tearout

ZERO-CLEARANCE TRICK APPLIES TO ALMOST EVERY TOOL IN THE SHOP

BY ASA CHRISTIANA

Wood is an amazing material, widely available in all sorts of colors, with beautiful grain patterns. It cuts easily with small machines and tools—products that are accessible to the home craftsman—and its strength-to-weight ratio rivals high-tech materials. But it *is* organic, and therefore comes with some strings attached.

One is movement, and there is no stopping it. The other is tearout. A budding hobbyist soon encounters splintered edges and pockmarked surfaces, damage that grows more obvious when finish is applied. It happens with almost every tool in the shop. The good news is that it can be stopped, in most cases easily.

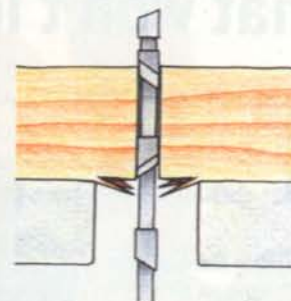
Tearout happens when wood is cut and its plant fibers aren't held firmly in place. There are two main types: One happens when wood is cut across its grain, and the other when the surface is planed. I'll start with crosscutting, which is the easiest to handle.

Crosscut with no worries

Ripping happens along the grain, and generally causes little to no tearout. The few long fibers involved simply shear away from each other. But crosscutting applies pressure across every fiber in a board. That's fine through most of the cut, but near the bottom or back edge, the last few fibers have nothing behind them and would much rather splinter away than be sliced through. On most tools,

Two main types

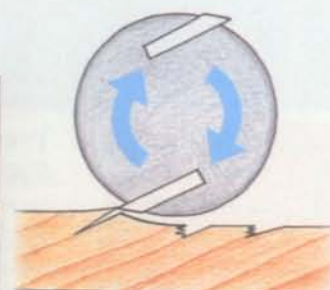
TEAROUT FROM CROSSCUTTING



Chip off the old block. At the bottom and back edge of a cut, unsupported surface fibers tend to splinter away, leaving a ragged surface.



TEAROUT FROM PLANING



Scarred surface. Jointers, planers, and handplanes can lift surface fibers and break them instead of cutting them cleanly, leaving pockmarks in the surface.



Zero clearance for tablesaws



Replace your tablesaw insert. A zero-clearance throat plate helps control tearout by supporting the fibers on the bottom of a workpiece.



Add support to your miter gauge, too. A hardwood or MDF fence screwed to the front of the miter gauge will prevent the wood from splintering at the rear of the cut.

CROSSCUT SLEDS



Also works on sleds. Clamp a piece of $\frac{3}{4}$ -in. MDF to the fence and tack down a sheet of $\frac{1}{4}$ -in. plywood. Then cut a new slot to match the crosscut or dado you plan to make.



there is nothing there to stop them.

Manufacturers build those tools to make both square and angled cuts, so the opening in the table or fence needs to be extra large to allow the blade to be tilted. Carpenters don't mind, because tearout doesn't matter on framing, and they usually can hide the bottom side of a trim- or deck board. But furniture makers can't always hide a splintered edge, and they quickly learn to close up that big gap with a "zero-clearance" plate, usually just a piece of plywood tacked or clamped onto the tool.

The principle is always the same: The blank plate is attached, and the sawblade is used to cut a kerf through it. Then, when wood is crosscut on top or in front of that plate, the lower or back edge is supported completely on both sides of the blade. Granted, that plate will need to come off or be replaced for angled cuts, but most cuts are at 90° .

Saws are simple—On tablesaws, you should replace the throat plate (the one with the big slot) with a blank plywood one for all square cuts (See Fundamentals: "Get safer, cleaner cuts on your tablesaw," *FWW* #200). But you can use a zero-clearance plate on the miter gauge fence, too, to support the back edge of the cut. This is nothing more than some plywood or MDF (medium-density fiber-board) screwed to the existing fence.

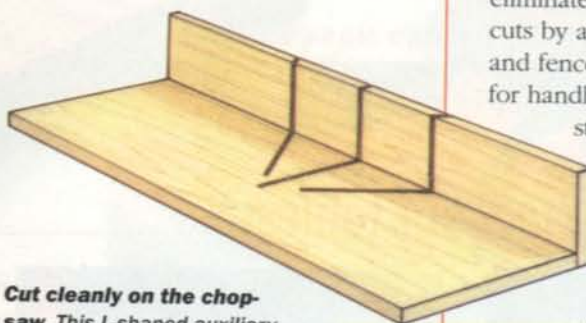
The same goes for any crosscut sled you build for the saw: You can tape or tack sacrificial surfaces onto the base and the fence. Don't use thick pieces on the base; you'll steal too much of the blade's height capacity. Later, when the zero-clearance slots on these plates get beat up by angled cuts or different-size blades, you just attach new

Zero clearance for other tools

MITER SAW



Cut cleanly on the chop-saw. This L-shaped auxiliary table supports the bottom and rear of the stock when cutting small parts.



ones. On miter- and chopsaws, you can eliminate tearout on both square and 45° cuts by attaching similar plates to the bed and fence. The principle even holds true for handheld power tools. A shopmade straightedge jig for a circular saw uses the same zero-clearance idea to eliminate tearout on at least one side of the cut, where it matters most.

Same deal for drill presses and router tables—Although

these don't exactly crosscut wood, they cut across the fibers in a similar way. And you use the exact same treatment.

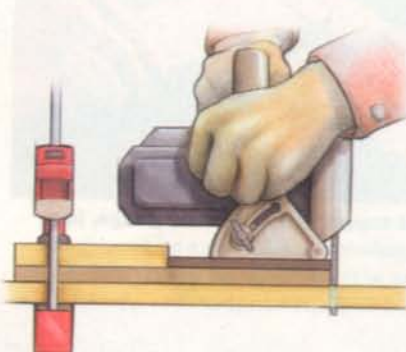
Most drill presses have a big hole in the cast-iron table to accommodate the largest drill bits. Without a backer board under your workpiece, you'll get terrible blowout on the bottom side of the hole you are drilling. A simple piece of plywood or MDF prevents this. Just move it around to get a solid surface under each new hole.

On router tables, the force of the spinning bit is horizontal, so you will sometimes need a zero-clearance plate on the fence, but almost never in the table. There are a number of ways to do it: Make the whole fence sacrificial and replaceable, attach a thin blank plate to the fence, or design a fence with replaceable inserts.

CIRCULAR SAW



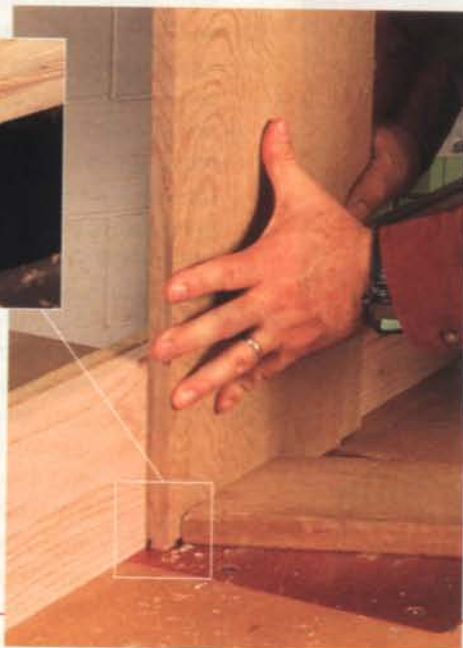
Get straight, square edges without splinters. A shopmade cutting guide keeps a handheld circular saw on a straight line. The MDF base helps support the fibers on the top surface, where the blade exits the cut.



ROUTER



Bury the bit in a sacrificial fence. A clean cut is crucial for delicate joinery like these sliding dovetails. Attach an extra board to the fence, then pivot the assembly into the spinning bit.



Torn fibers vs. a clean cut. The zero-clearance fence supported the wood adjacent to the cut on the lower piece, preventing tearout.

Surface tearout is trickier

Jointers, planers, and handplanes all can create nasty tearout in wood surfaces, especially when they hit grain that changes directions. But the power tools require a different approach than the hand tools.

I don't believe there is a way to use the zero-clearance principle on the jointer and planer (it's difficult to get support close to the spinning cutterhead), but there are

other ways to reduce tearout. Cut with the grain as much as possible. If you are getting tearout, try reversing direction. Also, try replacing dull knives with sharp ones. Sometimes it also helps to dampen the surface with water before sending the board through. Handplanes, on the

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Strategies for surface tearout

Pay attention to grain direction. On the jointer, the edge grain should run downhill toward the rear of the board. On the planer, the downslope should point to the front of the workpiece.

BEFORE

AFTER

JOINTER

Grain direction

PLANER

Grain direction

other hand, do benefit from the zero-clearance principle, or, more accurately, the tight-clearance principle.

The force of the blade tends to pry fibers upward, while the plane's sole holds them down. A tighter blade opening puts the sole closer to the front of the blade and prevents the fibers from lifting during the cut. For the final, critical passes on a board, resharpen the blade, set it for a fine cut, and adjust the mouth to a very tight opening.

Depending on the plane, you either adjust the frog forward or adjust the toe of the sole backward to close the mouth. And on planes with a chipbreaker, it helps to place it as close as possible to the tip of the blade, so it applies additional downward pressure on the chip as it curls it, fighting its tendency to tear upward.

Last, when tearout is unavoidable, use scrapers and/or sandpaper to work past it and produce a flawless surface. □

TIP

DAMPEN THE BOARD
Dampening the face of the board softens the surface fibers slightly, making them easier to cut and less likely to tear out.

HANDPLANES

HOW TEAROUT HAPPENS

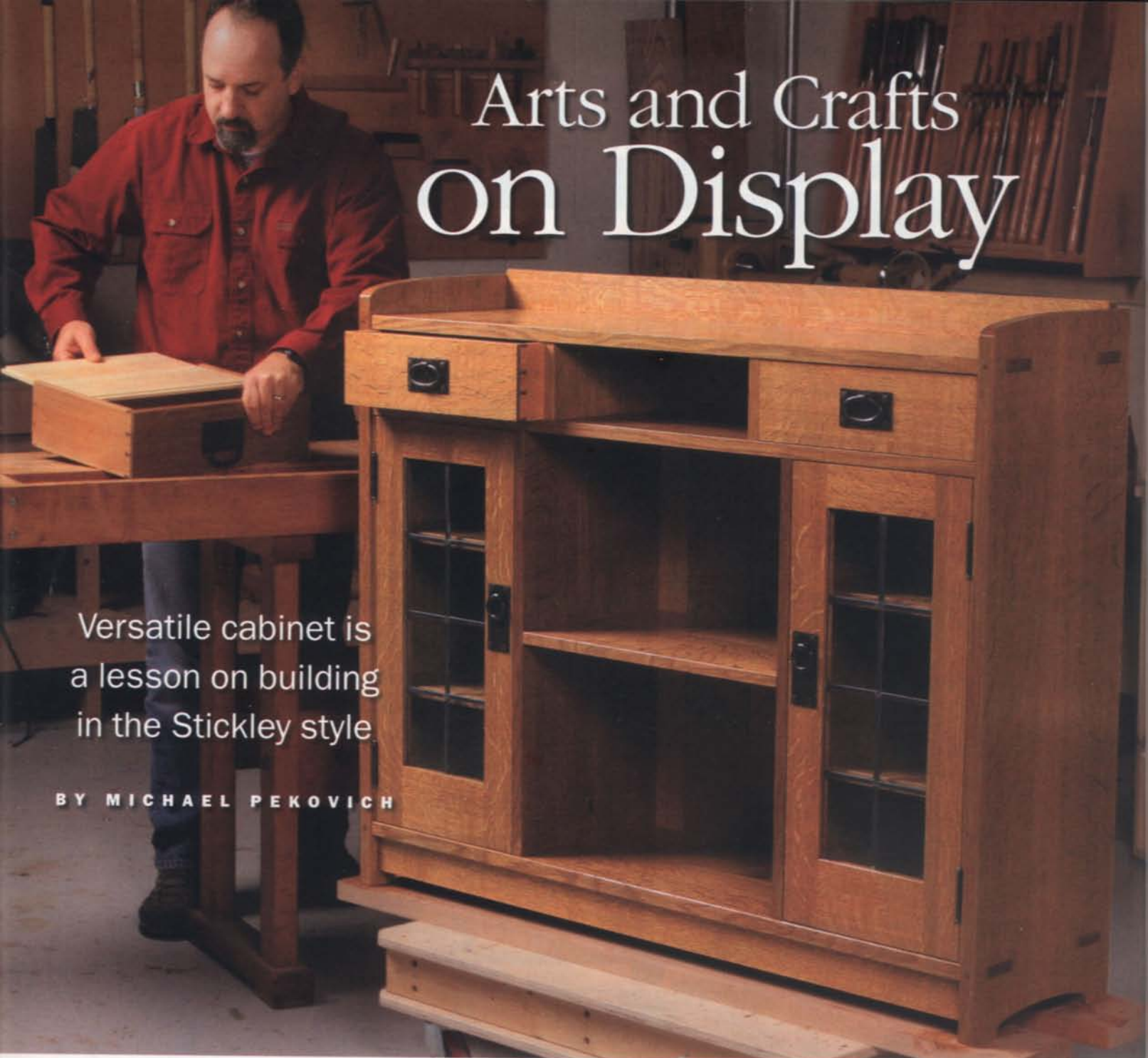
SET UP THE PLANE FOR A CLEAN CUT

Move the frog (blade carriage) forward to create a tight mouth opening. For fine cuts, open the mouth $\frac{1}{64}$ in. to $\frac{1}{32}$ in.

The goal. A properly set up handplane with a sharp iron should produce thin, fluffy shavings like these and a glassy surface with no tearout.

If the mouth is set too wide, there is nothing to hold down the wood fibers, allowing cracks to travel forward, deep into the surface.

When the plane's mouth is tightly set, the sole holds down the wood fibers in front of the cut. The iron shears them off cleanly.

A man with a beard, wearing a red button-down shirt and dark pants, is working on a wooden cabinet in a workshop. He is standing to the left of the cabinet, which is made of light-colored wood with glass-paned doors and drawers. He is holding a wooden box. The background shows a workshop with various tools and wood pieces.

Arts and Crafts on Display

Versatile cabinet is
a lesson on building
in the Stickley style.

BY MICHAEL PEKOVICH

Simple is not always easy. Take Arts and Crafts furniture. Woodworkers fond of the style—with its beefy parts, rectangular lines, and exposed mortise-and-tenon joinery—may think the furniture is easy to make. But this simple form is unforgiving of mistakes. Make one slip-up in proportions, hardware choice, or finish, and the design falls down. I've been building Arts and Crafts furniture for a long time, and I've worked through the challenges in making a piece that's true to the style.

This case piece is an original design, yet it would not be out of place in an antique Stickley catalog. With its quartersawn white oak, exposed joinery, fumed finish, and hand-hammered hardware, it breathes Arts and Crafts. The leaded-glass doors are typical, too, and add to the handcrafted look. You can have panels

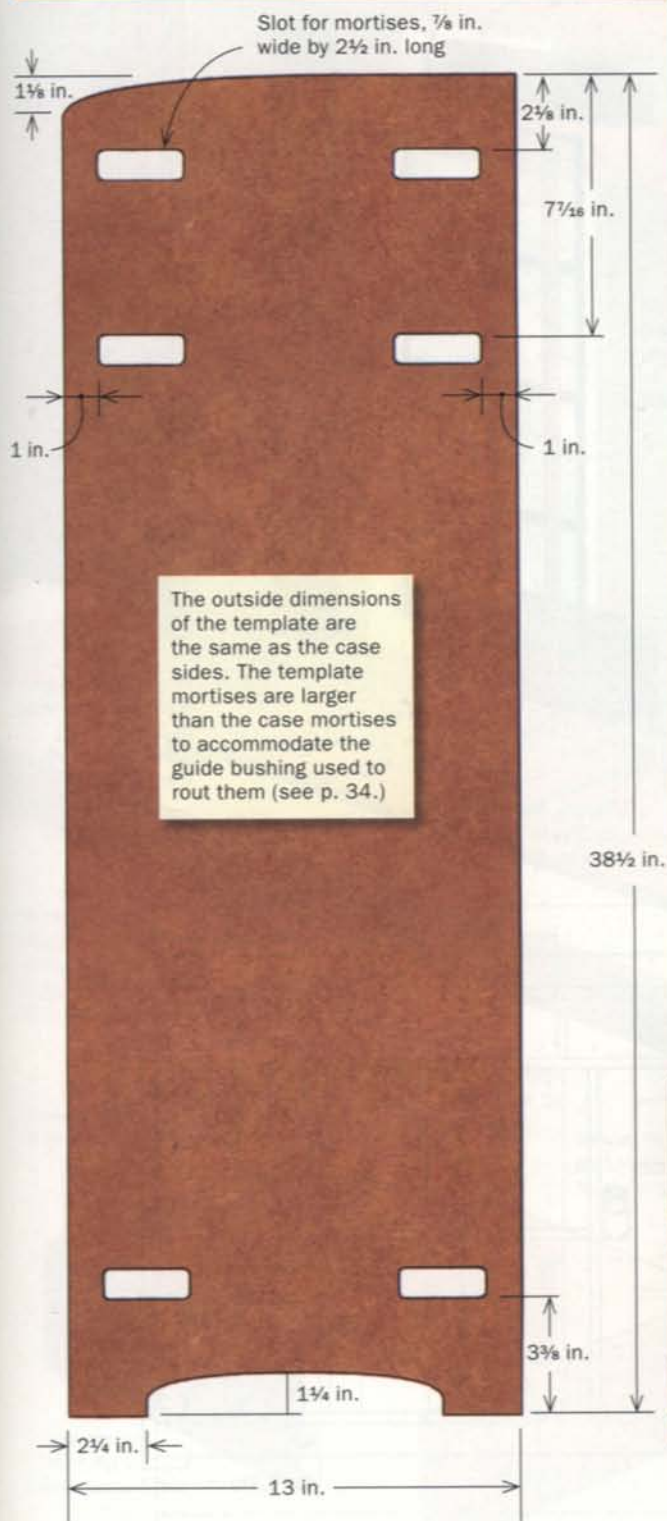
made by a local artist or you can make them yourself (to learn how, see Master Class, p. 88). If you are interested in building in this style, I hope you'll find a few valuable lessons here. Also, this piece is a versatile one: I designed it to hold books and cherished items, but it could work as a sideboard, too.

When building an Arts and Crafts piece, the most important step is to choose good wood. The tight grain and magnificent ray fleck of quartersawn oak is the primary ornamentation, so don't skimp on the lumber. I found some great boards online that I supplemented with lumber from a local yard (see "10 Tips for Mail-Order Lumber," p. 66).

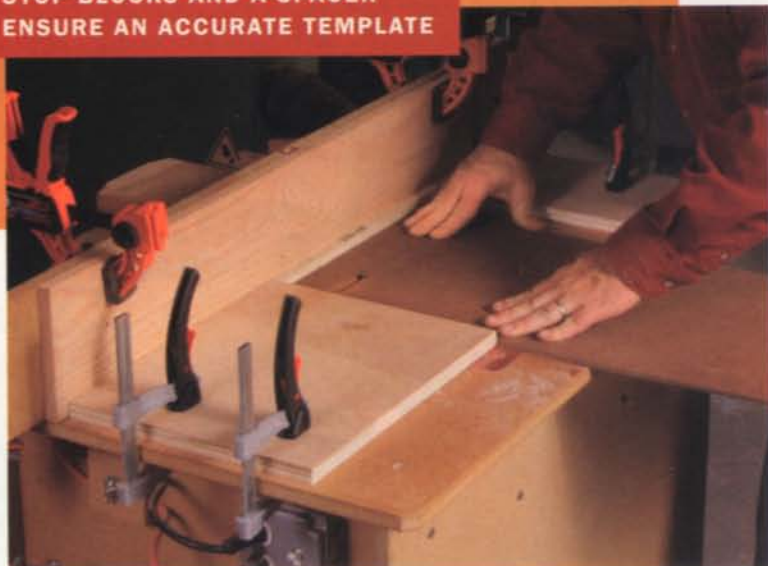
With a large project like this, I start from the outside and work my way in because it's easier to build the case first and fit the

Full-size template simplifies the sides

To cut matching mortises that align perfectly, make a full-size template from $\frac{3}{4}$ -in.-thick MDF. The template is quick to make using a $\frac{3}{8}$ -in. straight bit on the router table.



STOP BLOCKS AND A SPACER ENSURE AN ACCURATE TEMPLATE

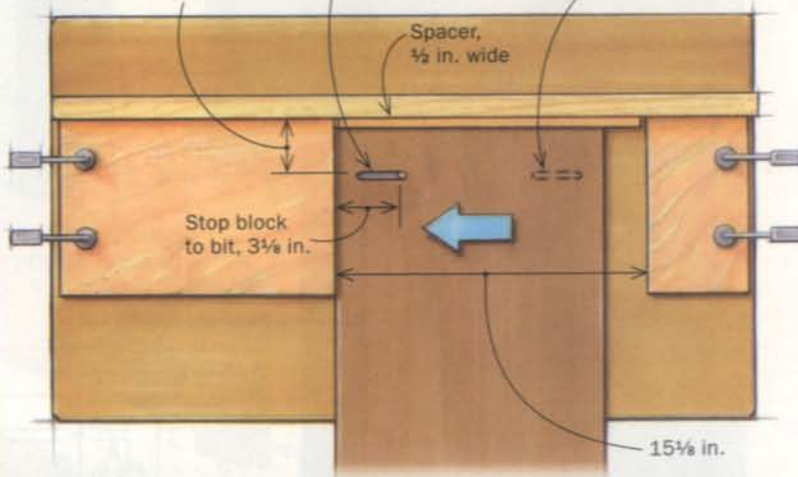


First cuts. Clamp stop blocks on both sides of the bit for the stopped cuts. With the spacer in place (see drawing below), plunge through the template and make one pass in the first mortise slot. Just flip the template to do the opposite slot.

Fence-to-bit distance:
Top mortises, $2\frac{5}{8}$ in.;
divider mortises, $7\frac{15}{16}$ in.;
bottom mortises, $3\frac{3}{8}$ in.

1. Drop the template onto the bit and make the first pass.

2. Flip the template and rout the second mortise.



Second cuts. After the first passes, remove the spacer between the fence and template and finish routing the mortise slots. Adjust the fence and repeat the process for each set of mortise slots.

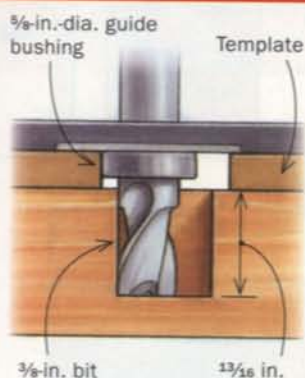
ORIGINAL PIECE, TRADITIONAL DESIGN

In Arts and Crafts furniture, it's all about the wood and small details. The tight grain and magnificent ray fleck of quartersawn oak is the primary ornamentation. To give the piece a solid feel without being clunky, Pekovich varied the thickness of the parts. The sides are a full inch thick, the top and bottom are $\frac{7}{8}$ in. thick, and the remaining interior dividers are $\frac{3}{4}$ in. thick. Also, each piece is slightly inset from the other, creating subtle shadow lines.

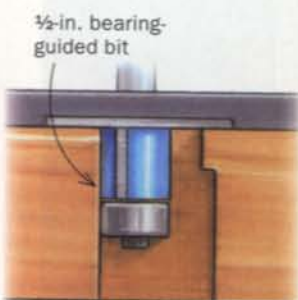


Case joinery

THROUGH-MORTISES WITHOUT MESS-UPS



Start on the inside face. To make it easier to hold the workpiece and template, Pekovich uses an elevated clamping table. A bushing guides a spiral upcut bit.

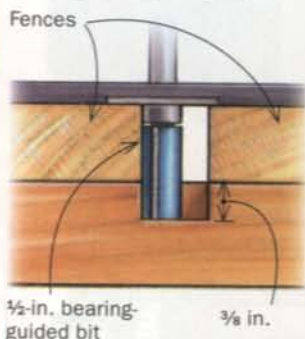


The Paolini trick. To complete the through-mortises with no tearout, Pekovich uses a trick he learned from Greg Paolini. Drill a hole through each mortise (right), flip over the piece, insert a bearing-guided bit in the hole, and rout out the remaining waste (far right).

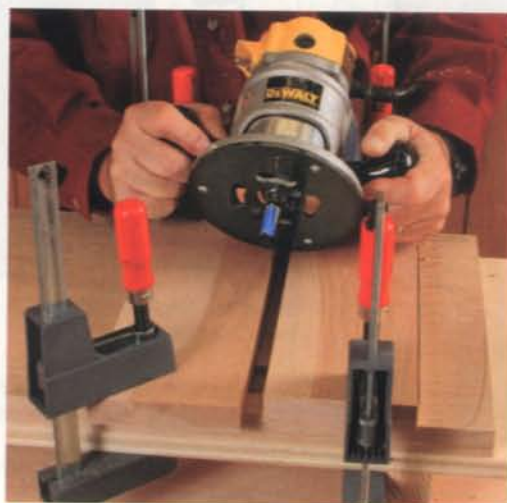


TIP

Place tape over the divider mortises so you don't drill through them accidentally.



Connect the slots. To rout the shallow dadoes that connect the through-mortises, clamp fences on both sides of the mortises, and use a top-bearing-guided bit.



interior dividers after. The top and bottom of the case attach to the sides with through-tenons. To help keep the case square and the wide boards flat, I added a stub tenon between the through-tenons.

The through-tenons are prominent features of the design, so you must get them right. For clean cuts and no gaps, I fitted the router with a guide bushing and straight bit and cut the mortises using a full-size template (see drawing and photos, p. 31). Then I cut the dadoes between mortises for the stub tenons. Finally, I squared up the mortises with a chisel.

To cut the remaining mortises for the backslash and the lower apron, attach a fence to the router and use a spiral upcut bit. Then square them with a chisel.



Dado blade does most of the work. After cutting the tenon cheeks and shoulders with a dado set, cut the through-tenons to width, using a tall fence to support the board. The scrapwood behind the tenons backs up the cut and reduces tearout.

TWO-PART TENONS

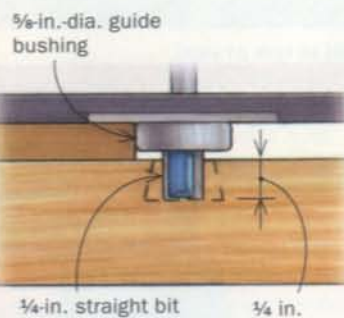
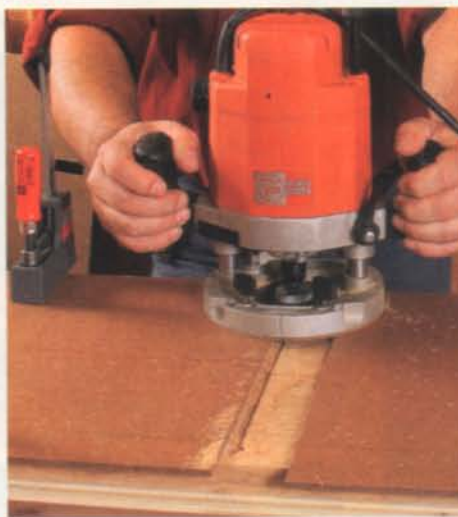


Saw off the stub tenon. Use the bandsaw to cut the stub tenons to length. The fence ensures a parallel cut.



SLIDING DOVETAILS MADE EASY

Use a fence to guide the slot cuts. To ensure that the dovetail slots are parallel, clamp an MDF fence to the workpiece to steer the router's guide bushing.



Remove the waste. Drill a 1/2-in.-dia. hole at the stopped end, then rough out the slot using a 1/4-in. straight bit. The 1/4-in. piece of MDF opposite the fence prevents the router from tipping.

Once the mortises have been cut, cut out the foot recess and profile the tops of the sides. Clean up the cuts with a block plane, a spokeshave, and files. The last task is to drill holes for the tenon pins. For this, I used a doweling jig to help keep the bit aligned.

Crosspieces must line up shoulder to shoulder

Now it's time to cut the tenons on the top, the bottom, the horizontal divider, the back splash, and the apron. These parts have three different tenon lengths among them, but they all have the same shoulder-to-shoulder length. To ensure the case remains square, it is critical to get this dimension exactly right.

To help, I use a trick I learned from contributing editor Steve Latta. Cut the parts all the same length,



Final cut. Use a 1/2-in. dovetail bit to finish the slot. The hole at the end of the slot lets you drop the bit into the cut before turning on the router. The hole will be hidden by the divider.

Glue-up without screw-ups

The case glue-up involves eight pieces. That many solid parts can be a pain to assemble and align during a single glue-up. So assemble the piece in stages.



Backsplash and apron first. Dry-fit the case to ensure proper alignment when gluing the backsplash and apron to the case top and bottom. These parts will help keep the case square in the later stages.



Top, bottom, and sides. Use grooved clamping cauls over the through-tenons to get pressure where it's needed (above). Place the case on T-supports to make clamping easier (right). Be sure to keep glue off the ends of the through-tenons.



VERTICAL DIVIDERS



Rout the dovetail keys. After cutting the dividers to length, use the dovetail bit to cut the keys. A tall fence supports the long boards and a featherboard keeps the piece snug against the fence.



Long sliding dovetails with no binding. The trick is to slide in the dividers from the back almost all the way without glue, leaving about 2 in. exposed, and then apply glue to that exposed end and into the slot at the front. Now you can drive the divider home with a mallet.

and then cut the tenon shoulders using the same setting on the tablesaw. Test the fit, and then trim the through-tenons to width. Next, cut the stub tenons to length using a bandsaw. Once you're sure everything is fitting well, trim the through-tenons to their final length and chamfer their ends.

Now rout the slots for the stopped sliding dovetails that connect the vertical dividers to the top, the bottom, and the horizontal divider. Then cut the rabbets in the sides and top for the back panel.

Assembly: Keep it square

It's critical that the case remains square as you assemble it. Otherwise, you'll be fighting to fit the doors and drawers. To simplify the glue-up and to help keep the case square, I first glued the backsplash and apron to the case top and bottom, respectively. Then I glued up the sides, top, and bottom.

After the glue is dry, drill holes through the tenons and dry-fit the pins. Cut the pins to length and chamfer the exposed end of the pins before gluing them in.

Once the case is assembled, cut the vertical dividers to length and rout the dovetail keys on the ends, using the same dovetail bit used to rout the slots. After installing

the dividers, cut and fit the shiplapped back panels.

Build the drawers and doors

With the case glued up, it's time to build and fit the drawers and doors. All three drawer fronts are cut from one board for continuous grain and color. Original Stickley pieces typically use white oak for the drawer sides as well, but I chose beech because of its dense, fine grain.

The doors are rabbeted for simple leaded-glass panels (see Master Class, p. 88). I wanted them to be inset $\frac{5}{16}$ in. from the front of the case, which means I couldn't hinge them directly to the case sides. So I added $\frac{1}{4}$ -in.-thick hinge strips to the inside of the case, inset $\frac{1}{4}$ in. from the front edge. The strips provide clearance for the doors to open, and it's easy to cut the hinge mortises prior to installing them.

Details that would make Stickley proud

No matter how true you are to the Arts and Crafts ideals when you build a piece, you can kill the design if you choose the wrong hardware or mess up the finish. For this piece, I chose traditional hand-hammered hardware (see Sources, below) and fumed the wood before applying a topcoat. Fuming may intimidate people, but I've developed a low-tech method (for details, see the story at right).

After fuming, I warm up the wood with a coat of garnet shellac. Then I switch to Waterlox, a wipe-on tung oil varnish. The last step is to rub out the finish with steel wool and apply a dark wax. This fills the open pores of the oak and pops the rays.

Now screw on the back slats, add the glass panels to the doors, install the traditional hardware, and the piece is ready for your living room. □

Michael Pekovich, Fine Woodworking's art director, is also a professional furniture maker.

SOURCES OF SUPPLY

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Gustav Stickley large O-Drawer Pull
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Fumed finish made easy



Fuming wood involves exposing it to ammonia fumes, which react with tannins in the oak to darken its color. The longer the wood is exposed, the darker it becomes.

Most people build a complicated tent to house the workpiece and contain the ammonia fumes. But I just drape plastic sheeting over the piece. It works as well as the tent and makes it easier to take the cover off the ammonia once it's safely inside. The sheeting also makes it easy to remove sample blocks to check the finish.

Though my method is low-tech, I still treat the ammonia carefully because it's a toxic chemical that can damage your lungs, skin, and eyes. Be sure to set up the fuming area in a low-traffic, well-ventilated area. Wear goggles and gloves when you're pouring it, and be sure to wear gloves when you take the lid off the container once it's under the plastic. Also, when you remove the sheeting, it's a good idea to run a fan in the space to help ventilate the area. The good news is that the fumes dissipate quickly.

Respirator not required. Drape plastic sheeting over the piece as a tent. Then put the ammonia in a covered container and slide it under the tent. Wear gloves when you reach under the cover to remove the lid.



How to dial in the color. The effect won't be apparent until finish is applied, so it's a good idea to throw in a few sample blocks, remove them at hour intervals, and wipe on some finish to preview the final effect.



Warm it up. Fuming imparts a greenish-gray cast to the wood. Pekovich warmed up the look with a coat of garnet shellac prior to applying Waterlox. He rubbed out the finish with steel wool and brown wax made from melting Kiwi brown shoe polish into paste wax using a double-boiler setup.

The Right Way to

Make your furniture stand out by combining different grain,

BY GARRETT HACK

Contrast can add drama to any design. The Egyptians understood this when they embellished their furniture with ivory, ebony, and gold. It's why craftsmen working in the Biedermeier style highlighted golden birch surfaces with dark details and moldings. Even the Shakers combined bird's-eye maple drawer fronts with cases made from quieter woods, and used bright contrasting washes of reds, yellows, and blues on some parts.

Figure, grain, and color can all create contrast, but a little goes a long way. The challenge is to understand what type of contrast to use and where to use it. Overdo it and the effect will be garish or gaudy. Keep a few principles in mind, and you'll take your work to another level.

Go figure

Two types of the same wood can provide all the contrast a piece needs. In this table by Michael Pekovich, FWW's art director, contrast is created by the different figure in the bird's-eye maple and curly maple.



Big areas, mild contrast

When using contrast in big doses, make the contrast more subtle.

Subtle is good

For this Arts-and-Crafts-style blanket chest, Jeff Dilks of Washington state combined a frame of quartersawn white oak with panels of European beech. The lighter beech works well with the slightly darker oak, and the oak's more pronounced grain and figure complements the subdued grain of the beech.



Age can be your friend

When Hack made this table, the figured maple and pearwood seemed quite different (left). Over time, however, the woods changed, becoming more harmonious (above).



Use Contrast

figure, and colors. Just don't overdo it

When introduced to the broad spectrum of beautiful woods, many budding furniture makers overdo it. But broad swaths of highly contrasting wood can shout instead of sing. The first rule is to choose woods that relate well together, such as maple and cherry. The photos on pp. 42–43 show 15 combinations, good and bad.

Unless you are doing marquetry, you should use no more than three or four woods in a piece (secondary woods that don't show don't count). With too many contrasting materials, the piece will have no focal point. One wood (or two if they are similar) should dominate. Hierarchy is important; use the boldest wood to deliver emphasis where you want it. A little goes a long way, particularly with high-contrast combinations such as holly and ebony. I reserve them for small inlays or flourishes. Too many different materials or large areas that stand out boldly can be hard to take. Even if

Sing, don't shout

Purple is an uncommon wood color that's too different from the golden-blond tones of maple, at least on this piece. Padauk or redheart are similarly gaudy and don't pair well with maple.



Use a hierarchy of woods

On this William and Mary highboy, Miguel Gomez-Ibanez combined cherry, madrone, Carpathian elm, and bloodwood. Note how he used color and grain to draw the eye to the drawers first.



Take a breather

When using large amounts of highly figured wood, balance it with less dramatic, neutral areas. In this writing desk by Don Green of New York state, a dyed-mahogany base balances and offsets the strong shape and bold grain of the sapele top.

Save high contrast for small touches

Highly contrasting woods are best for smaller details, working to break up large surfaces and draw the eye to the form and lines of a piece.



The power of one

Gerald Curry of Maine added several original touches to this traditional demilune table, including the curly-maple accent that plays up the scalloped shape of the apron. It shows how restrained use of one contrasting element can have a huge impact.

that's the intent, give the viewer some quiet areas to retreat to—areas that use a bland grain or a neutral color.

Use contrast as a road map

Mixing dark and light woods makes both seem brighter or more intense. The viewer's eye is drawn to this difference, which is useful if you want to accentuate some area of a design, such as the shaped edge of a light wood table outlined in ebony, or a door panel highlighted with wood of dramatic color or figure. I like to play with this idea by embellishing legs or table aprons with string inlay. These fine lines of contrasting color act almost like the center line of a highway to guide the eye.

The stronger the difference in color or figure between the parts of a piece, the more each stands out from the parts around it. For example, you can visually separate a tabletop from the base by making it a distinctly different color or material. I like to use contrast at transition points. The contrasting element need not be large, just bold enough to be noticed. At the cuff of a leg, for example, where I often start a secondary taper, I'll inlay a banding of ebony and holly. A waist molding between two



Small but bold flourishes

Hack used jet-black ebony and pure-white holly in small doses on this cherry table. Quarter-fans and stringing decorate the top, and black-and-white stringing works with a flame-birch panel to emphasize the shape of the legs.



Mark transitions

In this sideboard, Hack used contrasting woods at transitions. A thin ebony bead defines the bottom of the case and outlines the shape of the center drawer. Holly-and-ebony cuffs near the bottom of the legs mark a change in the angle of the taper.

cases can stand out in the same way. A dark inner molding around a door frame creates a frame within a frame.

Allow for aging and consider the finish

Over time, many woods fade or darken to some shade of brown. That can frustrate your desire to produce a piece with lasting contrast. Although tropical hardwoods hold some color, the purples and reds, darks and whites of most woods don't last. Where you want lasting impact, use contrasting woods that don't fade much, like holly and ebony.

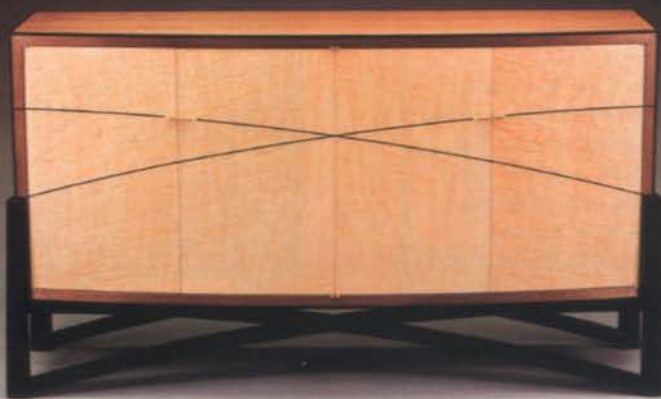
Finally, don't ruin good contrast with poor surface prep or finishing. Scraping and planing are better than sanding, which generates color-muddying dust. A sealcoat of thin, clear shellac can prevent dark colors from bleeding into lighter ones. To spot problems early, test finishes on sample boards. If bleeding seems to be a problem, give the lighter wood a couple of light sealcoats. All finishes tend to yellow over time, but lacquer and water-based finishes tend to yellow very little. They're the best choices for preserving contrast.

Garrett Hack is a contributing editor.



Define structure

California furniture maker Roger Heitzman used ebony accents on the base, the legs, and the stretcher to draw the eye to the structure of this table and help define its form.



Outlines and accents

For this sheet-music cabinet, Canadian furniture maker Christopher Solar used darker woods in the case to frame the curly-maple veneer of the door panels. Edge-banding further defines the shape of the case. And curved inlay draws the eye across the doors to the handmade brass pulls.

Contrasting woods: A slightly arbitrary guide

Use the samples shown here as a starting point. Some of the contrasts are color-related. With others, the grain or figure provides the contrast. In a few instances, I've added a bead in a third wood to play off the other two. Try not to take the pairings too literally. For example, even though one photo shows a mahogany frame and a cherry panel, you could swap them. Be careful, though: It's often nicer to have darker woods frame lighter ones. You can also try woods that are similar to the ones shown; several of the captions list possibilities that may be less expensive or more readily available.

Not-so-perfect pairings

PURPLEHEART, MAPLE

A typical frame has almost as much surface area as its panel. So the very high contrast between the maple and purpleheart is overwhelming. Padauk or redheart also don't work well with maple.



MAPLE, WALNUT

Over time, the maple darkens and this can be a handsome pair. But initially, a light maple frame intensifies the dark walnut panel, making the frame seem to disappear.



CHERRY, WHITE ASH

White ash has a strong grain that remains prominent even as the wood darkens over time. That makes for a jarring combination with cherry's subtler grain. Red oak also has prominent grain and tends to overpower some woods.



Happy couples

CHERRY, MAPLE

Over time, this combination works very well. The amber in the aged maple balances the dark browns and deep rust tones of the cherry. Both woods have mild grain.



RED OAK, WHITE ASH

These strong-grained, golden-hued woods have similar visual strength. Also consider white oak or elm with either of these woods.



BUTTERNUT, BLACK WALNUT

The warm, golden color of the butternut contrasts well with the walnut's deeper chocolate brown. An ebony bead adds an interesting accent.



BEECH, QUILTED YELLOW BIRCH

These woods make a powerful combination that ages well. Both woods are blond, with understated grain and fine, dense surfaces. Bird's-eye maple or curly maple would also work well with either of these woods.



MAHOGANY, CHERRY

Rich red coloring and subtle grain help these woods complement each other. Leaving the mahogany pores unfilled creates additional contrast, in surface texture. An ebony or rosewood bead would enhance the pairing.

**MAHOGANY, CURLY MAPLE**

The golden hue of the maple lights up against the reds and browns of the mahogany. The rippling curly maple figure adds further interest. Satinwood also contrasts well with mahogany—it's a traditional, high-style pairing.

**ZEBRAWOOD, BUTTERNUT**

The color of both woods is a combination of golden browns and lighter hues. Darker streaks in the zebrawood play off well against the mild grain lines in the butternut.

**CHERRY, SYCAMORE**

Quartersawn sycamore has dark flecking, which works well with the grain lines in the cherry. A quilted-birch bead would add further contrast with both color and figure. Beech would also provide interesting contrast with sycamore.

**CHERRY, MACASSAR EBONY**

Black is always elegant and hip. The brown and reddish streaks in the ebony play off nicely against cherry's deep, rich reds. Rosewood also works well against cherry.

**WENGE, WALNUT**

These woods share a dark chocolate-brown color and subdued grain. A rosewood bead, with its deep reds and streaks of black, adds a bit more contrast. Mahogany's warm reds and browns would also contrast nicely with walnut.

**PEAR, BEECH**

The pink tones in pear contrast nicely with the colors in beech. Flecks in the beech show up well against the uniformly smooth appearance of the pear. Both woods age to similar warm colors. Maple, either plain or figured, would be a good alternative to beech.

**BIRD'S-EYE MAPLE, TIGER MAPLE**

You don't need different wood species to get a striking contrast. These light woods age to an amber color, and the combination delivers understated elegance. An ebony bead makes an elegant outline.



Perfect Hinges Every Time

Built around the hinge, this routing template is fast and flawless

BY DOUG STOWE

Traditional methods for installing butt hinges involve a good deal of precision layout, and that means plenty of chances to make a mistake. I've made many, like cutting the hinge mortise too deep or too long. Fortunately, I've found a better way to make precise mortises for any hinge: I rout them, using a flush-trimming bit and a quickly made jig.

There's nothing tricky about the jig. It's just a two-layer plywood frame that's built around the closed hinge, leaving an opening the exact size of the hinge. The opening guides the bit and guarantees a perfectly matching mortise. A fence controls the location of the mortise on the door edge or cabinet frame. The jig can't be adjusted for other hinge sizes, but it's so easy to make that you can whip up a new one whenever the need arises.

Hand-tool purists might balk at using a router and template to make hinge mortises, but I'm for anything that results in better craftsmanship. I just wish I'd thought of this jig sooner.

Overlaid pieces are the secret

The two layers of the router template are made from 1/4-in.-thick Baltic-birch plywood, which is reliably uniform in its



Great fit. This smart jig, along with a router and a bearing-guided straight bit, give a precise fit and a perfectly hung door.

Stack pieces for a flawless template

Built around the hinge, this quick jig guarantees a perfect mortise. A router and bearing-guided straight bit follow the walls of the opening, and a chisel quickly squares the corners.

Template pieces are made from 1½-in.-wide strips of ¼-in.-thick plywood.

Equal to length of hinge plus 3 in.

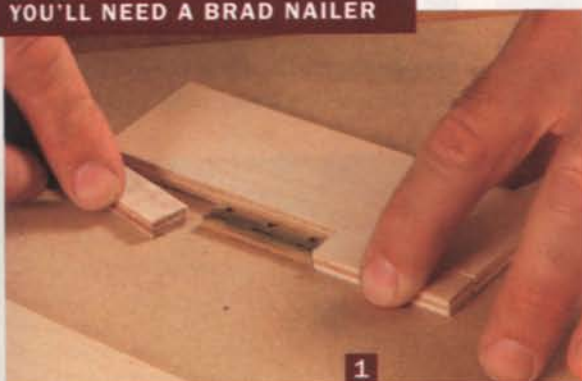
Equal to width of closed hinge

Equal to width of closed hinge plus 3 in.

Equal to length of hinge

Hardwood fence, ½ in. thick by 1½ in. wide, extends 2 in. past each end of the jig base.

YOU'LL NEED A BRAD NAILER



1



2

Align layers carefully.

Set the hinge against a long side and press the two narrow ends firmly against it (1). After adding the second long side, use the remaining four pieces to make the top layer (2). Use your finger to align the two layers (3). Any deviation in the slot will result in an inaccurate mortise. Finally, hand pressure is enough to hold all the parts in place as you secure them with brad nails (4).



3



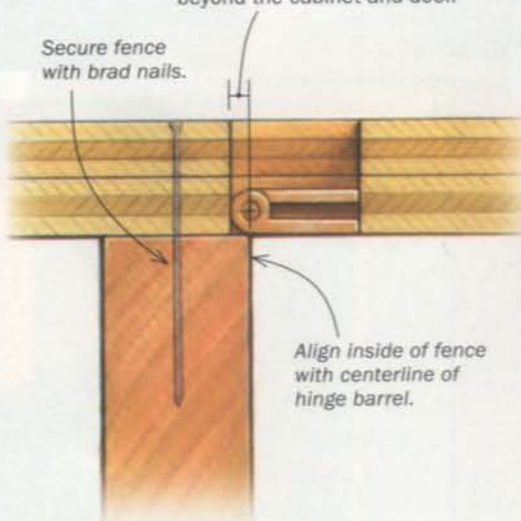
4

FENCE DETERMINES MORTISE WIDTH

A butt hinge works best when at least half of its barrel sticks out beyond the cabinet and door.

Secure fence with brad nails.

Align inside of fence with centerline of hinge barrel.

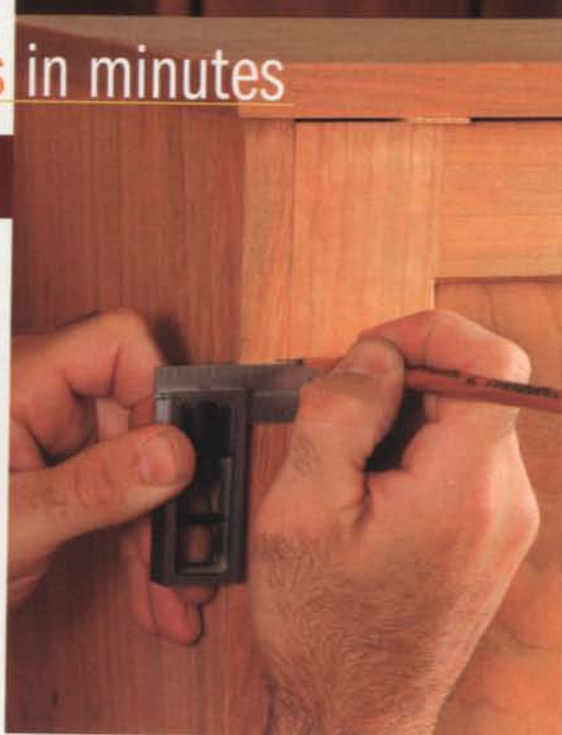


Fence location determines how much of the hinge barrel is exposed. Align the fence with the layout marks on the template and secure it with long brads.

Precise mortises in minutes

MARK CENTERLINES ON THE DOOR AND CABINET

These marks will align with the centerline on the router template. Routing the mortises on the door removes the centerlines, so transfer the lines from the door to the cabinet before mortising.



thickness. That's important for a hinge mortise, which must have a consistent depth.

Rip the plywood to size. The outer sections are 1½-in.-wide, which is wide enough to support the router, while allowing you to locate the jig close to the cabinet top and bottom. The interior strips are ripped to match the hinge width and length. Then crosscut the eight pieces to length (see drawing, p. 45).

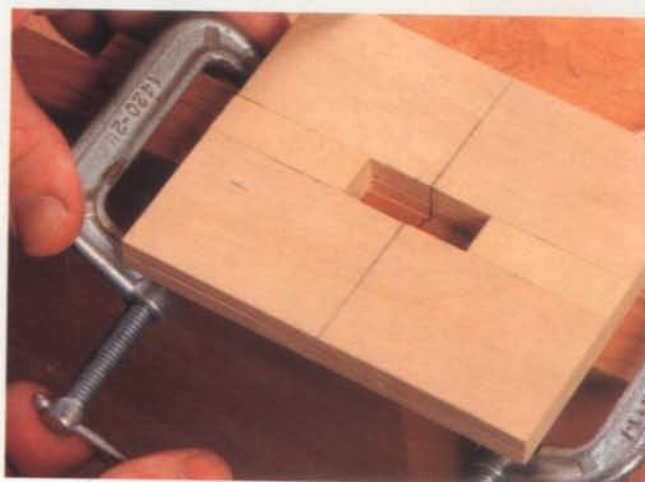
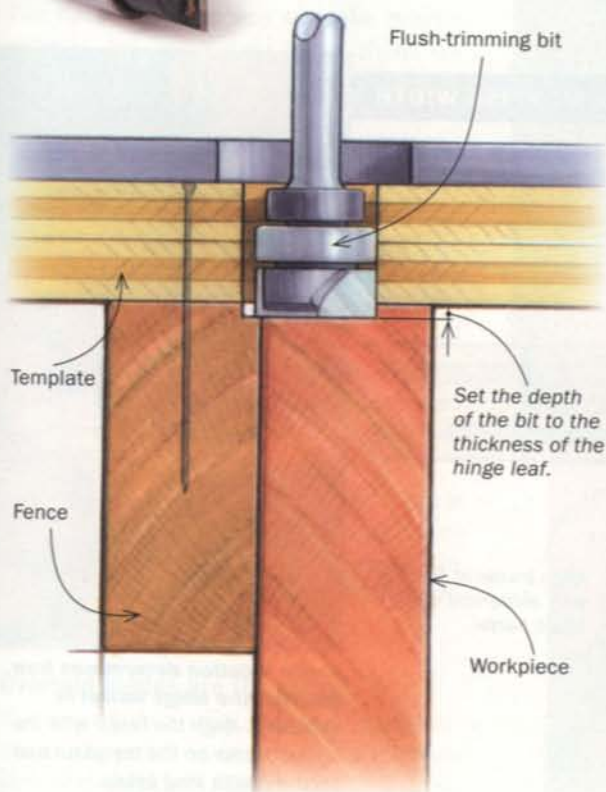
Assemble the first layer of the template, using the two pieces that are as wide as the closed hinge and the two that are 3 in. longer than the hinge. Place them around the closed hinge. Arrange the remaining four pieces on top of the first layer. Use your fingers to align the inside edges of the layers. Then drive brad nails through the layers to hold them together. Make sure that the pieces fit tightly around the hinge. Any gaps will transfer to the mortise. This

ROUT THE MORTISE WITH A FLUSH-TRIM BIT

Hinge mortises aren't deep, so you need a bit with a shallow cutting depth. A dado cleanout bit is the perfect size and has a bearing for flush-trimming.



Set the bit depth. Set the template upside down on the router's baseplate, and place the opened hinge on the jig. The bit should be just shy of thickest part of the hinge leaf.



Center the template. Align the centerline of the template on the centerline of the mortise, then clamp the fence to the door.

might seem like a tall order, but I manage it with one hand holding the template pieces and the other holding my nail gun.

Simple fence locates mortise with precision

With the template made, it's time to attach the hardwood fence to it. The fence's location determines how much of the hinge barrel will stick out beyond the cabinet and door. In order to work properly, a butt hinge needs at least half of its barrel to stick out.

To position the fence accurately, you must know the diameter of the hinge barrel. Halve the diameter, and use the resulting number to measure in at each end from one side of the template's opening. Align the inside edge of the fence with these marks, and then check to make sure that it is parallel to the edges of the opening. If

it's not, the hinge mortise won't be parallel to the edges of the door or cabinet frame. Attach the fence with a few brad nails.

Next, mark the opening's centerline on the template. The centerline will make it easy to locate the template on the workpiece (see photos, facing page).

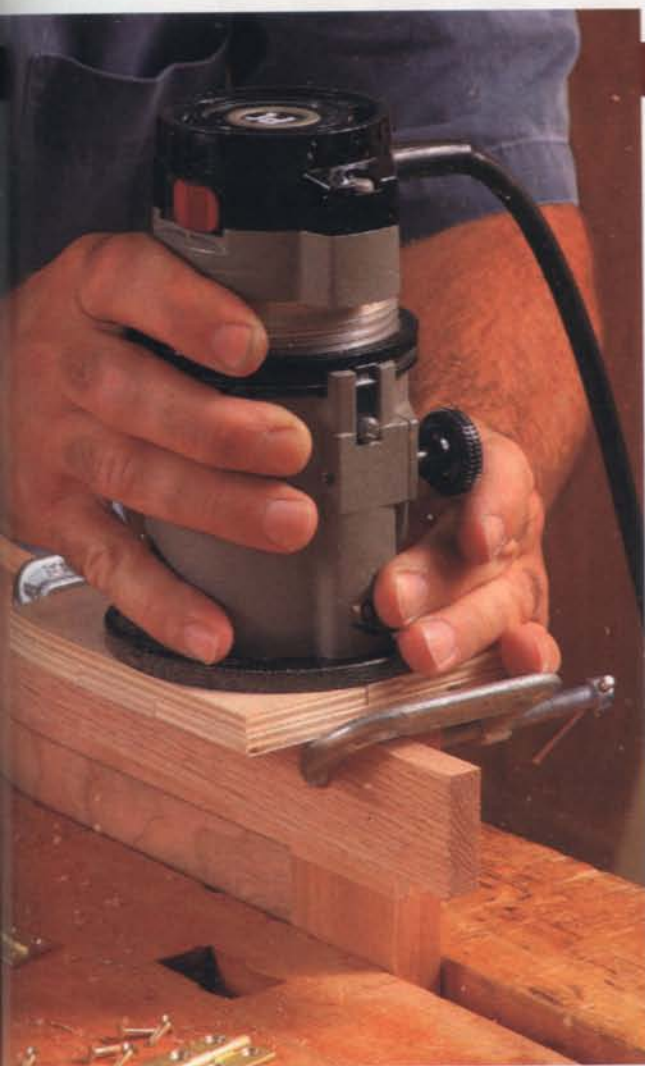
Now put the jig to use

I use a 1/2-in.-dia. flush-trimming bit with a shallow cutting depth, typically called a dado cleanout bit, to rout the mortise (www.mlcswoodworking.com; part No. 5382). After the bit is chucked into the router, set its cutting depth by turning the router over, placing the template on its base, and putting an open hinge on the underside of the template (not in the opening). Adjust the bit's depth until it's just shy of the depth of the thickest part of the hinge leaf. Then rout a mortise on

some scrap and test the fit. Once the depth is dialed in perfectly, you're safe to rout the actual hinge mortises.

Hinges usually line up with the inside edges of the door rails, so lay out the door first, marking the centerlines of the mortises. Then shim the door in place in its opening and transfer the centerlines from the door to the cabinet. Don't wait to lay these out, because the layout lines on the door will be routed away. Remove the door and secure it in a bench vise. Align the centerline on the template with the centerline on the door and clamp the template in place. Rout the mortise, then square its corners, using the template to guide your chisel. Use the same steps to rout the remaining mortises. □

Doug Stowe builds furniture and boxes in Eureka Springs, Ark.



Rout the door mortise. Don't pull the router off the jig until the bit has stopped spinning. If you do, the bit could cut into the template opening and ruin it.



The jig squares corners, too. The square opening makes a perfect chisel guide. Remove the template to pare away the waste (below).



AND IT FITS INTO THE CASE

Clamp the fence to the front edge of the cabinet side. The template is short enough that it won't butt against the cross-pieces.

4 Ways to Make Panels Pop



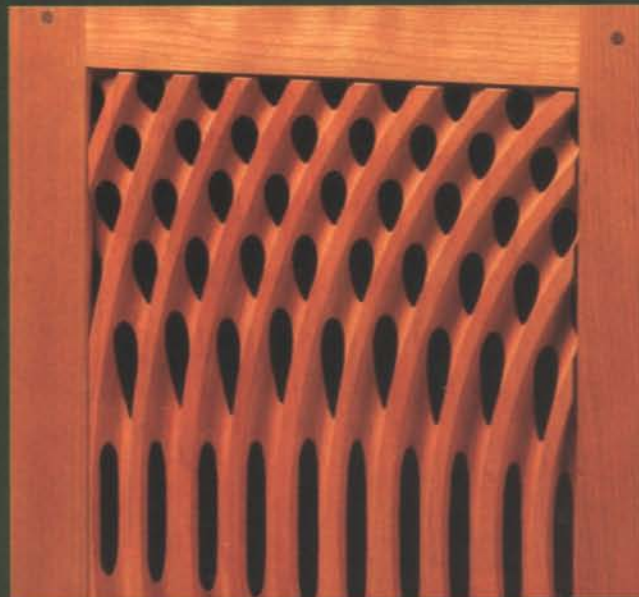
BOOK-MATCHED



HAND-CARVED



WOVEN



ROUTED

Since doors dominate most cabinets, one of the easiest ways to make your furniture stand out is to dress up the door panels. If the whole piece is made with frame-and-panel construction, panels can have an even greater impact.

Most panels are manageable—flat and finite—making them a good place to try new techniques and treatments. If you mess up, you cut a new rectangle and start again. That's why I chose door panels for my first stab at veneering, enlivening a cherry entertainment center with curly cherry panels. We recently covered how to use a vacuum

bag to veneer a simple, flat panel (*FWW* #208), so we've left that option out of this article.

The four panels featured here range from classic to cutting edge. But all are tasteful, catching the eye without overpowering the piece. And all come from experienced furniture makers who have boiled down the how-to into simple steps.

Try one or two of these, and post the results at FineWoodworking.com/gallery. We'll be watching.

—Asa Christiana is the editor.

Great Grain? Book-Match It

How to find a pleasing pattern
and glue up a perfect panel

BY ANDY RAE

About 30 years ago, when I worked in the finishing shop of the late George Nakashima, he told me, "Our job as woodworkers is to reveal the tree's inner beauty." That's literally what you do when you resaw a plank on the bandsaw and book-match the halves. Opening the two pieces like a book exposes a mirror image of color, grain, and texture—a natural pattern unique to that tree. Book-matching works well for all types of panels, including tabletops and all kinds of veneered panels, but my focus here is solid-wood door panels.

A GOOD MATCH TAKES PLANNING

If you could slice a board perfectly, without removing any wood, you'd have the ideal book-match—a perfect mirror image. But you can only achieve near-perfection because the board loses some material when you saw it apart, flatten it, and make it smooth enough for furniture. So the goal is to remove as little wood as possible.

Begin by looking up and down the plank. You could surface it first, but with practice, you can train your eye to see through the rough surface to find interesting grain patterns and the like. Try using a mirror to see what the final match will be.

Don't let the wood rule you. While the seam of the book-match is often centered in the door frame, that's not an ironclad rule.



An offset match is often more subtle than a centered match and creates a bit of visual tension, especially in paired doors or a run of cabinets. With flatsawn wood, I usually orient the points of the arches or any other predominant grain patterns toward the top of the panel. Be thoughtful with figured wood, too. For example, the fine, black lines of spalted wood can overpower a door if positioned in the center. Try moving the interesting pattern toward the edges to create some visual tension. Let the patterns emerge by butting two matched pieces together and trusting your eye.

RESAWN WOOD TENDS TO MOVE

The bandsaw is the best tool for resawing. If your bandsaw lacks the height to resaw the board in one pass, rip it along the

Make the most of special wood

FIGURED

In this credenza by James Probst, the book-matches highlight the color and figure of the curly maple door panels.



SPALTED

Matt Kirby used spalted maple for these book-matched door panels. Each panel has a different pattern of spalting, but each one is also balanced to make the best visual match.



Book-Match continued



1 Mirror image. Place a mirror against the board to preview the book-match and to gauge where to glue the resawn halves for the best appearance.



2 Flatten, resaw, flatten. Joint one face, then resaw the board, keeping the jointed face steady against a tall fence. You'll usually need to joint and plane the halves once more before gluing.



3 Fine-tune the match. Slide the pieces back and forth to see how the grain patterns align. Trust your eye to find the most pleasing alignment.

grain, resaw the pieces, then glue them back together where they were ripped. Be aware that almost all resawn wood distorts to some degree because of the moisture variation between the inside and outside and the built-in tension. When sliced down the middle, most boards will bow slightly. If the curve is severe, say $\frac{1}{8}$ in. or more over a 12-in.-long board, joint and plane the boards flat. But for most boards, you can move straight to smoothing after resawing. Once assembled, the frame around the panel will remove any small amount of bow. However, any cupping (curving across the grain) needs to be removed with a jointer and planer because a typical frame can't pull a cupped panel flat.

KEEP IT FLAT WITH A GOOD GLUE-UP

To join the two pieces into a single book-matched panel, start by running the mating edges over the jointer to straighten and smooth them. Rest the panel on shopmade beams (such as lengths of jointed 2x4) to make it easier to clamp. Use cauls to keep the assembly flat. Store the glued-up panel on a flat surface with some weight on top. Wait a day or two to allow moisture from the glue to evaporate fully before continuing.

HOW TO SIZE THE PANEL AND SMOOTH THE FACES

Do final dimensioning on the tablesaw. I initially rip the panel to the width of the frame opening plus the two grooves in the stiles. For flatsawn panels up to 1 ft. wide, I then remove $\frac{1}{8}$ in. from each side so the wood can expand without stressing the frame joints. For rift- or quartersawn wood, you can halve that measurement, removing $\frac{1}{16}$ in. from each edge. Adjust these dimensions for the season.

Because of the way the board is unfolded, reversing grain is always part of a book-matched panel. To smooth it without tearout, try taking light shavings with a bench plane, changing directions at the seam between the two pieces. Where the plane won't work, use a card scraper or sandpaper. Then apply a finish and bring out the tree's inner beauty.

Andy Rae is a woodworker and teacher in Asheville, N.C.

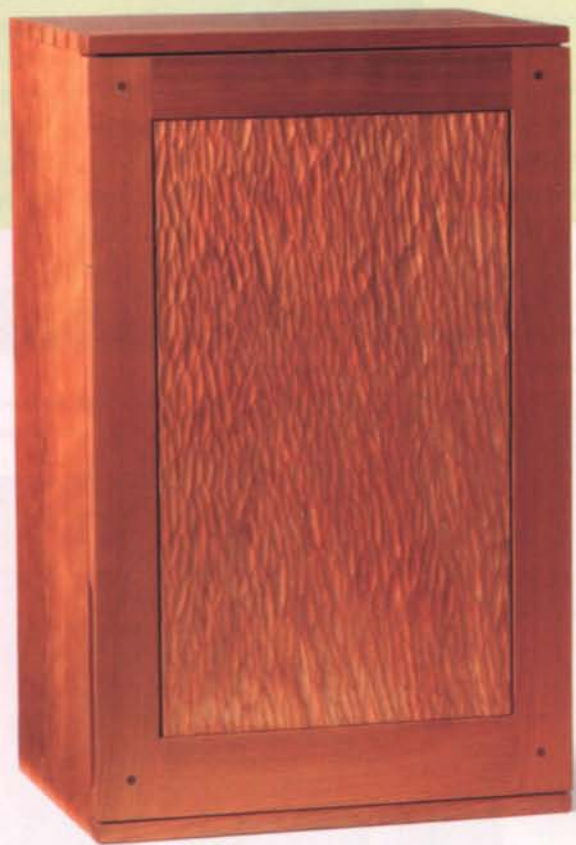


4 Tips for a trouble-free glue-up. Elevate the work to make it easier to position the clamps, and use waxed or taped cauls to keep the panel flat.

Carve a Panel for a Natural Look

A couple of gouges create subtle texture

BY CHRISTIAN BECKSVOORT



On occasion, I like to step out of my perceived role as “the Shaker guy” and explore my more creative side. Recently, I made a single-door wall cabinet with eight different door panels. The two that have received the most attention are a curved lattice panel created with a router and a textured panel carved by hand. Both are easy to execute, and they can be integrated into any number of designs. I’ll start with the hand-carved panel.

This treatment requires only two or three carving gouges. It is fast to do, doesn’t require a lot of talent, and has a subtle yet interesting texture.

Having carved a multitude of these panels, I’ve learned a lesson or two along the way. First, take time to choose the wood carefully. To avoid tearout, the straighter the grain, the better. Also, use a low, raking light source in addition to your overheads so you can see the hills and valleys better as you carve.



Shine a light. Use a strong, low, raking light to accentuate the texture as you carve.



Taming tearout. Much like planing in the wrong direction, carving downhill will produce tearout. When that happens, gently remove it by carving in from the opposite direction.



Already in the frame? No problem. If you choose to assemble the frame and panel prior to carving, or want to carve a panel already in a frame, just clamp sacrificial boards over the door rails to protect them.

The carving is straightforward. I start with a panel that has the tongue already cut around its perimeter. I prefer gouges with a relatively shallow sweep, a #5 or #7. I stick to shallower carving because it is much easier to oil and wipe, and has lower, stronger ridges between the troughs. I start at one end and work my way up the panel, changing gouges frequently to add variety to the texture. Around pin knots and when the grain changes, I reverse the panel 180° and work from the opposite side to eliminate or minimize tearout.

Christian Becksvoort is a contributing editor.

Rout Your Way to a Custom Panel

Pivoting jig yields striking effects

BY CHRISTIAN BECKSVOORT

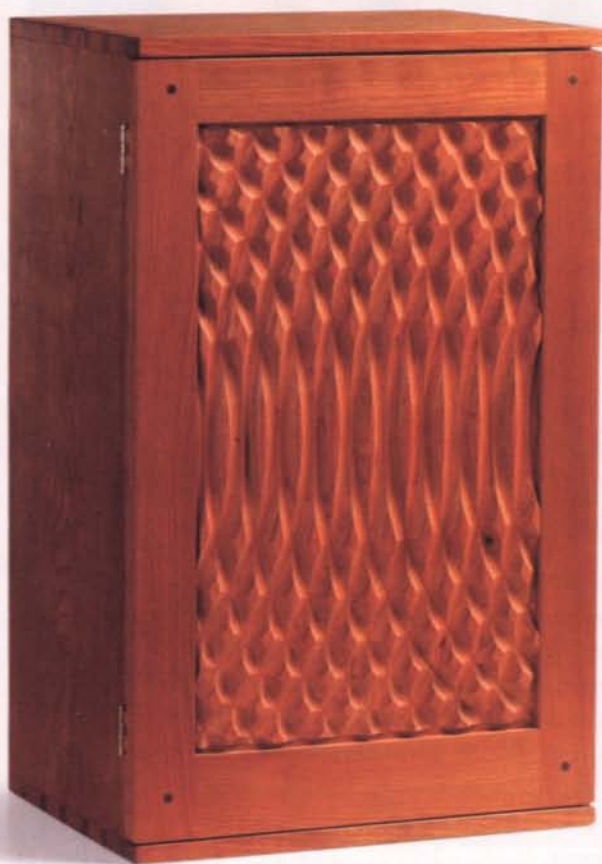
Using a router trammel like a compass, I discovered that I could create interesting moiré effects. Like the hand-carved texturing, this process is straightforward. But the effect is starker and more dramatic. This routing process can yield very different results, depending on how it is used. You can rout on the same side of the panel, from two different points, to get a solid pattern. You also can rout from one point, flip the panel, and rout from the same point on the other side to get a pierced, lattice look. And either one can be done with a symmetrical or asymmetrical pattern.

The pattern and appearance depend on several factors: first, the location of the center point; and second, the size, shape,

and depth of the router bit used. In a pierced panel, a half-round bit will produce oval holes, a square bit will make rectangular holes, and a "V" bit diamond-shaped holes. The depth of the bit determines the size of the holes, while the size of the bit and the spacing of the nail holes determines the overall size of the lattice. Smaller bits can have arcs closer together.

I start by making a new base for my router. I remove the existing plastic base and replace it with a $\frac{3}{8}$ -in.-thick piece of plywood, 6 in. wide and about 30 in. long. At one end, I drill a 2-in. hole for the router bit, then locate and drill the four screws for attachment to the router. Then I draw a line down the long center of the base and drill a series of $\frac{1}{8}$ -in. holes exactly 1 in. apart.

I work on a plywood surface so I can nail down strips that lock the panel in place. The strips are the same thickness as the panel, so they also help to support the router. Don't use too many nails, or you may have to reset them as you go to keep them out of the router path. The pivot point is a nail, too (12d finishing), with the head clipped off. Experiment with pivot locations to create the pattern you want. For a $\frac{1}{2}$ -in.-thick panel, I set the bit depth to $\frac{1}{16}$ in. I make my first cut, then shift the jig to the next pivot hole for each pass, making a series of concentric arcs, 1 in. apart. Then I either repeat the process on the same side from a different pivot point, or I flip the panel over and repeat the process on the back from the same pivot point.

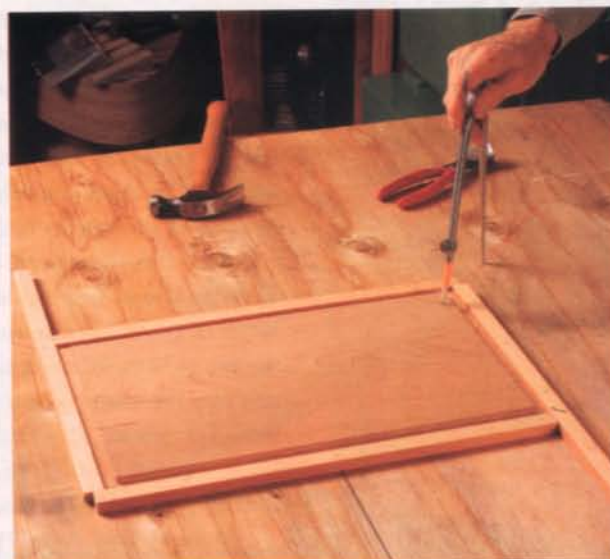


CHOOSE SOLID OR PIERCED

Cutting into just one side of the panel creates a very different look than cutting into both sides. Changing the router-bit and pivot points will produce hundreds of other varieties. In both of these examples, Becksvoort used a round-nose bit and symmetrical pivot points.



ROUT CONCENTRIC ARCS WITH A LONG PLYWOOD ROUTER BASE



Make the jig and locate the pivot point. After making the simple router-trammel jig and attaching it to the router (left), Becksvoort lays down a piece of $\frac{3}{4}$ -in. plywood as a work surface. He secures the $\frac{1}{2}$ -in.-thick panel by nailing a $\frac{1}{2}$ -in.-thick sacrificial pine frame to the plywood. To locate the pivot point, he draws a 45° line and uses a compass (above left) to see where the first router pass will hit the panel. The pivot is a 12d finishing nail (above right) with its head clipped off.

Final preparation.

The pivot nail fits the $\frac{1}{8}$ -in.-dia. holes in the jig. Set the depth of the bit. Make sure the nail is in the correct pivot hole before making the first pass.



Cover the panel with cuts. After each pass, reposition the router base by placing the next pivot hole on the nail. Between passes, make sure there is no dust under the jig preventing the bit from cutting to full depth, and that none of the nails holding the frame are in the router's path.



Now change the pivot point or flip the panel. If only routing on one side, leave the panel in place, move the router to a nail positioned opposite the first, and complete the process. If routing both sides for the pierced look, flip the panel and rout again from the first pivot point.

Woven Panels Made Easy

Use paper-backed veneer and a simple jig

BY TIM PASTORE



Woven panels are one of my favorite ways to dress up a woodworking project. Although you can purchase weaving strips from craft stores, I make my own from paper-backed veneer. Most paper-backed veneer is between 0.02 in. and 0.04 in. thick, providing a good balance of workability and strength.

I used 1-in.-wide maple strips on the hope chest. This size looks best on larger projects, but I've used strips as narrow as 1/4 in. for small boxes. You can vary the width, weave pattern, and wood species for added interest.

Before cutting the veneer into strips, I apply oil-based polyurethane to both sides. This minimizes

finishing time and eliminates drips and bubbles where the strips intersect. I avoid water-based products because they cause the strips to curl.

A tablesaw equipped with a thin-kerf blade is the best way to rip veneer into weaving strips; I use a 7 1/4-in. blade because it's even thinner than 10-in. versions. Supporting the thin stock close to the blade is a must. Although a zero-clearance insert works fine, I simply clamp a piece of birch plywood to the top and raise the blade through it. In addition to supporting the stock close to the blade, the plywood provides a clean, flat surface for the veneer to ride on. I clamp an aftermarket Incra fence (model No. IJ32) to the table. I hold down the veneer using a push block cut to the same length as the veneer. Once I have a sufficient supply of strips, I sand their edges by arranging them in a bundle.

A 1/4-in. space between the vertical strips makes for a good-looking weave, though very narrow strips require a tighter spacing. Once all the strips are positioned and double-checked for size, I glue the ends with Titebond III and an artist's brush. Even though the strips are finished, I've never had any problems with adhesion because the glue is really just a way to make slipping the panel into a frame easier. Once the glue has set, I mark the panel's dimensions. Then I trim it and apply a veneer backer for extra rigidity, using 3M No. 77 spray adhesive.

Tim Pastore is a woodworker in Wakefield, Mass.



Special tablesaw setup. Use a thin-kerf blade, a zero-clearance insert, and a fence clamped tightly to the table. Size a push stick to hold down the veneer along its full length. Stick sandpaper on the bottom to help control the veneer.

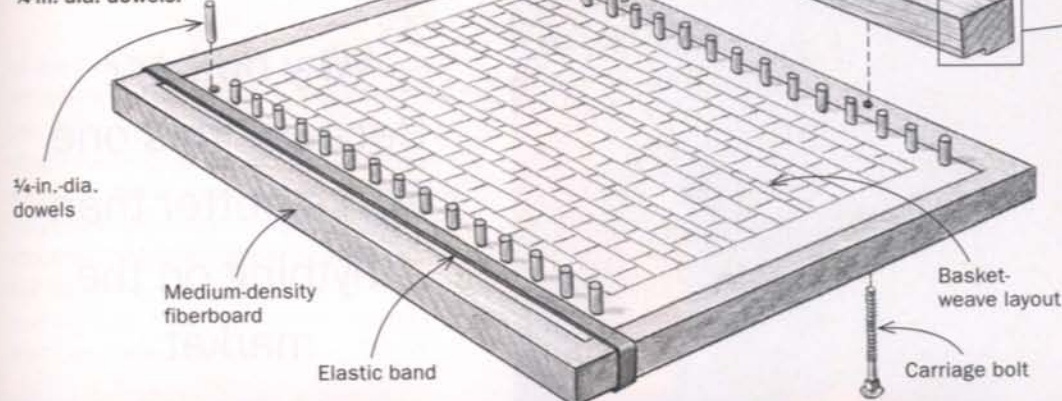
VARY THE WEAVE TO REFINE THE LOOK

Woven panels have a simple elegance that's perfect for boxes, doors, and chests. Patterns can be simple, like the one Pastore used on a hope chest (left), or more varied, like the one he used in the lid of a small box. Almost any basket-weave pattern will work, including herringbone.



MDF PEGBOARD ORGANIZES THE JOB

To allow the horizontal strips to butt against each other, the vertical strips need $\frac{1}{4}$ -in. gaps between them. Glue a copy of the layout to the jig and drill holes for $\frac{1}{4}$ -in.-dia. dowels.



Clever clamps. The vertical strips are held in position with a rabbeted stick on one end (above) and an elastic band on the other. The elastic allows the strips to be lifted so the horizontal strips can be woven through.



1

Verticals first. Slide the vertical strips under the rabbeted clamp bar and between the dowels. The dowels keep the strips perfectly aligned so no measuring is required while weaving.



2

Over under, over under. Lift the vertical strips one at a time while inserting each horizontal strip (left). Once a new horizontal strip is in place, the preceding strip can be pushed tight against the others with a small block (right). The block allows you to push the strips without splitting them, and it is easier on your fingers.



3



4

Glue the edges. With all of the weaving done, Pastore glues the perimeter using an artist's brush and clamps it down with hardwood cauls. Do it one side at a time and remove layout pins as necessary to make room for the cauls.



5

Trim it to size. Kitchen shears make quick work of trimming these thin veneer strips. Don't worry about rough edges and a bit of splintering. The panel will reside in a grooved frame, which will hide the edges.



6

Add a backer for strength. Cut a veneer backer to size using the shears, and then apply spray adhesive on both surfaces. Apply the backer immediately, touching down the center first, and rubbing it from the center outward.

Make Your Own

Why bother?

Because this one works better than anything on the market

I use a marking gauge for many things—mortises, tenons, dovetails—but I've never found one exactly to my liking. Western-style marking gauges typically use a sharpened pin or cutting wheel to incise a line in the stock. These tend not to cut crisply, and the pins especially have a bad habit of following the grain. Japanese gauges have great knives, but they use a wedge rather than a thumbscrew to apply pressure on the bar. The wedge makes adjustment finicky and, in my experience, can work itself loose.

This design combines the best from East and West. It has a knife that cuts a clean line no matter which way the grain is running, and a thumbscrew that is easy to adjust. Also, my cutter has a spear point, so it can be used in both directions. There are similar cutting gauges available commercially, but they all have design quirks—the shape

A cutting gauge makes a better marking gauge

DOVETAILS

A marking gauge with a knife-style cutter cuts much more cleanly across the grain than a pin-style gauge, and won't catch a grain line and get off track when cutting with the grain.

TENONS



Marking Gauge

BY MATT KENNEY

of the fence or the location of the thumbscrew—that make them uncomfortable to use. When you make your own, you can shape the fence and locate the thumbscrew to fit your hand. Also, once you know how, you can make others for specific tasks. For example, I made a small one to scribe dovetail shoulders. Last but not least: There's a real joy that comes from using a hand tool that you made yourself.

Fit the fence around the bar

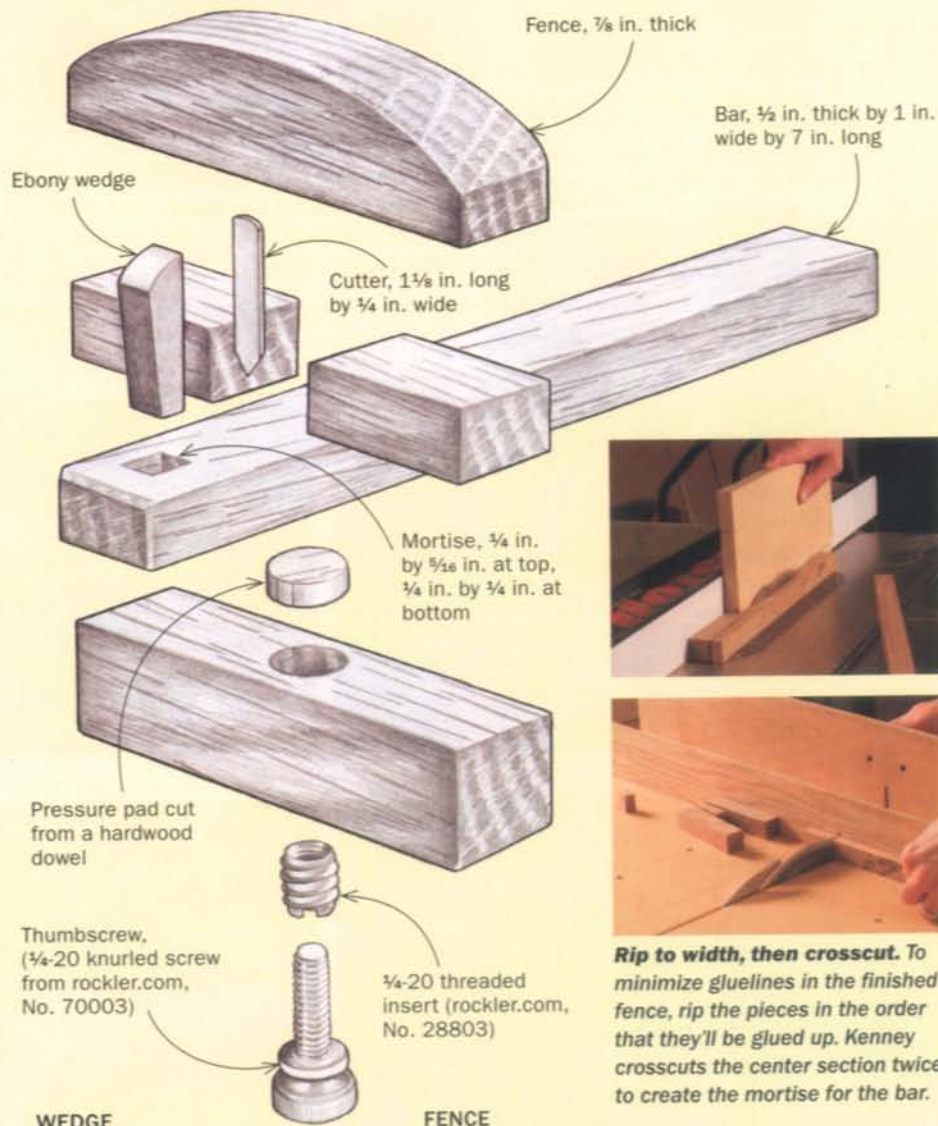
The trickiest part of making a marking gauge is getting the bar that holds the cutter to fit nicely in the mortise that goes through the fence. I find it tedious to try and fit the bar into a mortise cut into a solid piece of wood, so I glue up the fence around the bar.

Use a hard wood such as white oak or maple for the fence and bar; quartersawn stock will be more stable. Start with a 4/4 board about 4 in. wide and 18 in. long. Joint and plane it to 7/8 in. thick. Next, rip three strips in this order: 7/8 in. wide, 1/2 in. wide, and 7/8 in. wide. If you assemble the pieces in the order they come out of the board, you'll have a good grain match and less-obvious gluelines. Use a handplane to remove the sawmarks.

Dry-clip the strips back together, in order, and mark out for the fence parts. Do this toward one end of the stock to leave

A SHOP TOOL FROM A SINGLE BOARD

The parts are milled from a 1-in.-thick piece of hardwood that is 4 in. wide by 18 in. long.

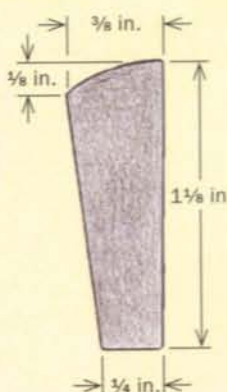


Rip to width, then crosscut. To minimize gluelines in the finished fence, rip the pieces in the order that they'll be glued up. Kenney crosscuts the center section twice to create the mortise for the bar.

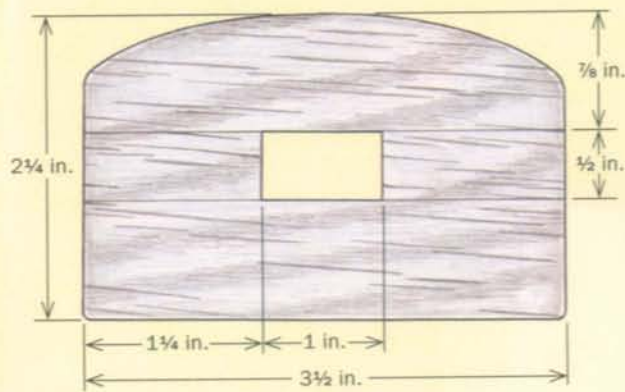
HINGE MORTISES



WEDGE

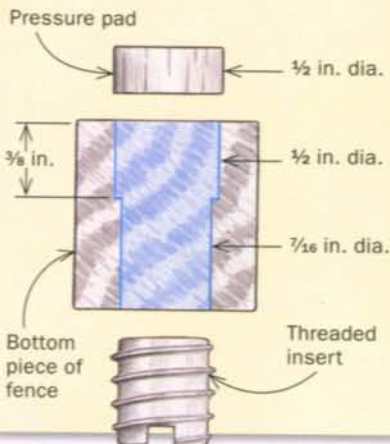


FENCE



Make the fence

FENCE MORTISE



A mortise houses the pressure pad. Drill a stepped through-mortise to hold the pad and the threaded insert.

enough length for cutting out the bar. To make the bar, cut a 12-in.-long piece from the 1/2-in.-wide strip. Make sure you don't use the section you marked for the fence. Now, drill the mortise for the cutter and square it up with a chisel, or use a mortising machine. At this point the mortise should be 1/4 in. square. But the cutter is held in place by a wedge, so you need to angle the wall farthest from the fence 5°. Use an angled guide block and a chisel. Finally, cut the bar to length.

The fence is a simple glue-up

From each of the two 7/8-in.-wide strips, crosscut a 5-in.-long piece. One will be the top of the fence, the other the bottom. Now cut a pair of 2-in.-long pieces from the 1/2-in. stock. These fit around the sides of the bar. Make sure the end grain cuts are square so the bar is perpendicular to the fence.

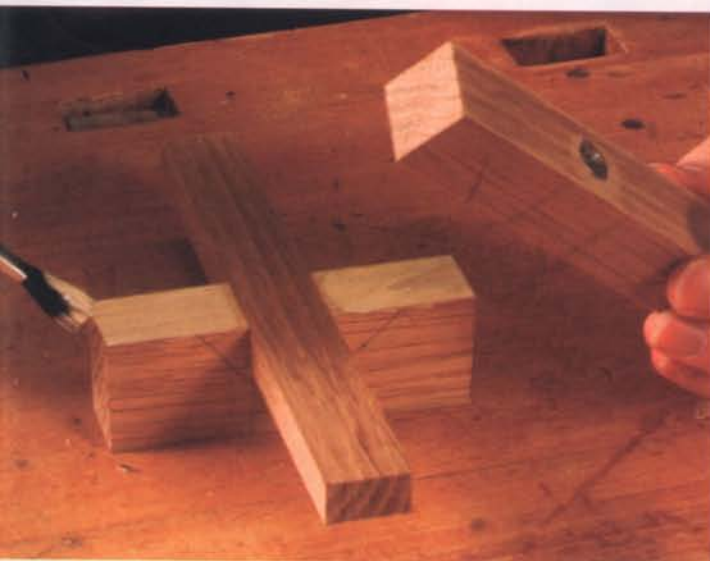
Before gluing up, drill the stepped mortise that will house the thumbscrew used to clamp the bar to the fence. Mark a center point on the top edge of the bottom piece. Drill a stopped mortise for the pressure pad. Then drill a through-hole, centered in the stopped mortise, for the threaded insert. Use a drill press to help drive in the threaded insert (see photos, left).

Glue up the fence around the bar to keep everything aligned. Spread glue on

TIP

INSTALL THE INSERT

Saw the head off a bolt and thread two nuts and the insert onto it (right). Chuck the bolt into the drill press. Use the press (turned off!) to apply pressure as you turn the top nut with a wrench to drive the insert into the hole (far right).



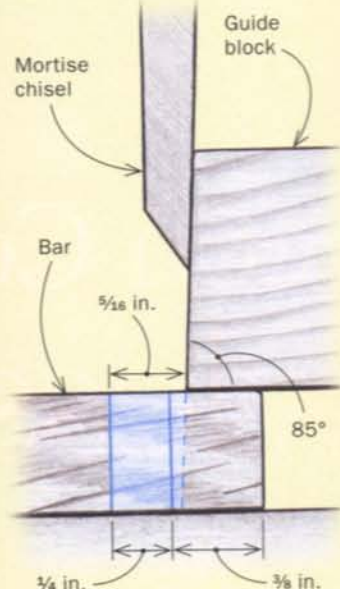
Glue up around the bar, then put the assembly in clamps. Take care to avoid glue on the walls of the mortise (above). Once the assembly is secure (right), remove the bar and any squeeze-out in the mortise.



Mortise the bar and install the cutter



ANGLED MORTISE



5° angle. Make a 1/4-in.-square mortise. Then use a guide block and chisel to angle one wall. Use a block of wood as thick as the bar to support the guide block.



Grind a spear point. After filing or grinding away the teeth from a jigsaw blade, shape the tip into a blunt spear point. Then re-set the tool rest to bevel the edges of the tip.



Hone the bevel. Work the cutter on a stone to polish the back and the beveled edges.



Fit the wedge. While test-fitting, mark the wedge for cutting to length. The top can then be shaped.

the center pieces, but not on the top or bottom: You don't want glue on any of the walls of the bar's mortise. Once everything is clamped up, pull out the bar and make sure there is no glue in the opening. The bar should slide if pushed, but otherwise stay put. There should be no side-to-side play. After the glue has dried, crosscut the fence to length and shape it.

Give the cutter an edge

You can fashion a cutter quickly at the grinder from an old high-speed-steel jigsaw blade (see photos, above).

To hold the cutter in place, cut a wedge from a contrasting hardwood. I like cocobolo or ebony, but I wouldn't go out and buy some just for this—hard maple works fine as well. Use the guide block you made earlier to set a bevel gauge and mark a line on the stock for the wedge.

Cut out the wedge with a bandsaw. Make it plenty long so that after it's sanded smooth on all sides, it will still wedge the cutter in place. Clean up the saw marks, test the fit with the cutter in the mortise,

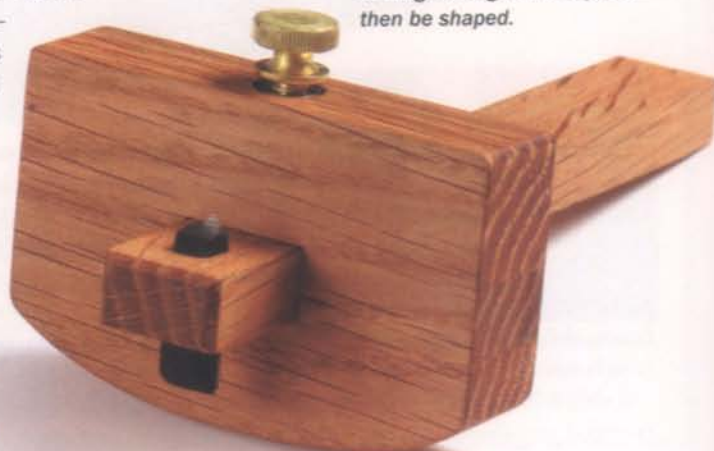
and mark where you want to cut it off. It should stick out about 1/16 in. below the bar, and 1/8 in. to 1/4 in. above the top of the cutter.

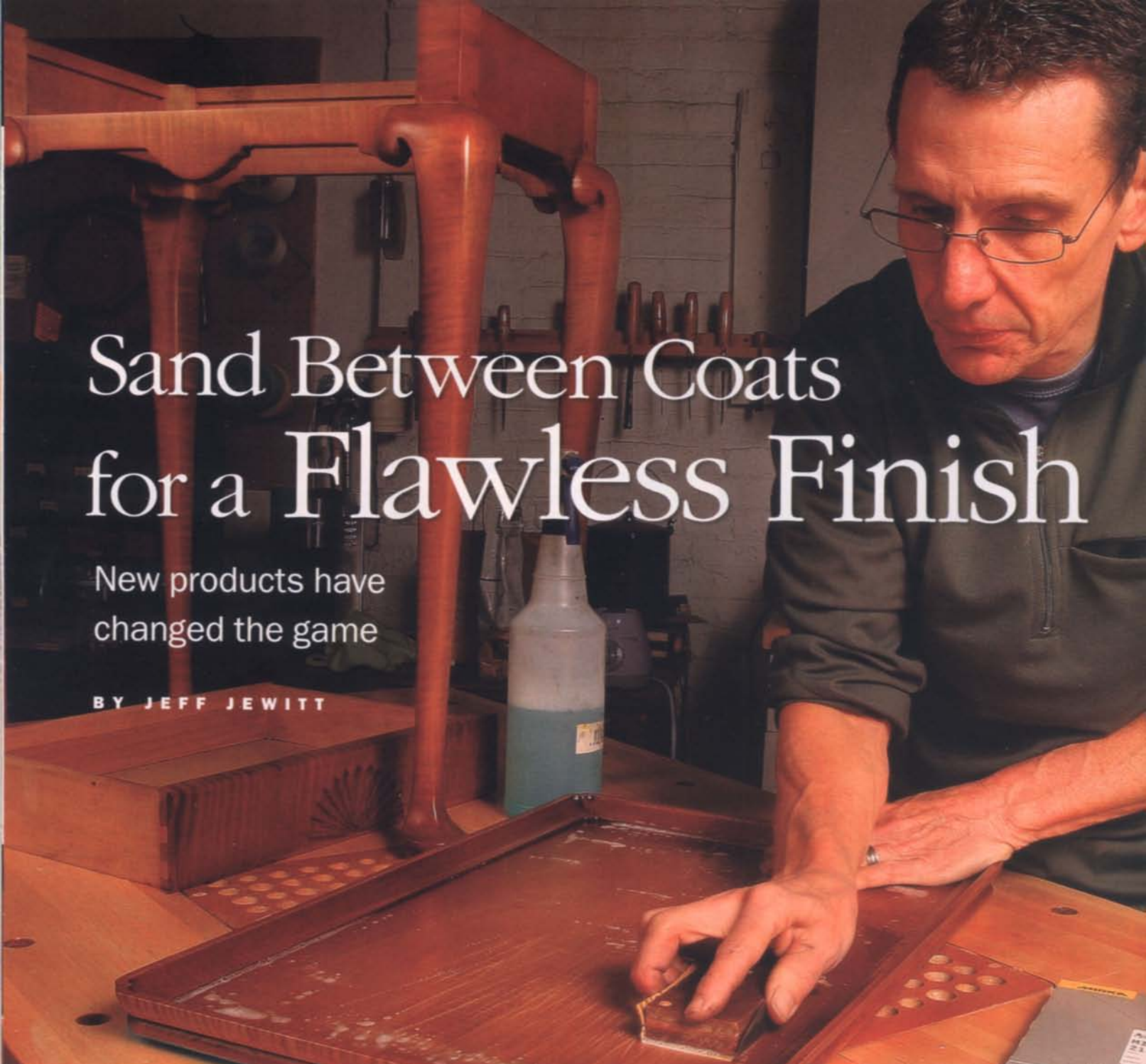
Getting the most from the gauge

For 99% of tasks, the beveled edge of the cutter should face the fence. This draws the fence against the workpiece as a cut is made, ensuring an accurate line.

For most tasks, a bevel-in cutter means the bevel is also facing the waste side of a cut. When marking out shoulders for tenons and even dovetails, this means I can make several passes and get a clean, deep cut, and then use a chisel to pare out a wedge in front of the cut line, leaving a clean shoulder as a reference for a chisel or saw. □

Matt Kenney is an associate editor.



A man with glasses and a dark long-sleeved shirt is focused on sanding a large, rectangular wooden tray. He is using a small, rectangular sanding block. The tray is placed on a wooden workbench. In the background, there is a wooden chair frame and a spray bottle. The scene is set in a workshop with various tools and materials visible.

Sand Between Coats for a Flawless Finish

New products have
changed the game

BY JEFF JEWITT

Whether you spray, brush, or wipe, one of the keys to a great finish is learning to sand between coats. When I began finishing in the 1970s, there weren't many choices when it came to sanding a finish: Steel wool shed tiny hairs that got embedded in the finish; regular sandpaper (if you could find it above 240 grit) clogged quickly when sanding shellac or lacquer; and if you wanted to flatten defects between coats of finish, you used wet-or-dry paper, which was messy and made it hard to gauge your progress.

Today, not only are there much better choices among consumer-oriented abrasives, but the Internet also has given everyone access

to industrial abrasives. I'll narrow down what to use with film-forming finishes like lacquer, varnish, and shellac (in-the-wood 100% oil finishes and thin applications of oil/varnish mixes typically don't require sanding). I'll describe new products to use for dry-sanding between coats, and I'll cover the better use of wet-or-dry paper for sanding the final coat in preparation for the rubbing-out process.

Fine grits and a light touch

Going from sanding bare wood to sanding a finish involves a change of gears. Instead of power-sanding using grits mostly P220

or coarser, you typically hand-sand using grits P320 and finer.

The first coat of finish, whether a purpose-made sealer or just a thinned coat of the final finish, generally leaves a rough surface with raised grain embedded in the finish. At this stage you aren't flattening the surface, just smoothing it, so there is no need to use a sanding block. Using P320-grit stearted paper, you can make a pad by folding a quarter sheet into thirds. This pad works best if you have to get into corners and other tight areas. Otherwise, you can just grip a quarter-sheet of paper by wrapping one corner around your pinkie and pinching the other corner between your thumb and index finger. An alternative is pressure-sensitive adhesive (PSA) paper in the same grit (P320) that comes in 2 $\frac{3}{4}$ -in.-wide rolls. You can tear off only what you need and temporarily stick it to your fingers.

Another option, which costs a bit more, is hook-and-loop pads that allow you to hand-sand using disks designed for random-orbit sanders. If the sandpaper starts to load up with debris or corns, I swipe the grit side of the paper against a piece of thick carpet (Berber is best). You also can swipe it on a gray abrasive pad.

It's important to remove the residue after each sanding, or it will cause problems with the next coat of finish. If your finish is oil-based, solvent lacquer, or shellac, dampen a clean cotton or microfiber cloth with naphtha or mineral spirits and wipe away the debris. I prefer naphtha because it evaporates faster and leaves a little less oily residue. For waterborne finishes, I make a mixture of 5% denatured alcohol in tap water (roughly 1 oz. denatured alcohol to 16 oz. water). It's OK to follow the solvent

Stearted sandpaper: No more clogging

The biggest advance in sanding between coats of finish has been the increasing availability and improving quality of stearted sandpaper. A waxy-feeling powder, zinc or calcium stearate (or a mixture), is incorporated into either aluminum-oxide or silicon-carbide sandpaper. The stearate prevents the dry finish residue from sticking and forming clumps, or corns, or clogging the spaces between the abrasive particles.

Dry-sanding between finish coats is better than wet-sanding because it allows you to see what you're doing much more clearly. If a surface is wet with lubricant, you could be sanding right through the sealer or finish because the lubricant creates an illusion of finish on the wood.

Myth-buster: New paper works with water-based finishes, too



Tough test reveals the truth. Jewitt applied eight waterborne finishes to a sample board and then sanded sections with different stearted sandpapers before adding a final coat of each finish.

I've always assumed that stearted sandpaper caused adhesion problems with waterborne finishes. However, after finding little hard evidence, I decided to test several consumer and industrial sandpapers with a variety of waterborne finishes.

I applied one coat of each finish to a separate sample board. When it was dry, I divided the board into sections and sanded this coat smooth with a variety of P320-grit stearted sandpapers. After I removed the sanding residue, I applied another coat of finish and after 72 hours, evaluated the surface for flow-out and adhesion (right).

I found no compatibility issues with any of the sandpapers and waterborne finishes. If you use a premium stearted paper, you'll have no problems as long as you remove the residue after sanding.



Deep scratches. Jewitt used a special tool to scratch a pattern in the cured finish.



Perfect adhesion. No finish from the scratched area stuck to the tape when he pulled it away.

How to handle flat surfaces

2 WAYS TO HOLD PAPER

Fold into thirds for tight spots. Fold a quarter sheet of sandpaper into thirds. All the paper can still be used but there is no grit-on-grit contact.



1



2



Sand inside corners. Folding the sheet into thirds allows you to work your way into tight spots.

Hand sander. For sanding flat surfaces, just wrap a corner of the sheet around your little finger and grip the opposite corner between your index finger and thumb.

2 WAYS TO USE DISKS



1

Handy pad. You can hand-sand using disks designed for random-orbit sanders by attaching them to a Velcro-backed pad.

TIP

KEEP SANDPAPER CLEAN



Unlike power sanders with onboard dust extraction, hand-sanding can clog the paper quickly. A quick wipe on a carpet remnant gets it clean again.



wipe with a tack cloth, but most tack rags can leave a residue that will interfere with the adhesion of waterborne finishes. One waterborne-friendly tack cloth is 3M's item No. 03192.

Higher grits for subsequent coats—After you have smoothed the sealer coat and applied the first real coat of finish, you should generally use P400- or P600-grit paper to sand; otherwise, you might see tiny sanding scratches in finishes that don't melt into each other, such as oil-based products and most waterborne ones.

You can use a power sander on large, flat surfaces, once you have built up enough finish thickness (at least four to six coats). Use caution when sanding, staying away from the edges and using P400-grit paper or higher. For better visibility, I always do this with dust extraction. The better papers out there have holes punched to match the ports on the sanding pad, or are made up of a mesh like Mirka Abranet. An industrial product called Clean-Sand by 3M is disk paper with a spiral progression of small holes for dust extraction.

Special products for moldings, carvings, and turnings—Although you can use sheet sandpaper with shopmade or commercial profiled sanding blocks on gentle profiles, this won't work on sharp curves and other extreme profiles. For these areas, use ultra-flexible sanding sponges or a synthetic steel-wool substitute.

TIP

REMOVE THE DUST

It is very important to remove all the sanding residue before applying the next coat of finish. For solvent-based finishes, dampen a cloth with naphtha or mineral spirits. The former dries faster (but is harder to spell).



Neither of these products has stearates because the face is more open and clogging isn't an issue. After use, most of them can be cleaned with soapy water and re-used. I like ultrathin synthetic steel wool, which more easily conforms to profiles and turnings. Choices include Mirka's Mirilon Total and 3M's Multi-Flex, both of which are available in a convenient roll, but look for 3M's SandBlast-er flexible pads, which

2



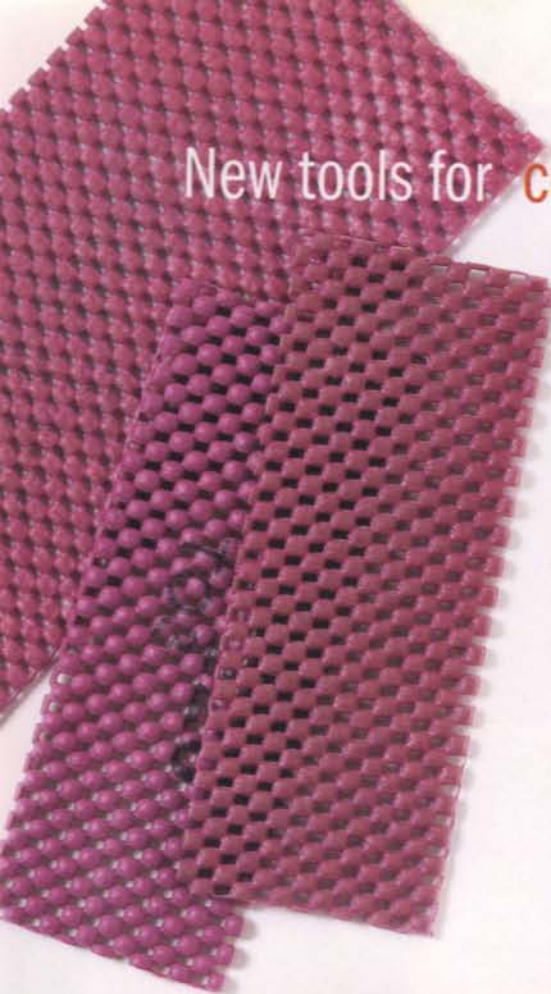
Power-sanding comes later. Once you have applied five or six coats of finish, you can safely use a random-orbit sander equipped with P400-grit disks.

New disks, better dust extraction.

Through-the-pad dust extraction has been one of the great innovations in wood finishing. The latest disks work even better and fit all sander models regardless of their hole configuration. Mirka's Abranet is an abrasive-coated mesh (top), while 3M's Clean-Sand disks have spirals of small holes (below).



New tools for curves and carvings



Foam mesh. 3M's Sandblaster is a drawer-liner type of foam mesh coated with abrasive. It can be folded over to reach into tight corners or wrapped around curves.



Abrasive pads. These pads come in a variety of grits and are thin enough to get into carvings.



Sticky paper. Adhesive-backed sandpaper is useful for sanding narrow surfaces. Simply stick it to a finger.



Sanding sponges. Less flexible than the other products, sanding sponges are good for gentle curves and can be washed out when finished.

last a bit longer and are easier to find at most home centers and hardware stores.

On thin, flat areas like the inside edge of a picture frame or door, hold the pad with your thumb on top and the rest of your fingers underneath. This keeps it level. Or just use a small piece of the PSA paper mentioned earlier.

Wet-or-dry paper still the best for final flattening

Unlike stearated sandpaper, wet-or-dry sandpaper can be either FEPA (P) or CAMI graded. Make sure you know what you're using, because a P600 is equivalent to just under a CAMI 400 (for a comparison of grits, see *Finish Line: "True Grit," FWW #176*). All FEPA-graded sandpaper should have a P before the grit number; if there is no P, assume it's CAMI grade unless otherwise



Switch to wet sanding on the final coat

specified. One feature of wet-or-dry paper is that you can get it in grits up to 2,000 and sometimes higher. If you have any trouble finding it, try an automotive parts supplier.

Wet-or-dry sandpaper is a very sharp and fast-cutting abrasive and works best for removing final defects and flattening the finish prior to rubbing out (where you polish the flattened surface to the desired sheen). You can use mineral spirits, a light mineral oil called paraffin or rubbing oil, or soapy water as a lubricant. Of the three, soapy water is the least messy, though it seems not to cut as fast or as well as the other two. I add a capful of Dawn dishwashing liquid for every pint (16 oz.) of tap water, and then apply the mixture using a plant mister.

Start with a quarter-sheet of P600-grit paper wrapped around a cork, or a cork-faced, block. Spray some lubricant on the surface and begin sanding with the grain if possible. On a top, I typically rub the outside 3 in. first so I can focus on keeping the block flat and not tipping it off an edge (that happens naturally with my arm motion if I'm taking a long sweep from one end to the other). Once I've gone around a few times, I come back and do the center. Wipe away the slurry and examine the surface. You're done when the surface looks about 80% to 90% dull. Don't try to make the entire surface perfectly dull, because you'll probably sand through the finish.

After using the wet-or-dry sandpaper, you can follow up with paste wax applied with 0000 steel wool for a satin finish. An alternative to steel wool is a very fine abrasive foam pad such as Mirka's Abralon. The 1,000, 2,000 and 4,000 grits can be used for sheens ranging from dull to satin. You don't need compounds or polishes with these products. For a gloss finish, follow the steps in "High-Gloss Finish Made Simple" (FWW #206). □

A frequent writer on finishing, Jeff Jewitt lives in Cleveland, Ohio. His latest book and DVD, *Spray Finishing Made Simple* (The Taunton Press) was released in February.



Flat surfaces. Wet-or-dry sandpaper is the best way to smooth the surface prior to rubbing out the finish. Use soapy water as a lubricant and wipe away the slurry to check your progress.

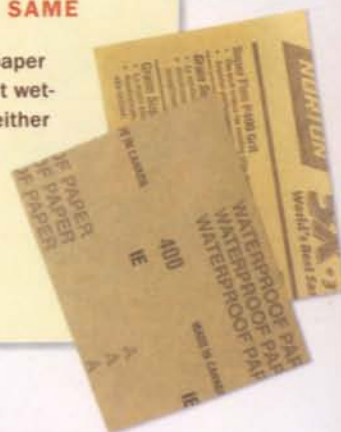


Tight curves. Use 0000 steel wool lubricated with soapy water to remove the gloss on curved surfaces.

TIP

ALL GRIT NUMBERS AREN'T THE SAME

Almost all stearated paper is FEPA (P) graded, but wet-or-dry papers can be either P or CAMI graded. The difference is significant in the higher grits, so make sure you know what you're using.



Finish up with wax. Apply some paste wax with Liberon's 0000 steel wool and then buff the surface with a cotton cloth for a smooth, satin finish.

10 Tips for Mail-Order

The Internet has made it easier to find exceptional wood, but you need to be an educated shopper

BY PATRICK MCCOMBE

Sooner or later, one of your projects will call for a material that's not available locally. Whether you need a deeply figured stack of matched boards, an exotic veneer, or an eye-popping slab for a natural-edge table, there's a supplier somewhere who can help. You can find them by flipping to the back of this magazine or asking friends. The Internet is also an increasingly popular and effective way to find just the right supplier, from small mom-and-pop shops to large wholesalers.

But before you send out a check or offer up your credit-card number, you need a way to tell that the faraway company you found online is reputable and has quality material. To gather some tips and insider advice, I spoke with nearly 50 specialty lumber and veneer suppliers who sell material over the phone and Internet. I asked them about their specialties and how they handle remote transactions. We discussed how the material is shipped and about typical turn-around times. Then, as a test, *Fine Woodworking* editors placed trial orders with five companies. Just to make sure we didn't get preferential treatment, we used cell phones to place the orders and had the material delivered to our homes. In the end, we came away with 10 tips to make ordering material over the phone and Internet safer and more successful.

Patrick McCombe is an associate editor.

Happy customers

Yew and spalted maple

I was browsing for something out of the ordinary when I found my yew and spalted maple at Exotic Lumber (www.exoticlumberinc.com). The yew is hard and prone to chipping and splitting, but it has fantastic tight grain and warm coloring that had my co-workers doing double-takes, even before I'd applied a finish. Just sanding to 400 grit gave it a terrific, glassy luster. The spalted maple had enough color to make the drawer fronts interesting without being punky or fragile.

—Steve Scott



Lumber

1 Don't mail-order material you can get locally

Nothing can replace actually looking at and feeling lumber before you buy it, and the shipping costs of online lumber can significantly increase what you pay for small orders. Therefore, it doesn't make a lot of sense to buy what you can get from your local suppliers. After finding book-matched white oak at Talarico Hardwoods in Mohnton, Pa., for \$22 per board foot (with shipping), FWW art director Michael Pekovich decided to use the mail-ordered wood sparingly. "The Web site stated that one of their specialties is quartersawn oak, and they had plenty of stunning pictures to back it up," he said. "Unfortunately, their price list was equally stunning, with lumber fetching from \$10 to \$28 per board foot. I decided that I didn't need exceptional wood for every component of my Arts and Crafts display case (see

p. 30). I opted for book-matched, mail-order stock for the top, sides, and drawer fronts, and purchased the remaining material locally."

Use mail-order material sparingly.

Rather than shell out \$22 per board foot for his entire Arts and Crafts display case, Pekovich reserved the expensive mail-order white oak for places where the boards' ray fleck would be most visible.

\$5 bd/ft

\$22 bd/ft

2 Start with a small order

Perhaps the best advice is to start with a small order and pay with a credit card. This allows you to test the supplier without investing too much money. As a last resort, you can always call your card issuer to stop payment if the deal turns sour. You can stop payment on checks, too, but not all suppliers accept them. And those that do will ship the material only after the check has cleared.

To those who have reservations about using credit cards over the phone or Internet, Jesse Schecter of Pine Creek Wood Co. in Friend, Ore., said, "You have less risk with a credit card than you do with a check or money order, because the card issuer is on your side if there's a problem."

Charge it. Most suppliers are honest and will work hard to ensure you're satisfied, but it's better to use a credit card for payment rather than a check, as card issuers are usually willing to help out if there's a problem.



3 Ask for recommendations

Almost every supplier we spoke with cautioned woodworkers to deal with a reputable company, but it's often hard to tell from a phone call or a Web site if a company is on the up-and-up. It's a good idea to ask your woodworking friends which companies they like, but unless they have ordered the same material from the same vendor, their experience may not be a good litmus test. Another option is to ask your peers in Internet discussion forums.

Suppliers' Web sites offer feedback from happy customers, but it's tough to put a lot of stock in a list of handpicked anecdotes. I would look for comments that indicate an order wasn't exactly right the first time, but then the supplier worked hard to please the customer. You also can ask the vendor for names of regular customers who can vouch for the quality of material and service.

Holly

I bought my holly from Groff and Groff Lumber (www.groffslumber.com) to use for stringing and inlay. I had never used holly before, but it cut easily with both a veneer saw and a knife and it cleaned up nicely with a scraper plane, regardless of the direction. A low-angle block plane worked great for trimming the fan sections. Overall, I'm delighted with the holly I purchased.

—Mark Schofield

Quartersawn white oak

The mail-order oak that I got from Talarico Hardwoods (www.talaricohardwoods.com) was more even in color and lighter in weight. It also milled easier and handplaned with less tearout. The local lumber was heavy, brittle, and dense, typical of my past experience. I did some research and found that slower-growing oak has tighter rings, which makes it lighter and easier to work.

—Michael Pekovich



4 Stick with suppliers close to the source

Try to buy from vendors who are relatively close to the source of lumber they're selling. Sawyers often have relationships with local hardwood suppliers and will give them a better deal than lumberyards that are hundreds or thousands of miles away.

5 Research unfamiliar species

If you're considering a wood you've never used before, be sure to find out about its woodworking properties, and what kind of variety to expect.

That way you'll know if the material you're getting is extraordinary or run-of-the-mill. FWW's Mark Schofield wasn't surprised by the shrinkage

cracks in the holly he ordered from Groff and Groff Lumber in Quarryville, Pa. "I can tell there was considerable shrinkage as the boards dried, but that seems to be typical with the species," he said. "Overall, I'm very happy with the quality of the wood."

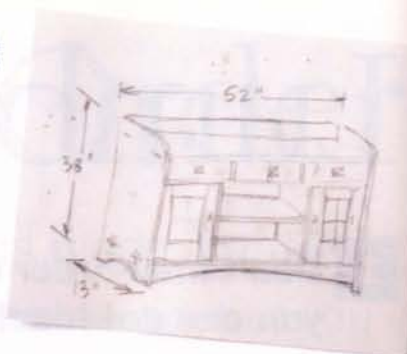
Do your homework.

If you're buying an unfamiliar species, learn as much as you can before purchasing.

6 Know what you want

Many suppliers suggested having a material list or measured drawing available so they can help you find the perfect wood for each part of your project. Pekovich reinforced this point: "When I spoke to the salesman at Talarico, it helped that I had created a scale drawing and cutlist of the parts. He asked me to email the information so he could get a better idea of what I needed. Later, he suggested the book-matched boards."

James Heusinger of Berea Hardwoods said it's also a good idea to steer clear of industry jargon because the terms often are loosely interpreted. "If you need finished stock that's $\frac{3}{4}$ or 1 in. thick, say exactly that, don't say $\frac{4}{4}$ or $\frac{5}{4}$. If you need curly or bird's-eye maple with one really eye-popping side, say that." At a minimum, tell the salesperson how you plan to use the material and the rough sizes of boards you're seeking.



Start with a drawing. If they know what you're building, many salespeople will go out of their way to find appropriately sized boards with color or figure that complements the design.

7 Check moisture content

You can't tell moisture content from a Web page, so ask the supplier about the moisture content of the boards, or at least whether the material is air- or kiln-dried. If you have a moisture meter, checking the stock when it arrives can alert you to a supplier's optimistic readings or improper handling by the shipper, as well as how long the stock should sit in your shop until it's ready to use.

Before you sign for the order, measure its moisture content. Kiln-dried stock should be between 8% and 12%. Air-dried material should be close to what was promised.



Happy customers (continued)

Madrone

The madrone I bought from Cook Woods (www.cookwoods.com) is beautiful and works extremely well. I am especially pleased with how it looks after a few passes with a sharp plane. It ends up as smooth as glass—better than cherry. But I do have one gripe. To make the grain, figure, and color visible to online buyers, the company planes the boards. One 8-ft. board was planed very poorly and had a $\frac{1}{8}$ -in. to $\frac{1}{4}$ -in. step running along its length, making one side thicker than the other. But admittedly, this is a small quibble and the quality of service makes up for it. I would gladly buy lumber from Cook Woods again.

—Matt Kenney



8 Be wary of online photos and inventories

Some large retailers with big Web sites have staff members dedicated to photographing and keeping an inventory of nearly every board in their warehouse. If you select a piece of lumber based on a Web-site image, make sure they're sending the exact board shown



Know what you're getting.

While some Web sites show the exact inventory, others show boards representative of the species, so make sure you know which method your vendor uses.

In the picture—some suppliers show photos that are “representative” of a particular board or species. Also, while most small suppliers don't have the resources for on-line photos, you can and should ask for a digital photograph of anything highly figured or exotic that you're considering.

It's also a good idea to ask about the mix of board sizes, as some suppliers send out mostly 3-in.- and 4-in.-wide boards, which won't work well for tabletops or large panels.

Last, don't put a lot of faith in inventory lists, as FWW's Steve Scott found out. “My first attempt at buying wood on the Internet taught me a lesson about on-line inventories,” he said. “I ordered several board feet of spalted maple and quartersawn sycamore through a supplier in western New York. Their Web site made it easy to order online, but a full week after placing my order, no lumber had arrived. When I called, I was told they were out of both types of wood.”



9 Consider your shipping options

Small orders are generally shipped by parcel carriers like UPS, FedEx, and the U.S. Postal Service. With these methods, package size and weight are limited, but some suppliers will trim boards or split orders so the package size is within the maximums.

Larger orders are generally shipped by trucking companies, which sometimes charge extra for home delivery. You should ask about any extra charges for residential service.

No matter how your order is sent, make sure to take a careful look at the material before you sign for it.



Shipping methods vary. Long and heavy packages incur extra charges, so cutting boards or splitting the order may lower shipping costs.

10 Nothing beats a phone call

By now it's probably apparent that the Internet is an invaluable tool for tracking down who has what, but almost every lumber dealer we spoke with said that nothing beats a phone call to ensure you really get what you want. A good salesperson will ask questions to help you get the right material for your project, and might even give you a good deal on some uniquely figured or unusually sized boards tucked away in the warehouse.

Make the call. One salesperson even sent a picture to Matt Kenney's iPhone, so he could see the actual boards he was considering while he was traveling for the magazine.



Mahogany

I contacted Irion Lumber (www.irionlumber.com) about the Honduran mahogany I needed for this lowboy. They gave me a few different options, depending on ease of carving or the amount of figure I was looking for. I ended up with a single 22-in.-wide board with stunning figure for the top. I was able to get the sides and drawer fronts from a second wide board, ensuring excellent grain and color match in those parts. That board also had more moderate grain that made the shell carving a little easier. The legs were all from the same riftsawn 12/4 board.

—Michael Pekovich

How to Add Quarter

Make classic fluted columns of any length, without a big lathe

BY JEFF HEADLEY

Many aspects of period furniture design are linked to classical architecture. One of the most obvious connections is the fluted quarter columns that adorn the front corners of many pieces, from chests of drawers to tall case clocks. The design has evolved through the years; on Federal pieces, for example, the fluting was replaced with inlay and stringing.

The good news is that while the column design may vary, the case construction is fairly constant. So once you've built one piece with this feature, you can easily incorporate it into a wide range of pieces. And quarter columns work on contemporary pieces, too.

Unlike some methods that require turning the whole column on a lathe, mine relies mostly on shopmade jigs and tools. The limited amount of turning can be done on a mini-lathe regardless of the



Columns add elegance

Many pieces, from chests of drawers to bookcases, desks, and tall clocks, use quarter columns. Instead of the abrupt termination of a conventional corner, flutes on the quarter columns create shadow lines that attract the eye. The carcase design must include a notch to receive the quarter column, but this is relatively simple to add. Instead of using a large lathe to turn the column and a complicated router jig to cut the flutes, Headley turns just the base and capital of the column on a small lathe and shapes the central section with hand tools.



Columns to Your Furniture

column's length. If you've long admired quarter columns but thought they were beyond your skill level, this article will prove you wrong.

A simple notch receives the column

Carcase construction using quarter columns is similar to that of a regular chest of drawers. The case is dovetailed and the rails are attached to the case sides with sliding dovetails. You'll notice that my sliding dovetail isn't much more than a rabbet with an angled bottom shoulder, but this joint will last lifetimes longer than a regular rabbet that has no mechanical strength.

The front is notched at both ends to receive the quarter columns. The inset from the front is $1\frac{1}{4}$ in., or $\frac{1}{16}$ in. to $\frac{1}{8}$ in. more than the radius of the quarter column. However, the distance from the end must also allow for the depth of the



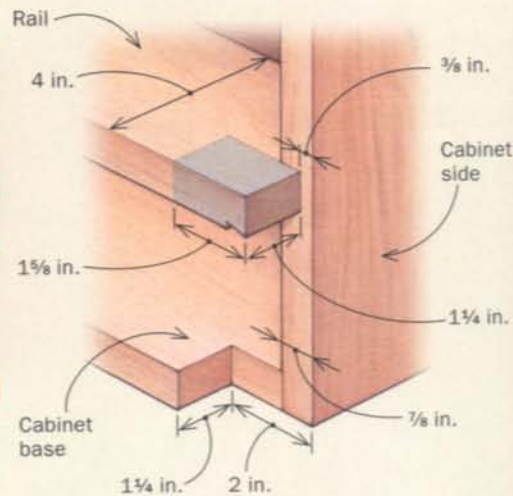
CREATE THE RECESS FOR THE COLUMN

The design and construction of a traditional square-cornered cabinet must be slightly modified in three steps to receive quarter columns.

1. NOTCH THE RAILS



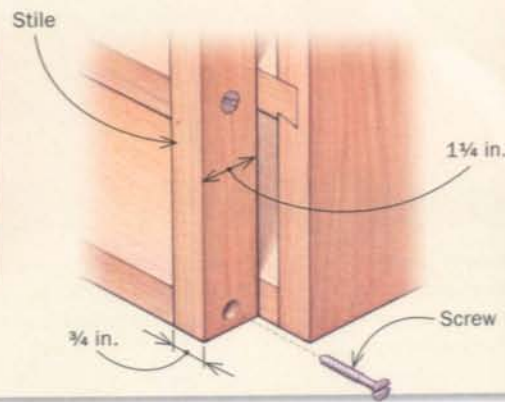
Not a square. The extra width accommodates the stile that is attached in the next step.



2. ADD THE STILE



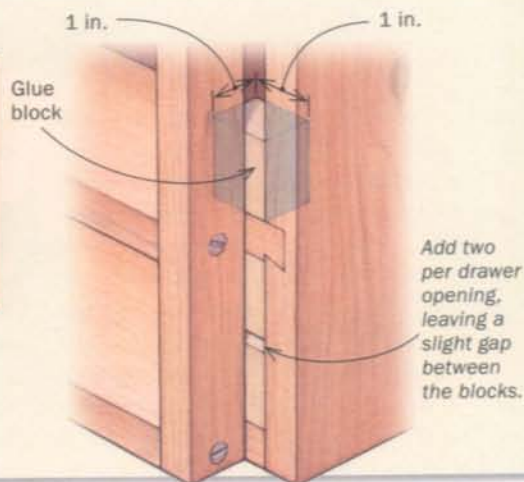
Just a few screws. The front corner of the column meets a stile that is screwed to the notched ends of the drawer rails.



3. ADD GLUE BLOCKS

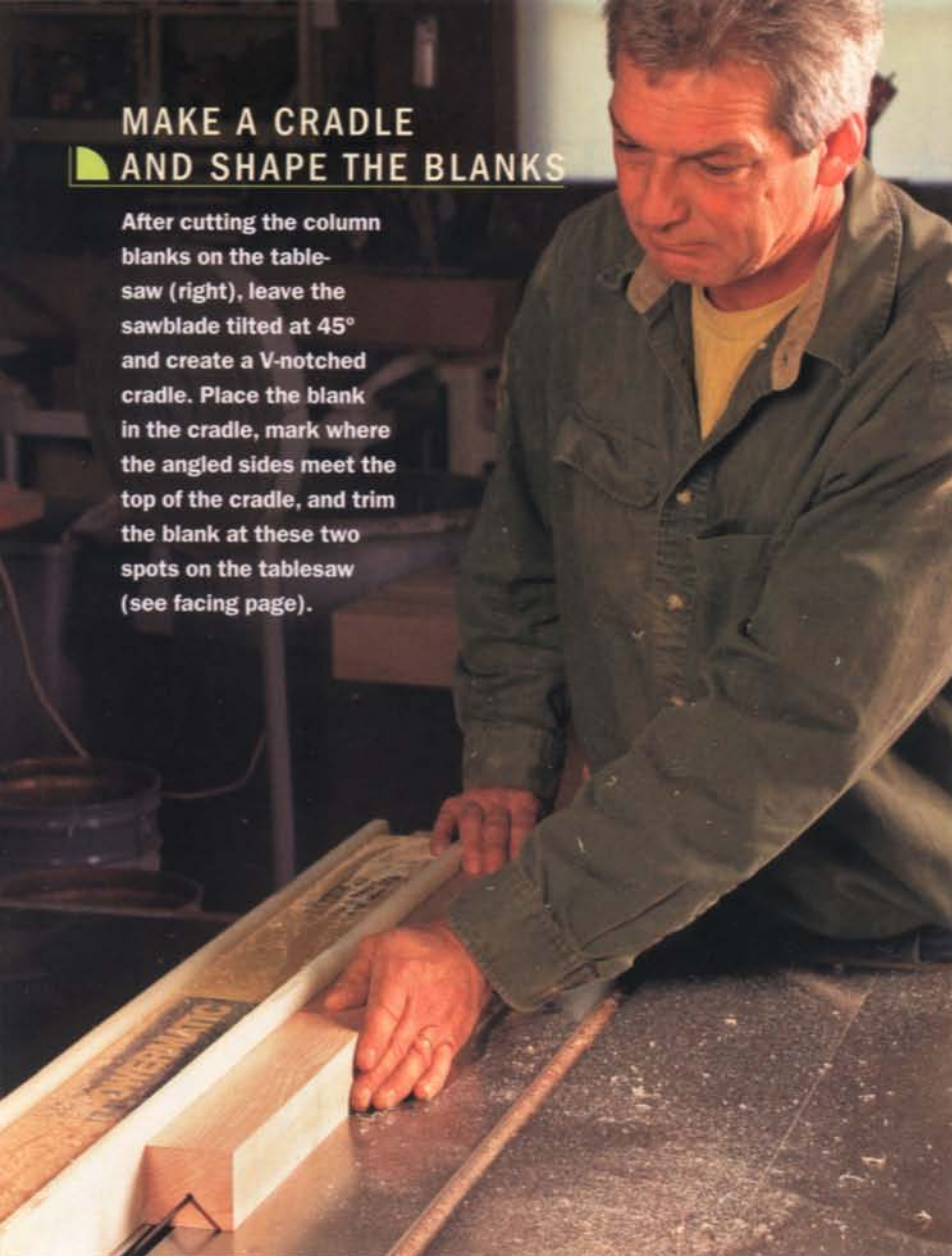


Glue blocks for rigidity. Add glue blocks to connect the stile to the side of the case, forming a stiff-sided recess for the quarter column. A rub joint holds them in place without clamping.



MAKE A CRADLE AND SHAPE THE BLANKS

After cutting the column blanks on the table-saw (right), leave the sawblade tilted at 45° and create a V-notched cradle. Place the blank in the cradle, mark where the angled sides meet the top of the cradle, and trim the blank at these two spots on the tablesaw (see facing page).



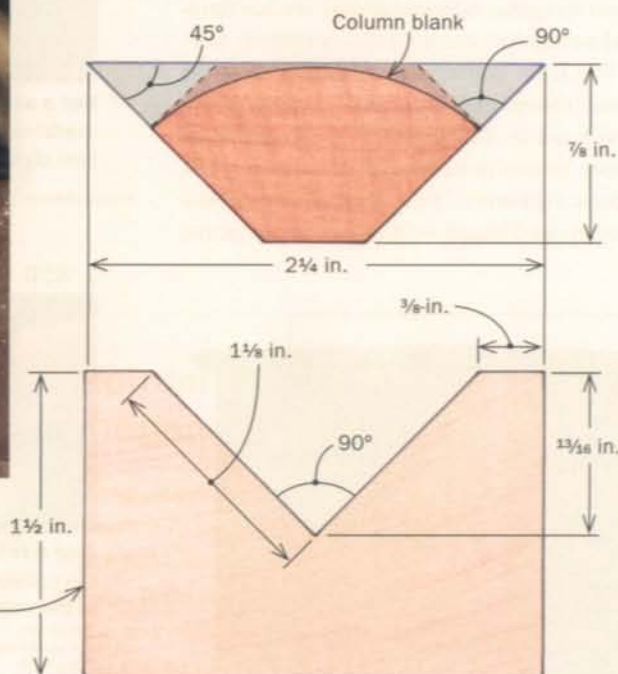
Simple cradle. The quarter column sits in a hardwood cradle while the fluting is added. To make the cradle, make two 45° cuts to form a V-shaped notch.

Hardwood cradle blank, a minimum of 4 in. longer than the quarter-column blank



Rip the blanks. You don't need thick stock for the columns. From 7/8-in.-thick stock, cut two blanks with sides at a 45° angle.

CRITICAL DIMENSIONS



dovetail and the width of a stile that will be added later. The base and sub top of the carcase are notched before being glued to the sides. Rather than figuring and measuring incorrectly, cut and dry-fit each rail into the case, and then mark the opening, allowing for the stile and the quarter column.

When all the rails have been notched and fitted, nail or screw a stile to each end of the rails. You should now have a 1 1/4-in.-square notch. Add glue blocks to

secure the stiles to the case sides. Bevel the corner between the two glued edges.

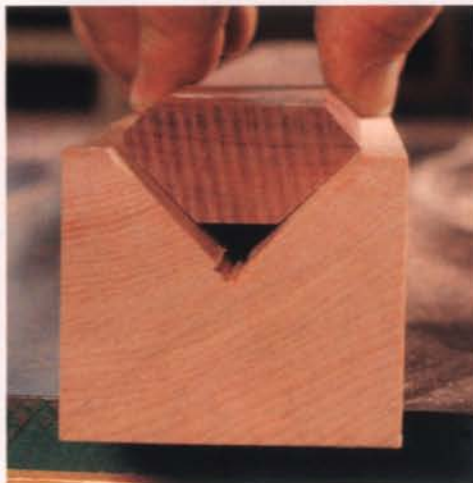
Shape the quarter round

With the corner notch complete, cut out a thin template the same radius as the quarter column with a 1/8-in. straight section on each end. You want the blank for the column to start out slightly too large, so you can handplane the sides to fit the notch perfectly. One way of producing the columns is to glue four blocks together

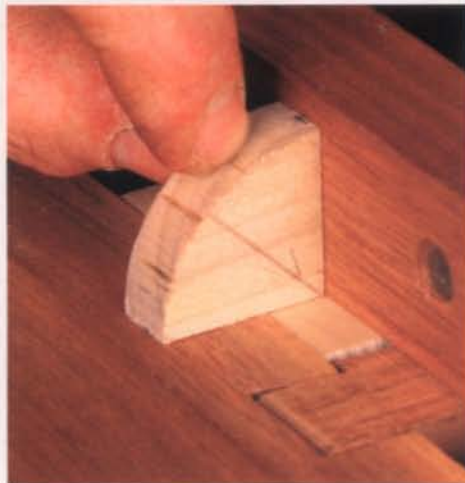
with brown grocery-bag paper in between them, turn the four-part piece into a cylinder on the lathe, then use a chisel to split the brown paper glue line to reveal four quarter columns. I've done this, but there are a number of drawbacks. Of course, you need a long lathe. But also: You have to wait for the glue to dry thoroughly; you hope pressure from the lathe centers doesn't cause the pieces to separate during turning; and you end up with two more columns than you need.



Trim the sides. With the blade set at 90°, cut away the sides of the blanks where they extend above the top of the cradle.



Test the fit. Place the blank in the cradle and check that the sides terminate flush with the cradle's top.



Check the radius. Make a template that matches the column's radius, but with an extra 1/8-in. straight section at each end.

I prefer a simpler method, using a handplane to contour the pieces. Start with a piece of 7/8-in.-thick straight-grained wood, angle the tablesaw blade to 45°, and rip two V-shaped strips with 2 1/4-in.-wide tops. For both laying out the curve of the column and scraping the fluting, you need to hold the blank in a cradle. On a piece of dense, straight-grained hardwood such as oak or maple, make two 45° cuts to create a 90° notch centered on the wide side of the cradle, leaving a 1/4-in.-wide shoulder on either side. Set the column blank in the cradle and use the template to draw the radius on each end of the blank. Now mark where the sides of the blank reach the top of the cradle. Take the blank to the tablesaw, and with the blade at 90°, trim away the excess beyond the mark.

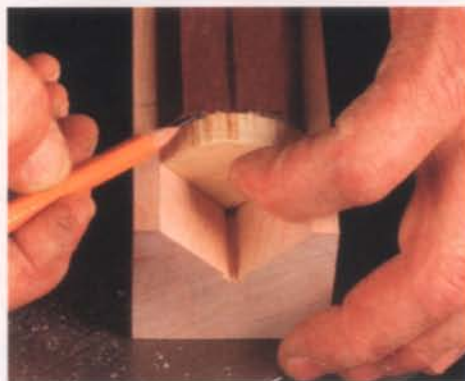
You are now ready to establish the quarter column's curve. Clamp the blank between dogs on your workbench. Use a handplane to create a multi-faceted curve, and refine the curve with a scraper. Don't use sandpaper. Residual grit from the sanding will blunt the scratch stock, which is used next.

Form the flutes with hand power

With two quarter rounds ready to be fluted, you can choose from a variety of styles. The simplest is flutes that extend the length of the column (we'll get to the turned capital and base later). The quarter column I'll make has the added beauty of stop-fluting—so called because the flutes stop about two-thirds of the way down and transition into beads. The transition varied

by region: On Philadelphia and Charleston pieces, among others, the transition line ran straight across; in northern Virginia and the Shenandoah Valley, the line curved upward toward the center as I'll demonstrate. John Shearer, a rather flamboyant late 18th-/early 19th-century builder, curved his downward toward the center.

Whatever style you choose, both the flutes and the beads are cut with a two-handed, shopmade tool that rides on the shoulders of the cradle you just made. On a blank of hardwood, bandsaw the



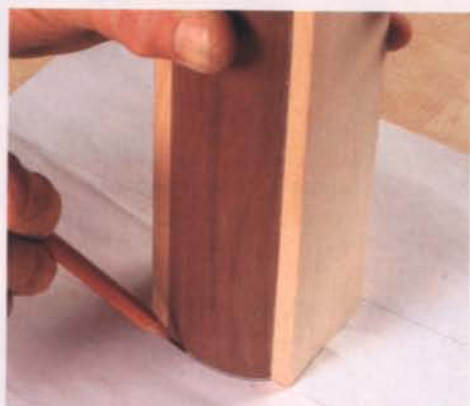
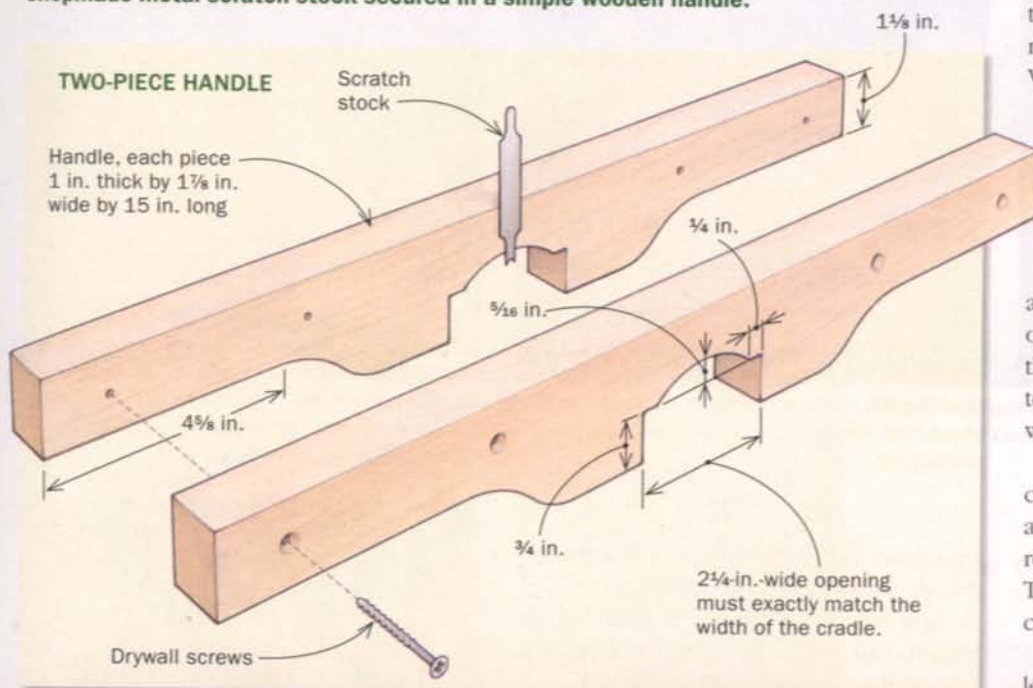
Transfer the shape. Place the template against the end of the blank and mark the desired curve.

Plane easy. Use a bench plane to create the basic curve on the quarter-column blank. You can refine the series of facets with a card scraper. Don't use sandpaper, because the loose abrasive left behind will blunt the fluting tool used later.



ONE SCRATCH STOCK HANDLES FLUTES AND BEADS

The flutes and beads are scraped into the column blank using a small, shopmade metal scratch stock secured in a simple wooden handle.



The cradle determines the tool. Use the cradle and the curved quarter-column blank to help lay out the scratch-stock holder.



No slop allowed. To cut straight flutes, the cheeks of the scratch-stock holder must fit snugly against the sides of the cradle.

profile shown in the drawing. Round over the handles at either end, run in screws, remove them, and then rip the blank in half. When screwed back together, the halves grip a piece of metal known as a scratch stock that scrapes the profiles on the blank. I filed and then snapped off a 1/4-in.-wide strip from a card scraper, but other sources include sections of an old bandsaw or hacksaw blade. Grind and file the convex profile to cut the flutes on one end and the concave profile for the beads on the other, being careful not to overheat and discolor the metal, which will cause it to lose its temper.

Secure the rounded quarter column in the cradle by screwing a block into the V-notch at each end, but make sure that the blocks remain below the surface of the column. This way, you can scrape to the end of the column.

When laying out the flutes on the column, leave the two outside shoulders slightly wider than the shoulders dividing the flutes. This way, you can trim the sides of the column to fit later. Now transfer the location of the flutes to the ends of the blank so that you can align the scratch stock in the tool with them. Although this quarter column has five flutes, you need to set the metal scratch stock in only three locations: The far outside position will do both outer flutes; the center outside position will do the two adjacent flutes; and the central position will cut the central flute.

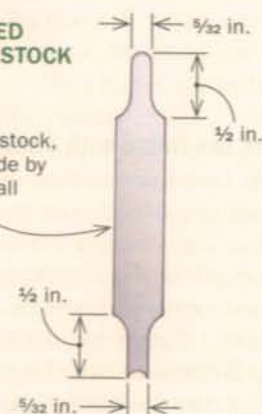
If you plan to do stop-fluting, mark the transition lines on the column. Begin scraping, stopping as close as possible to the transition line. When you have done



Two profiles on one piece. Start with a piece of card scraper or old hacksaw blade. On one end, grind the rounded profile for scraping the fluting (left). On the other end, grind the concave profile for the beaded stop-fluting (above). Any burr raised is insignificant, and the tool is used in both directions.

TWO-ENDED SCRATCH STOCK

Scratch stock, 3/8 in. wide by 2 1/2 in. tall



SCRATCH THE FLUTES AND STOPPED FLUTES

Lay out where the fluting will transition into the stop-fluting (beading). Calculate the position of the center point of the middle flute and that of the two flutes to its right. Mark these as lines on the top end of the blank. These will be used to align the scratch stock in the holder.



Lay out the transition. If you plan to combine fluting and stop-fluting on your quarter column, lay out the staggered transition.



Align the scratch stock and scratch the first flute. Mark the centerline of the middle and two right-hand flutes on the end of the blank. When the scratch stock is aligned and at the correct depth (left), screw the two parts of the holder together. Push and pull the tool along the cradle to create the flute (above). Reposition the scratch stock to create the adjacent flute on the right, then just reverse the tool to create a symmetrical flute on the left.

FLUTING

Outside shoulders start off at least $\frac{3}{16}$ in. wide to allow column sides to be planed to fit.

Flutes, $\frac{5}{32}$ in. wide by $\frac{3}{32}$ in. deep

$\frac{5}{32}$ -in. gap between flutes

Scratch stock alignment lines

$\frac{1}{4}$ -in. gap between adjacent transitions

STOP-FLUTING

Stop-flute, $\frac{5}{32}$ in. wide by $\frac{1}{16}$ in. deep



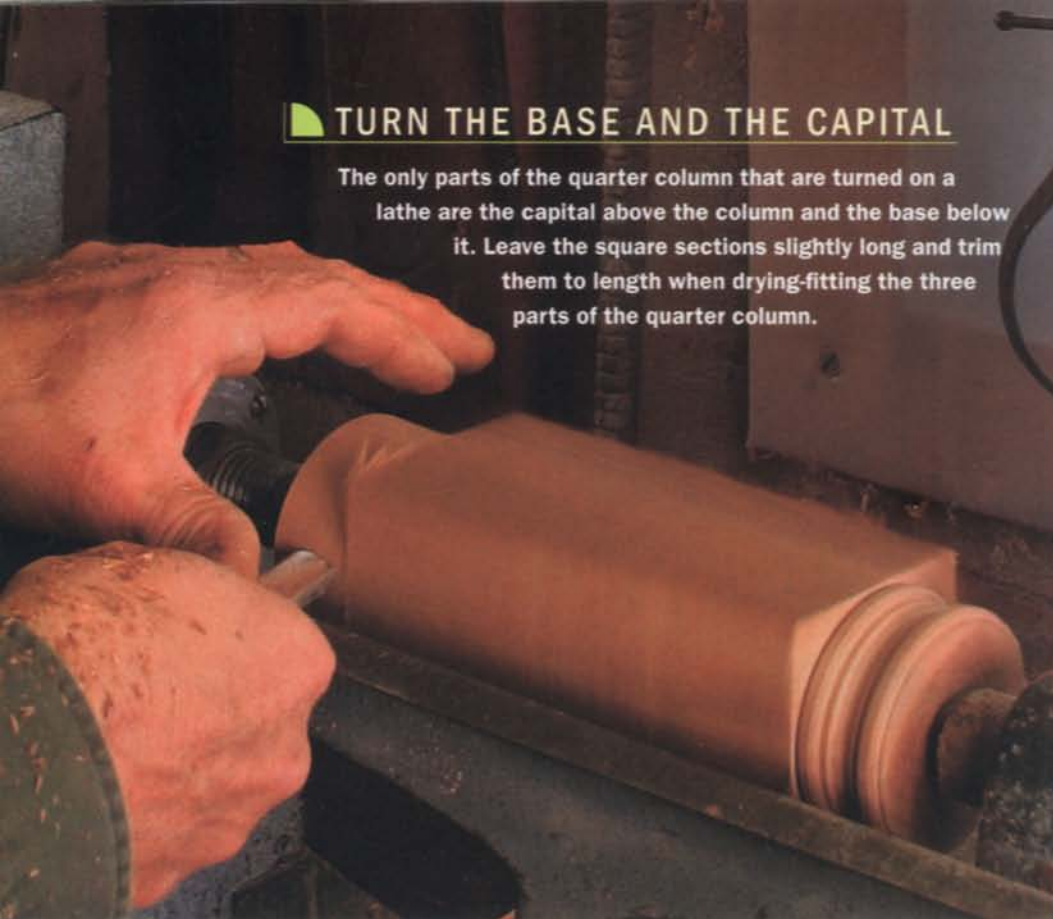
Finish with stop-fluting. After all the flutes have been cut, flip the scratch stock end-over-end, and create the beading.



Carve the transition. Try to have the scratched profiles almost meet, then use a #9 sweep, 3-mm-wide gouge to complete the intersection.

TURN THE BASE AND THE CAPITAL

The only parts of the quarter column that are turned on a lathe are the capital above the column and the base below it. Leave the square sections slightly long and trim them to length when drying-fitting the three parts of the quarter column.



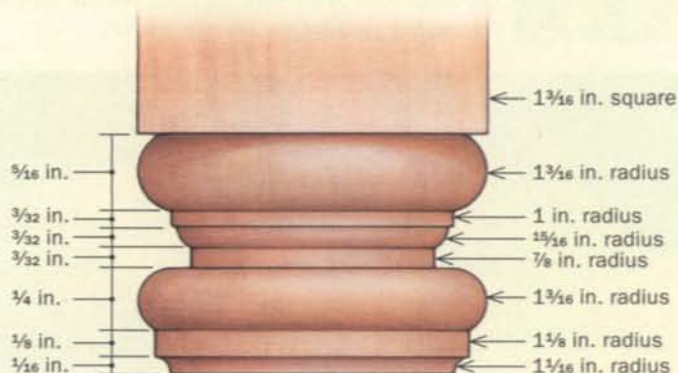
the fluting, flip the metal scratch stock and work on the beads. You will have to hand-carve the intersection of the flutes and beads, but try to keep this to a minimum.

Turn the ends and install the column

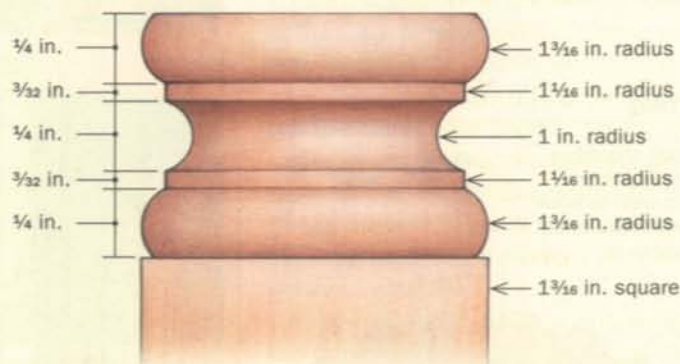
Starting with a 2 $\frac{5}{8}$ -in.-square block, turn a capital and a base to the desired shapes, leaving a slightly heavy shoulder so that you can adjust the length. Saw both turnings into quarters. You want these pieces to project a little from the case so you can plane them to fit the corner notch and the shaft of the column. Dry-fit the parts and handplane the sides of the column until it fits just inside the notch. It is best to lay the case flat on its back to fit and then glue and clamp the capital, the column, and the base into the notch. When dry, complete the rest of the piece. □

Jeff Headley is the owner of Mack Headley and Sons, period furniture makers near Winchester, Va.

CAPITAL



BASE



Eight parts from one turning. Rip the turned blank into four equal sections, four capitals and four bases.



Plane to fit. The radius of the turning is oversize to leave room for ripping and handplaning the sides until they fit.



Glue in the columns. With the cabinet on its back, trim the three parts of the column until they fit the recess snugly.

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readers gallery

AARON RADELOW

Escondido, Calif.

While a student at the American School of French Marquetry in San Diego, Radelow discovered this table (approximately 14 in. deep by 19 in. wide by 25 in. tall) in a marquetry book. Then he saw it on display at the J. Paul Getty Museum in Los Angeles and knew he had to build it. Over 3,000 hours later, he had finished the table and its bouille (reverse-image marquetry) counterpart.

PHOTO: BERT SEAL



Online Extra

To see a slide show of the tables and building process, go to FineWoodworking.com/extras.



BYRON J. BRAYTON

Manchester, Conn.

The majority of Brayton's work is veneered because it provides him with unlimited design possibilities. This Art Deco-inspired table is completely veneered with Macassar ebony. He uses MDF as a substrate as well as laminating his own solid-wood substrates for the curved base. Finished with lacquer, the table is 20 in. deep by 60 in. wide by 34 in. tall. PHOTO: JEFF KIELY

JERRY FROST

Ann Arbor, Mich.

Inspired by the need for a square table, Frost adapted the rectangular design of Christian Becksvoort's "Glass-Top Coffee Table" (*FWW* #92) when he built this version (30 in. deep by 30 in. wide by 18 in. tall). The wood is cherry and the finish is a wipe-on varnish.



CHAD HILL

Fredericksburg, Va.

Hill built this desk (29½ in. deep by 72 in. wide by 31½ in. tall) as an anniversary gift for his wife. Design elements include high contrast, tapered legs, a bevel on the underside of the top, lights under the top, and a sweeping inlay across it. The materials are white oak, blackened red oak, and black corian; the finish is lacquer.

PHOTO: LARRY W. STONE



TONY KUBALAK

Eagan, Minn.

Kubalak is a master of authentic period reproductions, yet this mahogany bombé chest still held challenges for him, particularly the serpentine front and angled dovetails on the bottom three drawers. He based the chest (20¾ in. deep by 36½ in. wide by 32¼ in. tall) on the Gardiner Greene bombé at New York's Metropolitan Museum of Art. The finish is aniline dye, shellac, and wax.

PHOTO: RAMON MORENO



WORTH SQUIRE

College Grove, Tenn.

When designing these chairs, Squire set out to stay true to the Chippendale form but also incorporate a tribute to trees. He harvested, milled, and dried the walnut himself. Finished with a French polish over linseed oil, each chair is 17½ in. deep by 21½ in. wide by 38½ in. tall. PHOTO: JOHN LUCAS



DAVRILL NASH

Laurel, Md.

Nash builds understated forms embellished with carving, like the basket weave on this cherry hall table with a glass top (14 in. deep by 50 in. wide by 30 in. tall). The finish is lacquer.



DENNIS CHILCOTE

Minneapolis, Minn.

Chilcote's inspiration for this basket (4 in. dia. by 3½ in. tall) comes from the simplicity and elegance of Shaker furniture and basketry. He learned how to harvest and splint the black ash from Martha Wetherbee's article "Making a Basket From a Tree" (FWW #20). The bottom is woven over a lathe-turned mold, and the turned bird's-eye maple lid (finished with linseed oil) snaps into place against the inner rim of the basket.

PHOTO: RAMON MORENO





RUTAGER WEST

St. Paul, Minn.

Inspired by Andrew Crawford's books on box making, West wanted to make a veneered box with inlay. While making some profiled molding with a handplane, he got the idea for the profiled inlay featured in this maple burl, ebony, and holly jewelry box. He made the inlay molding as a lamination and then routed a profile on it. The box is 8 in. deep by 13 in. wide by 7 in. tall and has a French polish finish.

PHOTO: RAMON MORENO

ANDY FAWCETT

Gambier, Ohio

Fawcett harvested most of the cherry for this Pennsylvania secretary (20 in. deep by 38 in. wide by 90 in. tall) from his family farm. Although his father never saw the finished desk, Fawcett completed the project as a tribute to him and their time together in the shop. To finish the piece, Fawcett moved it outside each day for two weeks to darken in the sun, and then applied an oil finish, shellac, and light brown wax.



DAVID STINE

Dow, Ill.

Stine fells and mills all the lumber he uses in his work, and as he watched this particular walnut board come off the mill, he knew immediately that it would be a headboard on an otherwise simple bed design. The cherry and walnut king-size bed is 80 in. deep by 80 in. wide by 40 in. tall. The finish is linseed oil.



Cut slotted screw holes in a drawer bottom

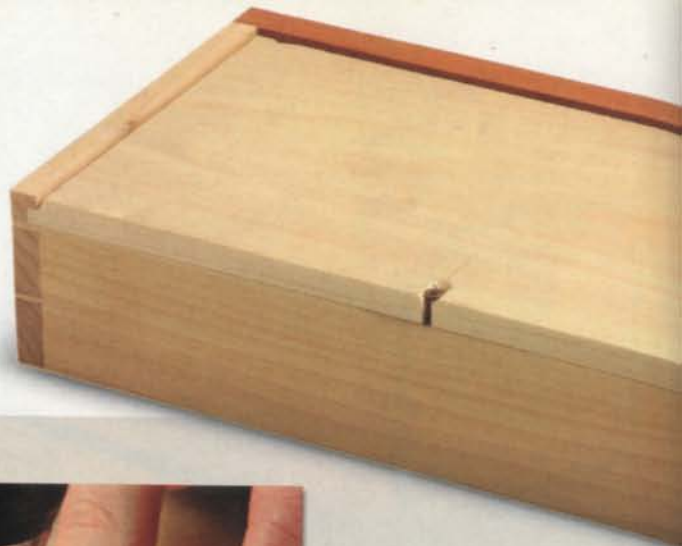
Q: I like the chamfered screw slots found on the bottoms of many drawers. What's a good way to make them?

—CARL ENGEL, Pawtucket, R.I.

A: A SLOTTED SCREW HOLE is critical in traditional drawer construction. Without it, the drawer bottom would be trapped between the drawer front and the screw. And with nowhere to go, the bottom's seasonal expansion would eventually damage the drawer's joints, if not tear them apart altogether.

You can make the hole quickly and easily with a countersinking drill bit, a handsaw, and a chisel. First, drill a clearance hole and countersink in the drawer bottom, drilling from the underside. On the top side, mark a line from the outside edges of the pilot hole to the back edge of the drawer bottom. Use a handsaw to cut along both lines and open up a slot. Then, on the underside of the bottom, chamfer the slot with a chisel to match the taper of the screw head.

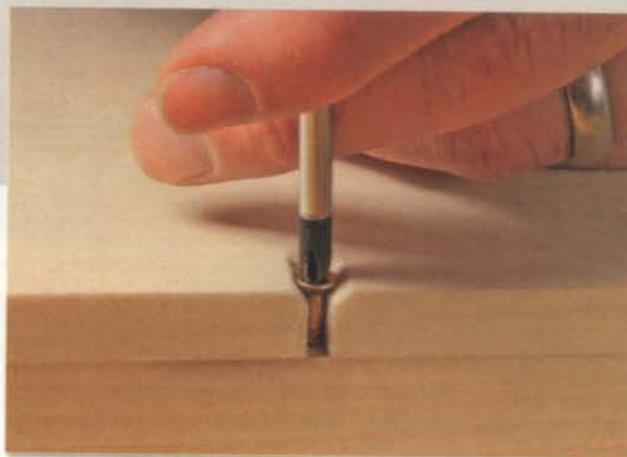
—Michael Pekovich is Fine Woodworking's art director.



Drill a clearance hole in the bottom. For a ½-in.-thick back, the hole should be less than ½ in. from the edge of the bottom. Otherwise, it will be visible from inside the drawer. Countersink the hole.



Cut the slot and chamfer it with a chisel. Extend layout lines from the edges of the hole. Then use a backsaw and cut along the inside of the lines (left). For the screw head to move freely in the slot, the walls must be chamfered (right) to match the underside of the head.



Slide in the bottom, and insert the screw. But not too tightly. The drawer bottom should be able to expand and contract freely.

Ask a question

Do you have a question you'd like us to consider for the column? Send it to Q&A, *Fine Woodworking*, 63 S. Main St., Newtown, CT 06470, or email fwqa@taunton.com.

Foolproof finish for the kitchen

Q: I found Mark Schofield's wipe-on gel varnish ("One Editor's Foolproof Finish," *FWW* #196) very useful, as I always have trouble getting a smooth surface with a brushed finish. Would his finishing method be suitable for kitchen cabinets?

—ROD PARIS,
Edinburgh, Scotland

A: YOU CAN USE A SIMILAR method, but because kitchen cabinets need to be cleaned regularly, they require a more durable undercoat. First, seal the wood with a washcoat of dewaxed shellac such as SealCoat. Next, brush on a coat of polyurethane. When dry, sand lightly with P320-grit paper, vacuuming away the dust. Apply at least two more coats. Sand the last coat thoroughly until the surface is totally smooth with minimal shiny spots. This will flatten any brush marks. Then wipe on three coats of gel varnish, then a coat of paste wax.

—Mark Schofield is the managing editor.



Protective base coats. Give kitchen cabinets the protective film of finish they need by brushing on at least three coats of either an oil- or water-based polyurethane (above). After sanding smooth the last coat of polyurethane, wipe on three coats of gel varnish (left). While offering little added protection, each coat dries smooth with no brush marks or dust nibs and doesn't require sanding or rubbing out.

Change machine height to improve comfort

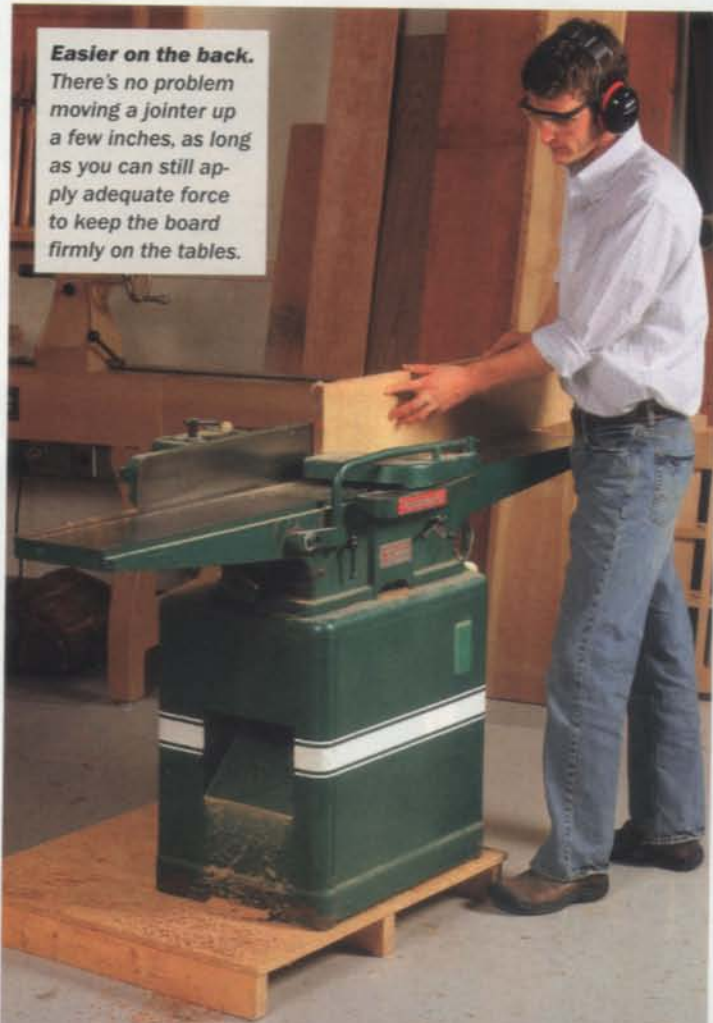
Q: I'm over 6 ft. tall and have a bad back. Bending over to use my tablesaw and jointer just isn't comfortable anymore. What can I do to make them more comfortable to use?

—RICHARD WRIGHT,
Leesburg, Va.

A: THE HEIGHT OF ANY WOODWORKING machine is related to factors like the operator's stance at the machine, the direction stock is fed through it, and the amount of pressure needed to feed it. Don't be afraid to experiment. If you think that your jointer or tablesaw is too low, put it on a platform. If a tool is too tall, build a platform for yourself. Experiment with different heights until you find the one that works best for you, but don't sacrifice safety. You should be able to apply adequate force and feed stock past the blade or knives at the appropriate rate.

—Christian Becksvoort, who is 6-ft. 3-in. tall, is a contributing editor.

Easier on the back. There's no problem moving a jointer up a few inches, as long as you can still apply adequate force to keep the board firmly on the tables.



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Rectangular benchdogs are quick to make

Q: I'm making Garrett Hack's bench ("A Workbench 30 Years in the Making," *FWW* #209) and would like more information about his benchdogs. In particular, what type of spring does he use to hold them in place?

—COOPER WILLIAMS,
Oxford, Miss.

A: I MAKE MY BENCHDOG BODIES from whatever hardwood scrap I have around. For the springs, I use either ash or white oak, because they are strong woods but have enough spring to hold the benchdog in place.

Cut the body on the table-saw, and use a bandsaw to cut both the groove that holds the spring in place and the recess in the dog's body to accommodate the spring. Plane the spring to fit into the groove and then glue it in place.

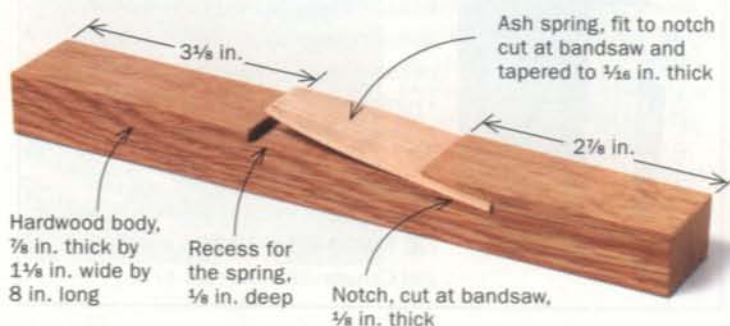
—Garrett Hack is a contributing editor.



Tail vise's best friend. A pair of benchdogs lets a tail vise clamp boards flat on the benchtop for planing. Rectangular dogs don't turn and are quick to make. A wooden spring holds the dog in place.

SPRING-LOADED

This shopmade dog adjusts beautifully with its simple spring.



Rough-turn bowl blanks before storing

Q: I have a large walnut slab that I'd like to cut into bowl blanks and turn on my lathe. What's the best way to store the blanks so that I can turn them over the next few years?

—VINCENT STINSON,
Boise, Idaho

A: CUT AND ROUGH-TURN the blanks before storing them. This speeds up the drying process and decreases the chance that they will crack.

First, cut the pith out of the slab. Its instability can ruin a bowl blank. Next, cut out the blank and round it at the bandsaw. Then turn it until the wall thickness is 10% of the bowl's final diameter, so it won't be too thin to turn after the blank shrinks as it dries. Any thicker and the walls will likely crack while drying. Last, cover the entire blank with a green wood sealer, like Anchor Seal, and store it in a cool, dry place.

—Mike Maboney is a professional wood turner in Orem, Utah.



Rough-turn and seal. Then you can store blanks in a cool, dry place until you're ready to turn them to final size.



Start turning at the bandsaw. Cut the square pieces into oversize round blanks to make turning them easier.



Leave the walls thick, but not too thick. About 10% of the bowl's diameter is right. Turn the walls thinner and there won't be enough left to turn after drying; thicker and they're more likely to crack while drying.

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Leaded glass made easy

BY MICHAEL PEKOVICH

For the Arts and Crafts display case on p. 30, I made doors with leaded glass. Not only is leaded glass attractive and true to Stickley furniture, but it's also simple to make and an alternative to glass panels divided by wood mullions. The simple pattern on these doors is a great introduction to the craft, but the techniques apply easily to more intricate designs (see "A technique for tight curves," p. 91).

Choose your glass first

You will need a few special tools and materials to make leaded-glass panels (see box, below). For the panes, I chose a slightly distorted glass ($\frac{3}{16}$ in. thick) that my local glass shop referred to as restoration glass. There are a lot of glass options available online and from stained-glass supply stores, but for this display case, stay away from anything too textured or bubbly. Clear plate glass would be better than something that draws too much attention to itself.

The process of making a leaded-glass panel involves cutting the glass into

WHERE TO BUY GLASS SUPPLIES

www.delphiglass.com

- Glass cutter: \$6 and up
- Soldering iron: \$22 and up
- Solder (60/40): \$12 per lb.
- Glasflux: \$6
- Horseshoe nails: \$12 per 100
- Inland black cement: \$8
- Whiting powder: \$4
- Lead nipper pliers: \$9
- Lead vise: \$6
- $\frac{1}{4}$ -in. lead came: \$5 per 6-ft. strip
- $\frac{1}{4}$ -in. zinc channel: \$3 per 6-ft. strip

Cutting glass cleanly

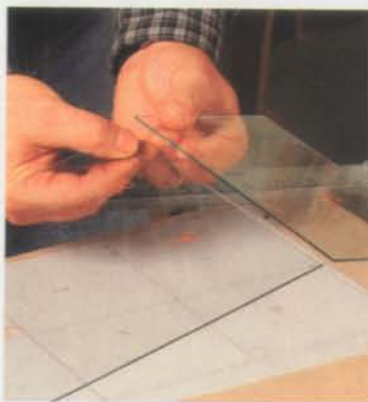
Although a steel-wheel glass cutter from a hardware store will work, you'll get better results with a diamond-wheel cutter.



Oil is a must. Without lubricant, the kerf cut into glass will want to close up, leading to a coarse edge. A simple steel-wheel cutter gets dipped (left), while a self-lubricating cutter gets filled (right).



Use a full-size pattern as a guide. A drywall square ensures a straight, square cut. Make one pass only, pressing hard enough with the cutter to hear a slight crackling sound. Offset the cuts $\frac{1}{16}$ in. inside the lines to account for the lead came.



Breaking up isn't hard to do. With a properly lubed cutter, the glass should snap apart cleanly after scoring.



Assembly: Follow the pattern

3/4-IN. ZINC
U-CHANNEL

3/4-IN. LEAD
CAME

The glass panes are
installed between sections of
lead came. The entire assembly
is framed with zinc channel.

small pieces and reassembling them
between strips of lead called came. Lead
came is available in a few profiles, but
for this panel I used a simple H-profile.
Surrounding the assembly is a U-shaped
zinc channel that adds some rigidity to
the panel. After assembly, the joints are
soldered, and cement is forced between
the came and the glass pieces. Finally,
the came is buffed, which has the added
benefit of darkening the lead.

Use a template to cut the glass

It's always best to start with a full-size
pattern of the glass panel. In this case,
it's easy enough to lay the glass on the
pattern and use it as a guide to cut the
rectangles. For ornate designs, I'd transfer
the pattern onto heavy paper and cut
the pieces apart to use as individual
templates for the glass. When cutting the



Clamp and pull. The
lead-came strips are
flexible when shipped.
To straighten them
and make them rigid,
you need to stretch
them. Put one end in
a lead vise (above) or
other clamp and pull
hard on the other end.



Square from the start. To keep the glass panel
square, assemble it on a right-angle jig, placing
the full-size pattern underneath.



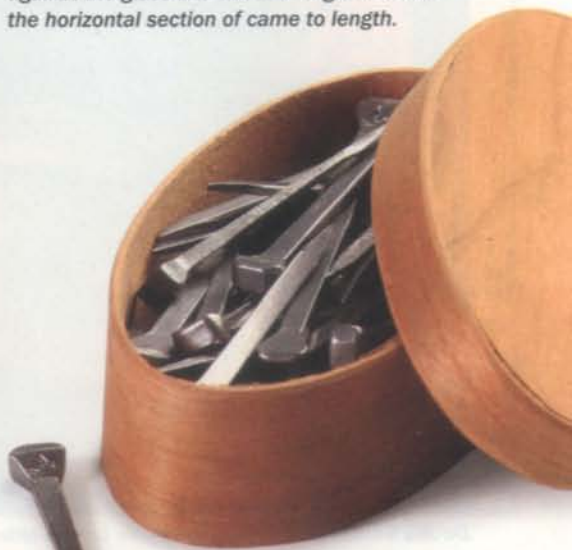
Corner first. Slide the first piece of glass into
the zinc channel. Snug a short section of came
against the glass and use it as a guide to cut
the horizontal section of came to length.



One row at a time. Tack the glass rectangles in
place with horseshoe nails, using short pieces
of came as a cushion. Horseshoe nails (far
right) can be removed and reused.



Secure the frame. Once all the panes are in
place, install the last two sections of the zinc
frame. Use horseshoe nails to prevent the
assembly from shifting.





Solder the joints

To achieve a smooth solder joint, let the soldering iron heat until the solder melts easily and doesn't stick to the iron.

rectangles, offset the cuts $\frac{1}{16}$ in. inside the pattern lines to allow for the $\frac{1}{16}$ -in.-thick rib inside the lead came; otherwise, the panel will end up too large.

As you cut the glass, number each rectangle to correspond with the numbers on the pattern.

Right-angle jig is the key

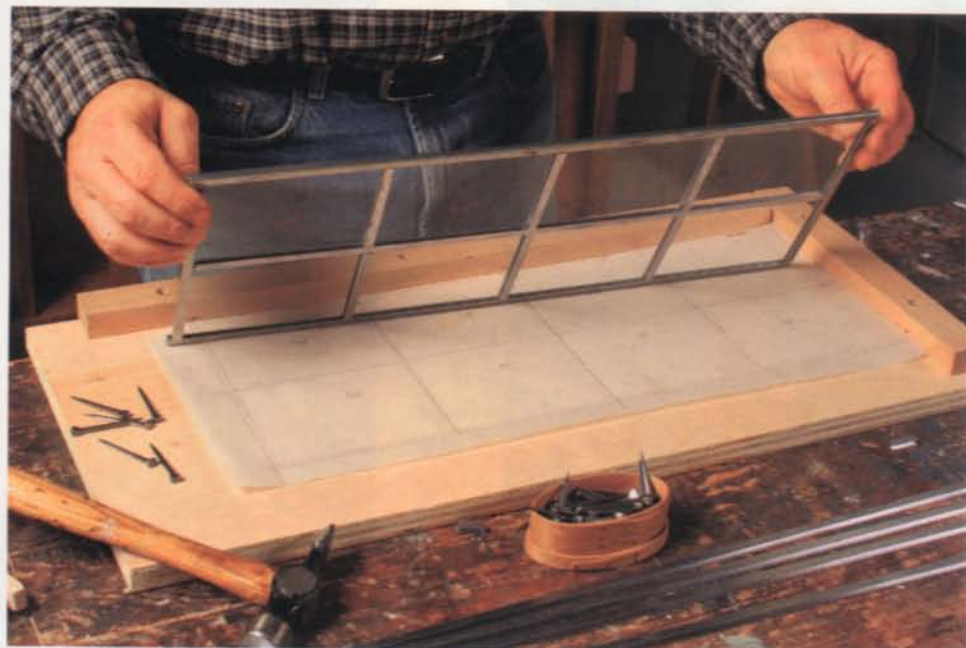
To keep the panel square during assembly, use a jig with a $\frac{3}{4}$ -in.-thick plywood base and two fences that meet at a right angle. Trim the pattern along two adjoining edges and place it against the fences of the jig. Then cut the zinc border to length and place two pieces



Flux first. Flux cleans the joint before soldering. It also helps the solder to flow more easily when it's melted, making a better-looking joint.



Solder on. Melt some solder onto the iron (left), and apply it to the joint (right). Do not leave the iron in contact with the came too long or it will melt the came and create a gap.



Do the second side. Once the joints on one side have been soldered, remove all the nails along the border and carefully flip the panel to solder the other side.

against the fences. Put the first piece of glass in the corner, securing it with a horseshoe nail and a short piece of came.

Cut a piece of came to length, place it along the side of the glass, and install the second rectangle. Continue until the first row of panels is completed. Cut the center strip of came to length and install it and the second row of panels. Once the last two pieces of zinc border are secured, solder the joints on both sides of the panel.

To cement the glass in place, you can use glazing compound, but I prefer the dark look of black cement. Apply the cement liberally, brushing it into all crevices, then use whiting and sawdust to solidify the mix and to clean the glass. Do both sides of the panel.

When the glazing is complete, the panel is ready to be installed in the door. □

Glaze the panel

Use black cement to fill any gaps and make the panel more rigid. Whiting firms up the cement and helps clean the panel.

Apply the cement liberally, then sprinkle on whiting. Use a stiff-bristle brush to work the cement into the gaps between the came and glass (right). Sprinkle on the whiting and rub it in (far right). You can use plaster of paris in place of the whiting.



Burnish with sawdust.

The final step is to pour sawdust on the panel and brush (far left). This step not only helps clean the glass, but it also darkens the lead and the solder joints. The more you brush, the darker the look. Use a thin stick to remove excess material in the corners (left).

A technique for tight curves

I use a different technique to make intricate designs such as the glass panels on these Greene-and-Greene lanterns. First, make a full-size pattern of the panel and cut individual patterns for each piece of glass.

Instead of assembling the glass pieces using lead came, wrap the edge of each piece with adhesive-backed copper foil. Once all of the foil-wrapped pieces are in place, melt solder onto the copper. This technique requires much more soldering than the lead-came technique, but it's easy to assemble and doesn't need to be glazed. Typically a chemical patina is used to darken the solder lines.



Wrap and fold.

Run adhesive-backed copper foil around the edge of the glass and fold it over onto the face.



Flux and solder.

Assemble the pattern and brush flux onto all of the copper foil. Then apply solder along every joint line.



A lesson in curves

BY ANISSA KAPSALES

Begin at the bandsaw



1

Hank Gilpin's designs (see the back cover) are driven more by the wood than by a preconceived notion of how the form should look. In another shop, the wood for these pieces might have ended up in the stove or scrap pile, but Gilpin saw a better use in them. As with his larger pieces, these smaller examples narrow the divide between sculpture and function. The design is sparse enough to let the wood's color, texture, and grain show through, but still interesting enough at first glance to capture attention. To build this bowl and tray, all you'll need is a steady hand at the bandsaw and a few hand tools. As for the talent to design others like them, that might take a decade or two to develop.



2



3



4

Cut the bottom, then the top. After sketching the design on the blank with two larger bumps serving as the "feet," Gilpin makes stop cuts that end where one curve meets another (1). To remove the waste, he starts near the center of each semicircle, and cuts the material up to the next notch, removing a triangular slice (2). When one side of all the semicircles has been cut, he turns the board to repeat the process in the other direction, removing the rest of the waste (3). Gilpin's bandsawing is very precise, taking him nearly to the finished surface. He often uses the bandsaw as a rasp, smoothing the surface and sneaking up to a pencil line. Once the bumps are cut, Gilpin carefully cuts the long curve on the top of the tray (4).



Smooth with hand tools



Faceted curves. Although the bumps of this tray look perfectly smooth, they are actually lightly faceted using a rabbet plane across the grain. Few tools fit into the corner where two curves meet as well as the rabbet plane.



Smooth the long, curved top. Gilpin's apprentice, Mark Gower, uses a compass plane (left) and then a scraper (above) to smooth the top. He smooths the top with sandpaper, but leaves the underside's handplaned look.



Hand-carved details

Like the tray, this bowl starts on the bandsaw, then goes in a different direction with hand-carved shaping and texturing.



Subtle cut-in adds to design. On the example he made for us, Gower decided to undercut the sides to break up the flat surface and emphasize the grain. He defined the basic shape with a chisel, and then faired the surface with a rasp and files.



#8 gouge does it all. Gower drives this gouge with a mallet, moving quickly around the bowl and roughing out material. Going across the grain produces less tearout than moving with it (left). Once most of the material is gone, he works with hand pressure alone, taking smaller and more precise cuts to produce the finished texture (above).

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From Scrap to Sculpture

Every once in a while, Hank Gilpin shifts gears in his Rhode Island shop and declares “knickknack week.” The results were on display recently in a one-man show at Boston’s Gallery NAGA. Although the gallery was filled with Gilpin’s masterful furniture—characterized by exuberant shaping, superb joinery, and eye-popping domestic woods—a dozen or so trays and shallow vessels were sprinkled in, distilling his inventiveness and verve into just a few ounces of wood. Although Gilpin’s broad de-



sign resume extends to landscapes, swimming pools, tunnels, and buildings, he says these little pieces are “the most fun in the world. Here’s a scrap you would normally burn—what can you do with it?” Gilpin bandsaws each one from a single block of wood, then often passes them to his assistants to refine the shapes with hand tools. Mark Gower completed all of these. Gilpin says his inspirations range from 18th-century Newport furniture to the cars of the 1950s that he admired as a boy.

—Jonathan Binzen



Photos: Karen Phillipi

How They Did It Turn to p. 96 to see how Gilpin and his assistants shape these small pieces.

Online Extras Go to FineWoodworking.com/extras to get inspired by more of Gilpin’s work. Then, share photos of your creative use of cutoffs in our “Scrapacular” gallery challenge.