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Tenon shootout: hand vs. power, p. 42

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Fine Woodworking

JANUARY/FEBRUARY 2010 ■ ISSUE 210

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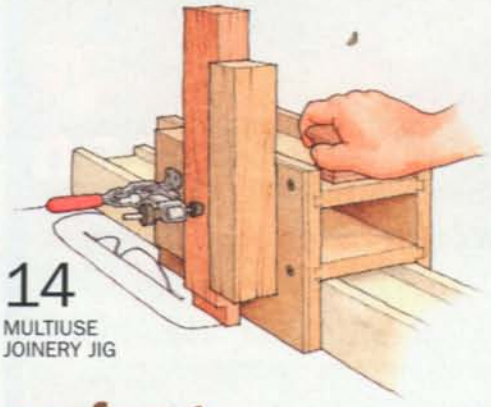

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## THIS MONTH ON FineWoodworking.com/extras

**Visit our Web site to access free Web tie-ins, available December 16. While you're there, don't miss our collection of totally free content, including tool reviews, an extensive project gallery, and must-read blogs.**

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### LIVE VIDEO: Tenon Shootout: Hand vs. Power Tools

JANUARY 21: Tune in at 1:30 p.m. EST as two experts face off. What's the best way to cut a tenon?

### VIDEO: Turn a Shaker Leg

Breeze through this elegant turning with expert guidance from Christian Becksvoort.

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**VIDEO**

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Don't miss this collection of quick, smart video shop tips that offer simple solutions for common woodworking problems. December's releases include:

- A clever stop-block solution
- A quick-to-make miter-saw "stand"
- An easy way to drill for shelf pins


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***Fine Woodworking:*** (ISSN: 0361-3453) is published bimonthly, with a special seventh issue in the winter, by The Taunton Press, Inc., Newtown, CT 06470-5506. Telephone 203-426-8171. Periodicals postage paid at Newtown, CT 06470 and at additional mailing offices. GST paid registration #123210981.

**Subscription Rates:** U.S and Canada, $34.95 for one year, $59.95 for two years, $83.95 for three years (in U.S. dollars, please). Canadian GST included. Outside U.S and Canada, $41.95 for one year, $73.95 for two years, $104.95 for three years (in U.S. dollars, please). Single copy, $7.99. Single copies outside the U.S. and possessions, $8.99.

**Postmaster:** Send address changes to *Fine Woodworking*, The Taunton Press, Inc., 63 S. Main St., PO Box 5506, Newtown, CT 06470-5506.

**Canada Post:** Return undeliverable Canadian addresses to *Fine Woodworking*, c/o Worldwide Mailers, Inc., 2835 Kew Drive, Windsor, ON N8T 3B7, or email to mnfa@taunton.com.

**Printed in the USA**

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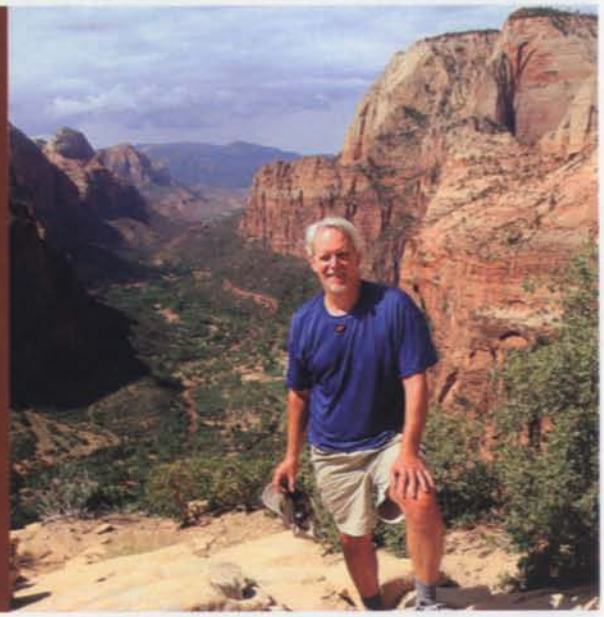

Professional finisher **Peter Gedrys** (*"Foolproof Recipes for 3 Favorite Finishes"*) recently put down his spray gun, said good-bye to his shop cat Doomer, and took a long-overdue vacation with his wife to Zion National Park in southern Utah. He recommends hiking Angels Landing along a trail where, as you near the top and the trail narrows, there is chain embedded in the rock to assist you. From the summit, he says he got an unparalleled view of the red Zion canyon and was reminded of the lyric, "America the beautiful."

**Michael Fortune** *("Curved Panels Made Easy")* jumped at the opportunity to spend the winter of 2009 teaching at the Sturt School for Wood in sunny Australia. Now back in snowy Canada, he is not only busy making furniture again, but also adding a large building that will house a design office, a gallery space, and an intern's apartment. Go to www.michaelfortune.com for more.

Sibling rivalry will be familiar to any parent of more than one child. In *FWW* #171, **Sean Clarke** *(Finish Line: "Bleach Mahogany for a Unique Look")* appeared on this page with his first son, Connor. To head off future problems, we thought his newly arrived brother, Owen, should also get a chance to appear. Clarke and his wife Angela own Clarke Company Restoration and Refinishing in Columbus, Ohio.

**Patrick Sullivan** *("Make Your Own Bandsaw Fence")* started turning wood scraps into toy guns when he was 4, and hasn't stopped sawing and gluing since. Now retired from his medical practice, he has more time to engage his passion for woodworking. His current interests are Craftsman furniture and wood sculpture. Sullivan lives with his wife in Carmel Valley, Calif., in the shade of a large number of live oaks, which he is eyeing for his next project.

When **Bill Nyberg** *("2 Fast Ways to Build a Box")* was a week old, his dad propped him up on his workbench—and he's still there. After studying photography in college, he did oceanographic underwater photography and is now the Director of Ophthalmic Photography for the University of Pennsylvania's Medical School. When not playing with cameras or tools, he appreciates the finer things in life: family, good friends, and Dave Brubeck music.

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

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# letters

## Spotlight

ANISSA KAPSALES

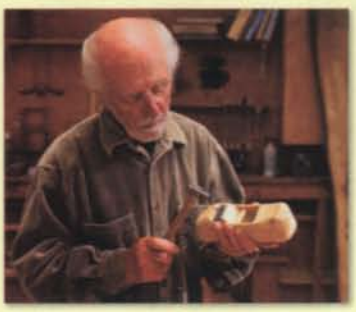
### JAMES KRENOV INFLUENCED A GENERATION OF WOODWORKERS

Since James Krenov died Sept. 9, comments have been pouring in to FineWoodworking.com. It is impossible to miss Krenov's impact. His contributions came not only as a craftsman but also as a teacher and author of five influential books. The first, *A Cabinetmaker's Notebook* (1976), was the catalyst for the other books and ultimately led Krenov to northern California, where he started the renowned woodworking program at the College of the Redwoods. His inspiring words and growing reputation drew hundreds of students to Fort Bragg, all vying for a spot in the bench room next to the man himself.

In 2005, I had the good fortune to attend the school for one year. At that point, Krenov had been retired for a few years, and I wondered how the program would be without him as the driving force. The answer is that he will always be the driving force. The instructors, the curriculum, the energy—all are intertwined with the core of Krenov's philosophies. The program will continue to draw people interested not in churning out mass amounts of work for large profit, but rather in working with the wood on an intimate level—thoughtfully, respectfully, and with passion.

This program is Krenov's greatest legacy. In this issue, we have expanded the Readers Gallery (p. 76) and dedicated it to his former students and their astounding work.

Opinions of Krenov are intense and run to extremes. I can only speak about the man I met when I was attending the program and would visit his shop: always welcoming, generous with feedback and advice, passionate, kind. While his apricot-colored cat milled around his bench, he spoke of his daughters, walking the beach with his wife, books, art, teaching, and of course wood. In March of 2009, I made my way back to Fort Bragg and was able to spend some time with JK in his small shop. Although his failing eyesight prevented him from building furniture, he still was able to build handplanes through feel and an intuition that comes from a lifetime of woodworking. Perhaps what struck me the most was his enthusiasm for wood and woodworking, undimmed after so many years. To read the entire interview, go to FineWoodworking.com/extras.



—Anissa Kapsales is an associate editor.

### A problem with Triton routers

I purchased the Triton 2¼-hp plunge router recommended for router-table use in "Top 10 Tools for a Tough Economy" (*FWW* #209), and soon afterward the above-table lift function stopped working. I left several messages on the Triton customer service number and never received a response. I also tried the email address with similar results.

A closer look revealed that the worm gear inside the router had stripped. I have seen several glowing reviews on this router in other publications and thought it was time for the rest of the story.

—BUCK POSTLEWAIT, Cheraw, S.C.

**Editor replies:** *We've heard a number of similar complaints about the Triton router and the company's customer service, so we called HTC, who earlier this year was named the exclusive distributor of Triton products in North America. Here's HTC's reply:*

Unfortunately, the transition from the previous distributor to HTC has not been as smooth as we would have liked. We were not able to secure the old Triton 800 number to support customers in a seamless way. Literature, ads, and Web sites had to be updated with our contact information—hence, the confusion, the lack of returned calls, and the bounced emails. The good news is the brand is now being supported by HTC's outstanding customer service team, who stand ready to solve any issues previous Triton customers may have.

Now to the problem with the lift mechanism: It's caused by not removing the plunge spring when the router is used in an inverted, table-mounted position. Our most recent shipment of routers includes updated owner's manuals detailing spring removal, along with product stickers to remind users to remove them for inverted use. It's very easy to do. To find out how or to have us repair a damaged unit, please contact us right away at 800-624-2027.

—MARK CROSS, General Manager, HTC Products

### In defense of pricey tools

I disagree with Wilson Lamb's letter "New Tools Don't Make the Woodworker" (*FWW* #208). At least one reader enjoyed the



Photos: staff

Fine WoodWorking

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READER SERVICE NO. 10



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READER SERVICE NO. 43



READER SERVICE NO. 63

Blue Spruce chisel review. The impression I get from woodworking forums, blogs, and magazines is that there is a growing market for high-quality tools, enough to support the likes of Veritas, Lie-Nielsen, Bridge City Tools, Blue Spruce, et al.

For professionals, a tool that does not work well costs them time and money. Time is precious for hobbyists, too, and some don't want to spend it tuning deficient tools.

I purchased a Blue Spruce marking knife, and the more I use it the more I appreciate the subtle shape and balance of the handle and the geometry of the blade. If I were about to invest $400 in a set of Blue Spruce chisels, I would find a thorough review indispensable, since test-driving them would be unlikely.

—JAMES TILLEY, Nottingham, England

### Wife-Approved?

I love The Taunton Press's books, magazines and Web sites, but I find the "Wife-Approved" SawStop ads offensive.

I am a young, forward-thinking female carpenter, and I slog through enough of this crap at work. When I get home, put up my tired feet by the fire, and open a magazine, this is the last thing I want to see.

—(name and address omitted by request)

**Editor replies:** *We do turn down ads from time to time for issues of taste or sensitivity. But we do so hesitantly. After all, the advertiser is paying for the right to deliver a message of their choosing. In this case, the ad is certainly exclusive, in that it targets men, but not sexist in the sense that it denigrates women. So we accepted it. I assure you that the editors do not consider woodworking to be a boys' club. The women on our staff would never allow that.*

### A tip and a warning on shop lighting

Your article on shop lighting ("Let There Be Light," *FWW* #209) recommended putting the bench and machine areas on different switches. In my shop, the switches turn on alternating rows of fixtures across the shop. I turn on just one when I walk in to find things quickly or do simple tasks. When I am working on machines or doing hand work, I turn the additional lights on. Together my two-circuit lighting is 10% to 20% north of the 75 foot-candles you recommend. As each year passes, these old eyes are increasingly thankful for the extra light.

—HARLAN JANES, Chocowinity, N.C.

Readers may know that Seattle's great fire in 1889 was caused by a woodworker heating hide glue. Another spectacular Seattle fire occurred in May of 2001, and when almost half a city block burned, the city lost a great landmark, the famous Speakeasy Café. When our company was cleaning up after this intense fire, the cause became clear: A workman's halogen light ignited wood that had been refinished earlier that day. That task light was considerably farther away from the workpiece than the one pictured in "Let There Be Light." In my opinion, never use a halogen light in your workshop. An incandescent or compact fluorescent bulb in an aluminum reflector is a far safer alternative.

—JOHN DUNCAN, Seattle, Wash.

**Editor replies:** *Halogen lights do get very hot, but many woodworkers use them with no problems. Our advice is to put them only as close to the workpiece as you have to, especially when finishing, and to turn them off as soon as you are done.*

### Duct tape not great for ductwork

When Oneida designed my dust-collection ductwork, they warned against using duct tape (as shown in "Step Up to Whole-Shop Dust Collection," *FWW* #209), saying that it dries out, gets brittle, will eventually leak, and leaves a mess on the duct when you change it. They recommended foil tape instead. My HVAC contractor agreed, saying that duct tape is the greatest thing in the world, except for ductwork.

—JIM SMITH, Sammamish, Wash.

### Corrections

Photo: David Welter

In Jim Budlong's Master Class on Krenovian details (*FWW* #208), we failed to give credit to David Welter for the beautiful images of Budlong's finished cabinet, as well as the close-ups of the Krenovian details.

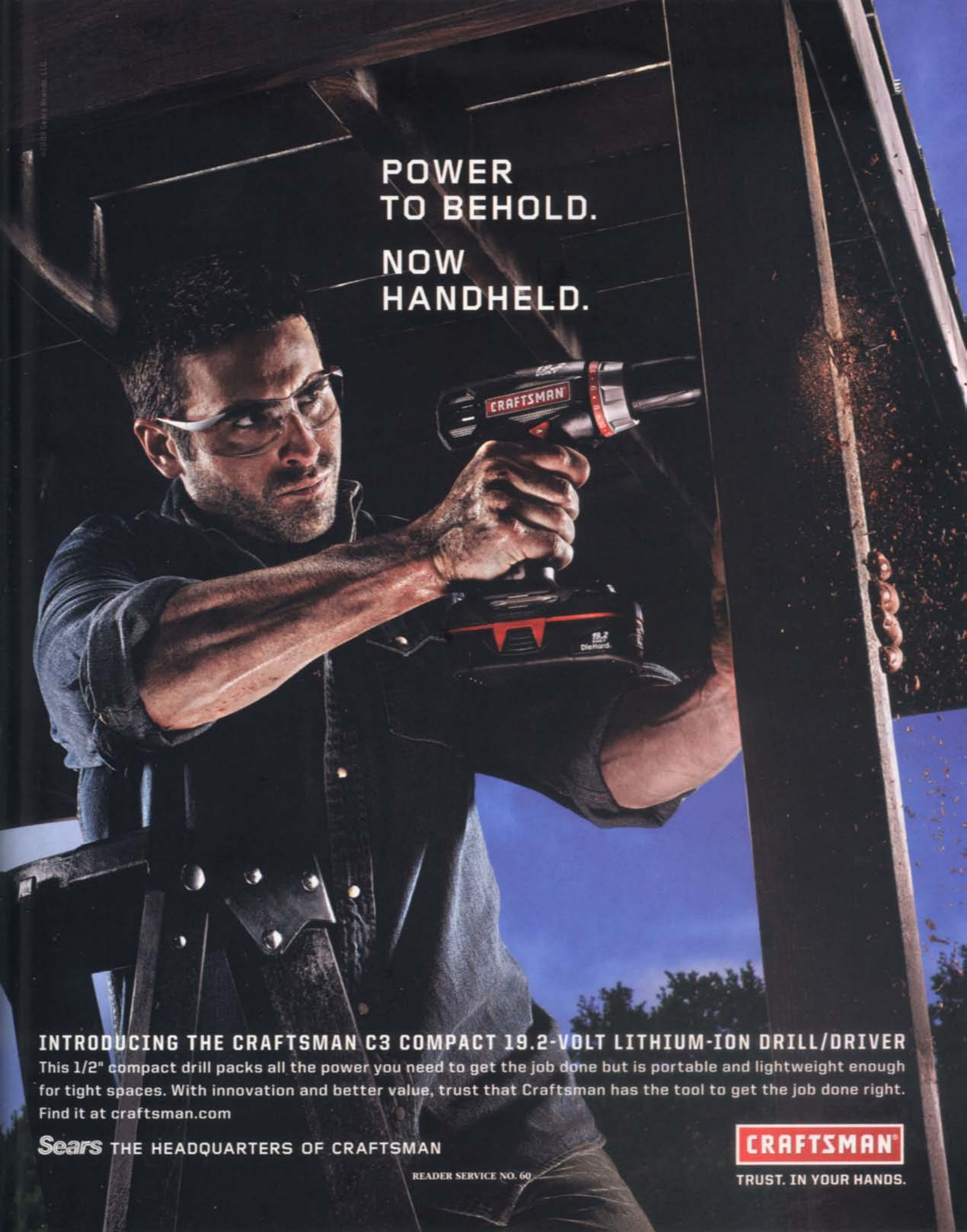
Also, in the main article on Budlong's display cabinet, the lower shelf was omitted from the drawing. It was, however, pictured (see photo, above) in Master Class. The shelf is 7/16 in. thick by 8⅞ in. wide by 18 15/16 in. long. It lines up with an intermediate rail in the back of the cabinet, and creates a small storage area below.

In "Smart Sawhorses" (*FWW* #209), we gave the wrong total height for the horse. It should be 32¼ in.

Our apologies to the folks at Veneer Supplies.com of Forest Hill, Md. In the article "A Vacuum Press Makes Veneering Easy" (*FWW* #208), we mistakenly published a photo of the company's Excel 1 veneer-pressing kit, using it as an example of a small system without identifying either the unit or the company. VeneerSupplies.com offers a wide range of vacuum-veneering kits and parts, in addition to veneers and glues. The Excel 1 features a 1.1 cfm, motor-driven pump with 10 ft. of hose and the necessary fittings, and sells for $300. The company's 4x4 vinyl bag is $100.

Another sharp-eyed reader noticed that the knot tied in "Keep Planes Close at Hand" (*FWW* #209) is an overhand knot, not a square knot as described.

Last, the blade on the Zona 35-500 Razor Saw ("Top 10 Tools for a Tough Economy," *FWW* #209) cannot be replaced. Before Zona changed and upgraded the crimping method, they offered replacement blades for most of their saws. However, at $6.50, the Razor Saw is very cheap to replace entirely.

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# methods of work

EDITED AND DRAWN BY JIM RICHEY

## Best Tip

# Multiuse joinery jig for the tablesaw

**Doug Blacke credits his brother for inspiration and Palomar College in San Diego for woodworking techniques and skills he's acquired. He enjoys working with native hardwoods and exotic species, contrasting their colors and textures in detail work such as inlays and miter keys.**

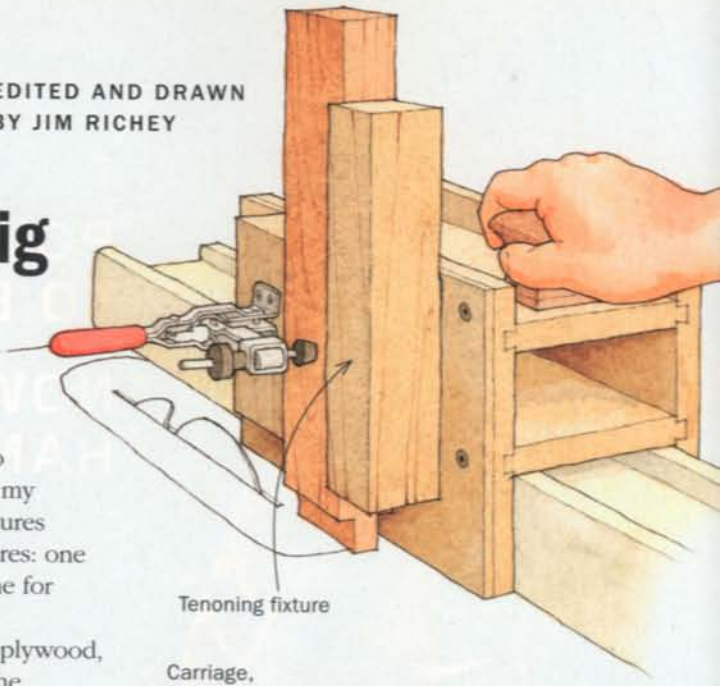
Instead of making multiple jigs for cutting different joints on the tablesaw, I saved time, materials, and space by making one that can do multiple jobs. It consists of a carriage that rides my Biesemeyer-style fence and interchangeable fixtures designed to cut various joints. I have three fixtures: one for cutting tenons, one for keyed miters, and one for cutting spline slots.

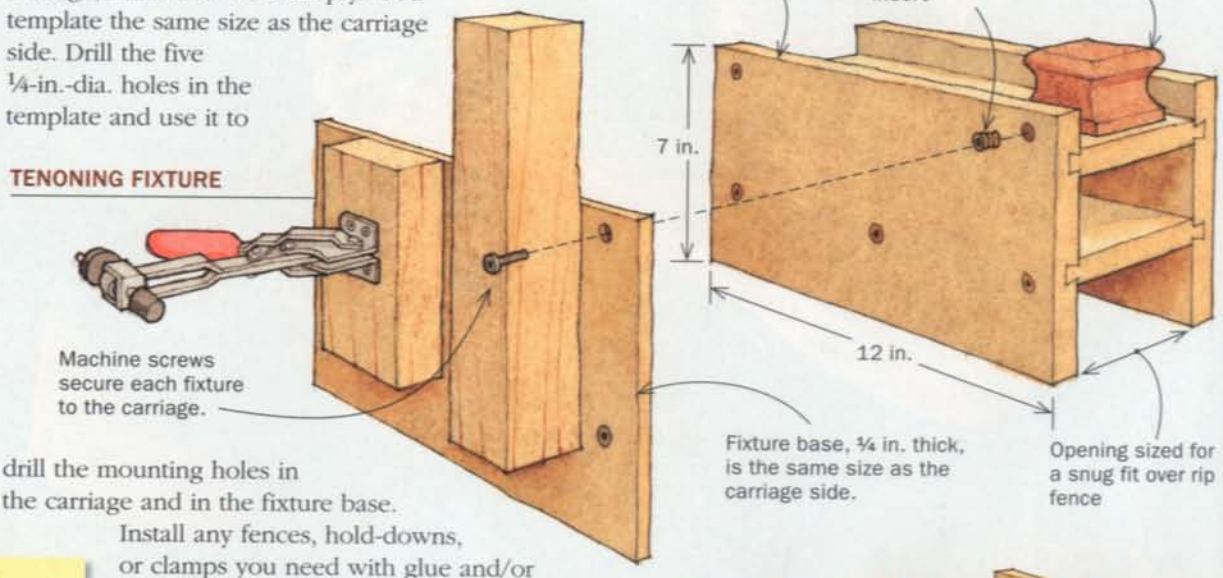
The carriage is made from ¾-in. Baltic-birch plywood, but MDF would work as well. To ensure that the mounting holes in all fixtures align with those in the carriage, make a ¼-in.-thick plywood template the same size as the carriage side. Drill the five ¼-in.-dia. holes in the template and use it to drill the mounting holes in the carriage and in the fixture base.

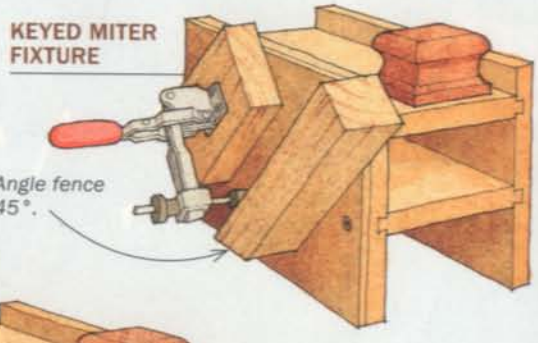
Install any fences, hold-downs, or clamps you need with glue and/or screws from behind.

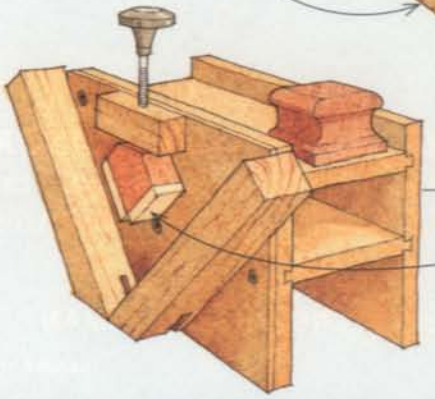
I finished the carriage and fixtures with two coats of shellac and applied paste wax on the interior of the carriage so it slides freely on the rip fence.

—DOUGLAS BLACKE, Olivenhain, Calif.



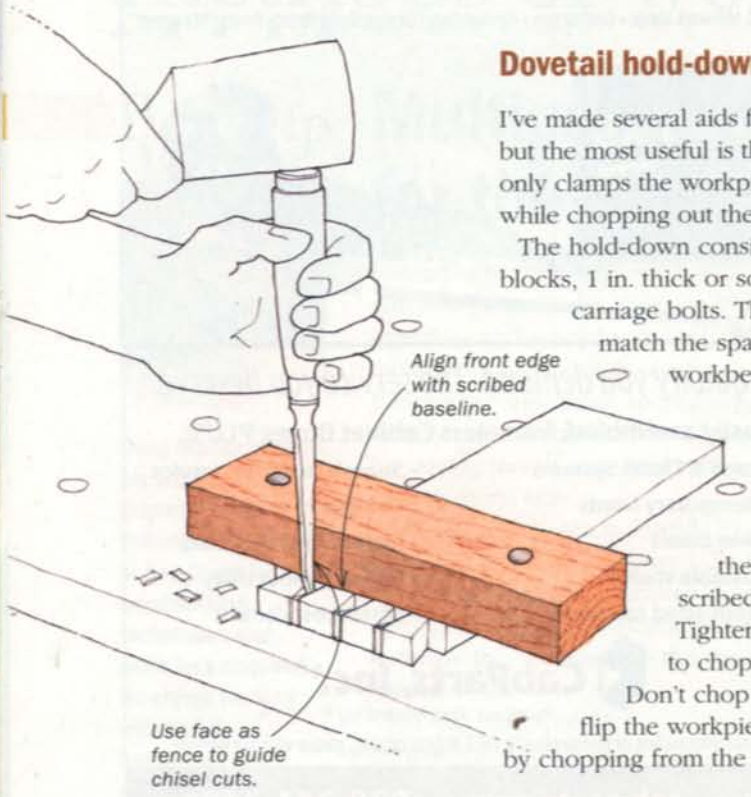




### Online Extra

For an animated display of the fixtures, go to **FineWoodworking.com/extras.**

### A Reward for the Best Tip

Send your original tips to Methods of Work, *Fine Woodworking*, PO Box 5506, Newtown, CT 06470. If published, we pay $50 for an unillustrated tip; $100 for an illustrated one. If your tip is the best, you win Bosch's two-tool combo kit (model CLPK21-120), which includes a 12v impact driver and 12v screwdriver.

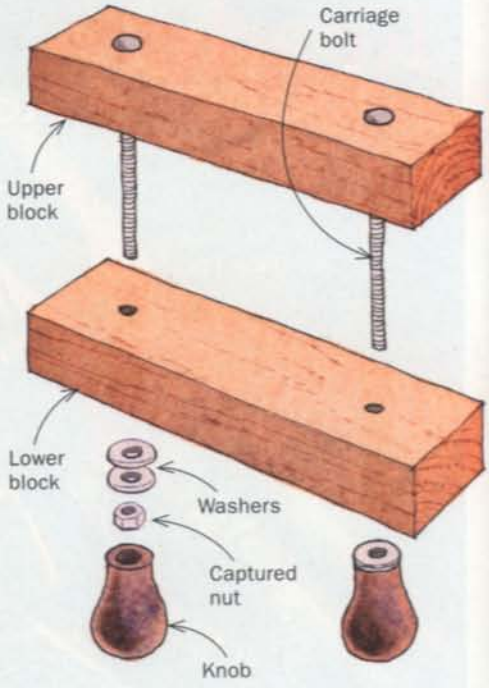


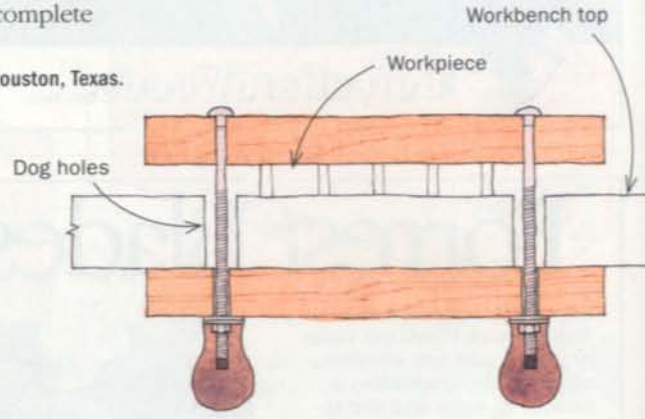

## Dovetail hold-down guides chisel

I've made several aids for hand-cutting dovetails, but the most useful is this hold-down fence. It not only clamps the workpiece but also guides the chisel while chopping out the pins.

The hold-down consists of two sturdy hardwood blocks, 1 in. thick or so, drilled to receive two carriage bolts. The holes in the blocks should match the spacing of the dog holes in your workbench. To use, push the top block down through the bench, and slide the bottom block over the bolts. Clamp the workpiece under the top block, carefully aligning the face of the fence with the scribed line on the workpiece. Tighten the knobs. You're now ready to chop one side of the pins or tails. Don't chop all the way through. Rather, flip the workpiece, realign it, and complete by chopping from the other side.

—CLARK KELLOGG, Houston, Texas.



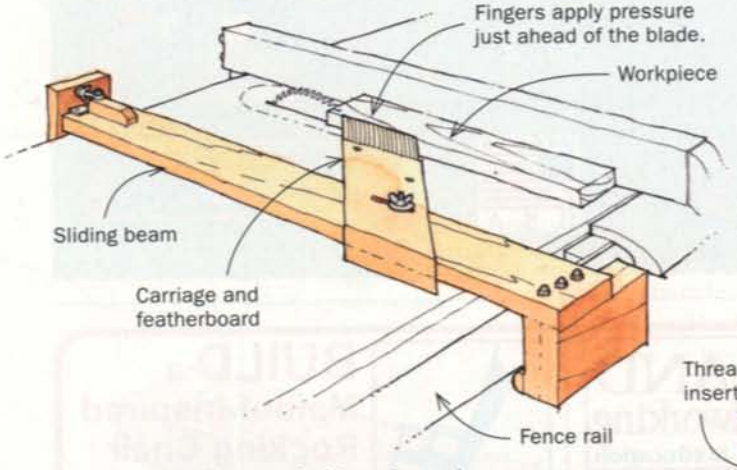



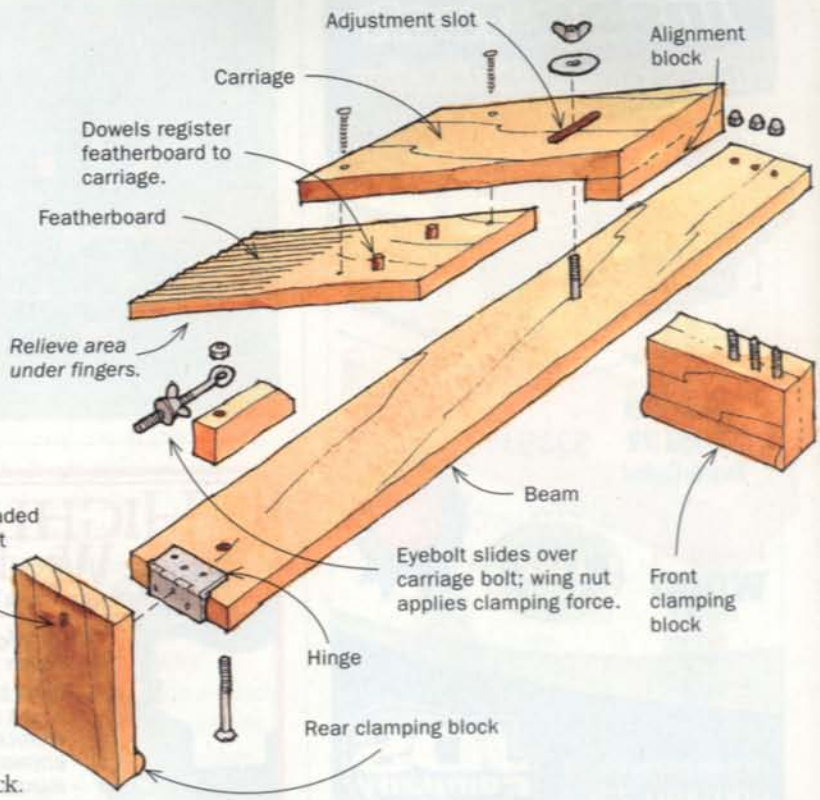

## Quick Tip

**Printable magnet sheets are commonly available at office-supply stores, like Staples. Cut the sheets into rectangles and attach them to your scrapers or other tools. Then make notes (like "needs sharpening") on the blank labels. Move the tags around as needed and keep the extras on your metal toolbox.**

—BRUCE BARNETT, Troy, N.Y.

## Easy-mount featherboard for tablesaws




A featherboard can make for safer and more accurate tablesaw ripping and grooving. But most featherboard designs seem like too much trouble to set up and adjust, and those that clamp to the miter-gauge slot can't be used with wide stock. This design, sized to fit my saw table and fence rail, sets up quickly and works with narrow and wide stock.

All of the wooden parts were cut from a maple 1x4, and the metal parts are common hardware-store stock. The featherboard and carriage both are mitered 45° on each end. I glued an alignment block on the back end of the carriage to register the featherboard parallel to the sawblade.

Before cutting the fingers on the featherboard, I made a single, light pass partway through the jointer on the underside so the fingers don't drag on the tablesaw deck. Rather than gluing the featherboard to the carriage, I pinned it with wooden dowels and a couple of screws so that I can replace it.

To use the fixture, set the saw's rip fence to the desired ripping width, put the stock in place against it, slide the beam over, and lock down the rear clamping block by tightening the wing nut on the eyebolt. Adjust the carriage so that the featherboard applies pressure just in front of the blade. You don't want the featherboard pushing against the side of the blade, where it might pinch the workpiece and cause kickback.

This featherboard adds a measure of safety without being a hassle to set up. It saves me a lot of time because I don't have to fiddle with miter-slot expanders or C-clamps.

—BOB WEY, Westford, Mass.

## Quick Tip

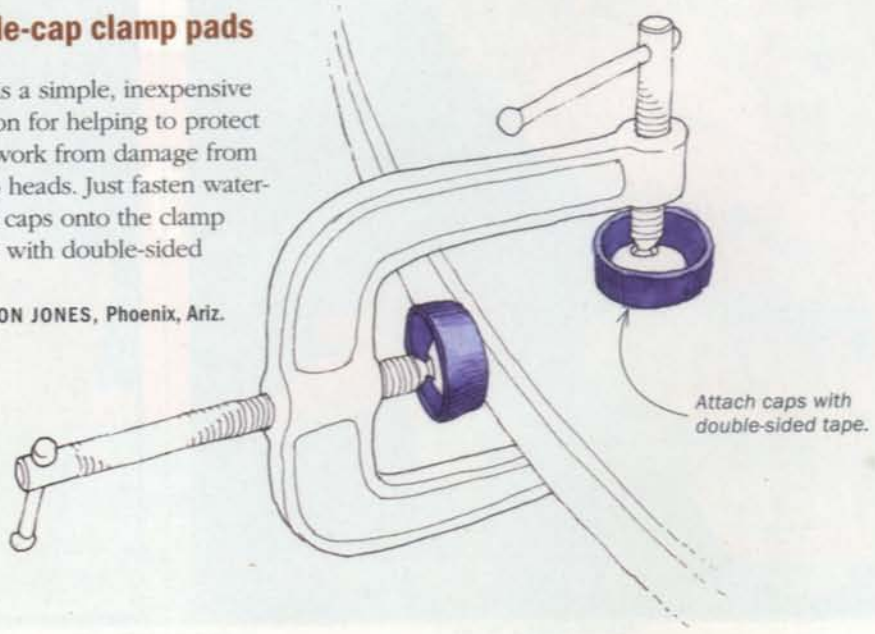
**To clean your hands after applying an oil finish, "wash" them in a waste can of sawdust. You will be amazed how quick and effective this is. When you wash with soap and water, it seems no amount of soap will do the job. But after washing your hands in sawdust, they will clean with soap and water quickly. Even the smell of the oil finish is removed.**

**—DOUG STOWE, Eureka Springs, Ark.**

## Bottle-cap clamp pads

Here is a simple, inexpensive solution for helping to protect your work from damage from clamp heads. Just fasten water-bottle caps onto the clamp heads with double-sided tape.

—RON JONES, Phoenix, Ariz.



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BENCHTOP TOOLS

# Makita 10-in slider: large capacity in a small footprint

**TO GET THEIR CROSSCUT CAPACITY,** most sliding compound-miter saws ride on a pair of long tubes. The Makita LS1016L has two pairs of shorter tubes. Makita claims this design improves rigidity. What is certain is that the design gives the tool a smaller back half, which could make a big difference in a cramped home shop.

***High visibility.*** *Large, white-on-black markings make the bevel and miter scales easy to read.*

I recently put one of these innovative saws to work and I found there's a lot to like about it. The saw features a 52° miter capacity left and 60° right. It can cut 2¾-in.-thick stock up to 12 in. wide at 90° and up to 1⅞ in. thick at 45°. It can bevel 45° in both directions, thanks to a tilted motor and a two-part sliding fence.

The fit and finish on this machine is superb and the controls are intuitive and function well. The bevel lock at the back of the saw has a V-shaped handle that allows you to change the setting from either side. Truing the fence and setting the bevel stops was easy.

The saw also has a sturdy depth stop, but it doesn't maintain the depth all the way to the fence because of the circular blade. So you'll need an auxiliary fence or spacer for making full-width dadoes. The guard retracts smoothly and provides good visibility of the cut line.

I used the saw to cut a variety of materials and got high-quality, accurate cuts each time. If you want a top-notch miter saw, I recommend the Makita LS1016L. The price is $550. For more information, go to www.makita.com.

*—Patrick McCombe is an associate editor.*


***Dual slides.*** *Pairs of top and bottom slides give the 10-in. Makita LS1016L nearly the capacity of a 12-in. sliding model. The maker says the design also improves rigidity for more accurate cuts.*


Photos: staff

FINISHING

# Budget-priced spray system

**EARLEX RECENTLY INTRODUCED** the budget-minded Pro Spray Station 6900 and I put it through its paces over several weeks. The turbine is compact and easy to carry. It supplies 71 cfm at 5 psi through a 13-ft. flexible hose. It comes with a 2 mm needle and tip, with 1 mm, 1.5 mm, and 2.5 mm tips available as extras.

I sprayed lacquer and shellac through the 1.5-mm needle. For heavier waterborne finishes, I used the 2-mm needle. The rig had plenty of power and applied a nice finish with all the products. Unfortunately, the gun has an awkward feel. Specifically, the air-feed tube is directly in front of the trigger, leaving little room for fingers. I had to pivot the handle a bit off center to make the grip more comfortable.

A simple air-control valve would make the gun much more versatile. Without one, the gun sprays at the same velocity all the time. This creates an unnecessary amount of overspray when you're finishing inside cabinets and cases and spraying dyes and other low-viscosity materials.


***Finish faster.*** *Suitable for both oil-based and waterborne finishes, the Earlex 6900 HVLP sprayer has a 13-ft. hose and can pump out 75 cfm at 5 psi.*

At $500, the Pro Spray Station 6900 is an economical way to achieve a good finish, but with its awkward ergonomics, you should try it out before buying it. For more information, go to www.earlex.com.

—Peter Gedrys is a professional finisher in East Haddam, Conn.

HARDWARE

# High-quality stainless-steel hardware

**I'VE USED SOLID-BRASS BRUSSO** hardware on several boxes and furniture projects over the years and have found the quality to be top-notch. So I was pleased to hear that the company has been adding stainless-steel hardware items to the catalog over the last two years. Now Brusso makes almost everything in stainless that they make in brass. The only exceptions are quadrant hinges and lid stays, which are too difficult to machine accurately in stainless steel, according to Brusso.

In general, I like stainless steel better than brass for projects with a modern aesthetic. Its silvery finish looks especially great with dark woods like walnut.

After checking out a number of the Brusso stainless-steel pieces (www.brusso.com), I can say the fit and finish is equal to the company's excellent brass hardware, but the prices are about double what similar brass pieces cost.

*—Matt Kenney is an associate editor.*

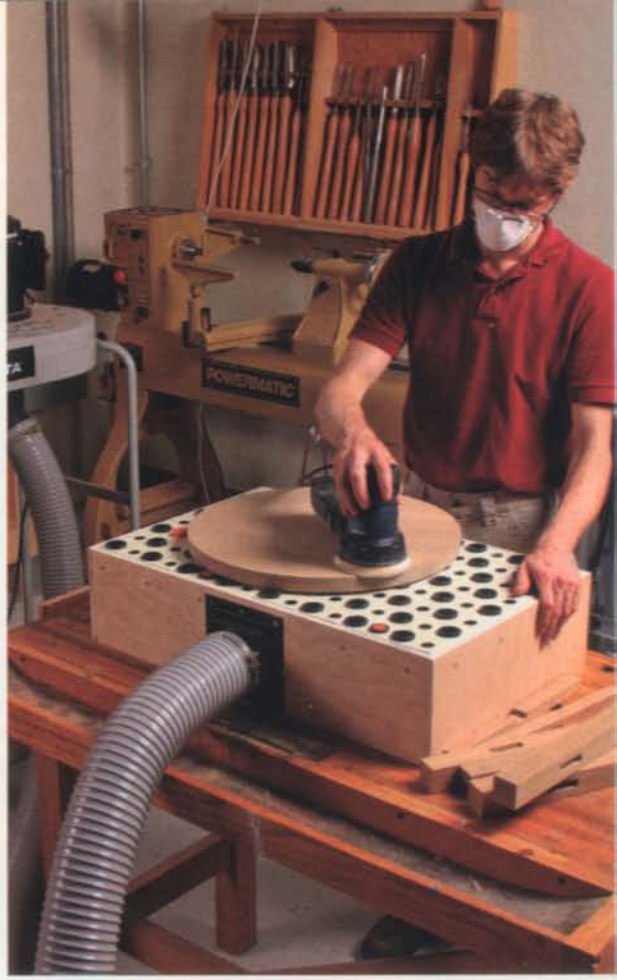
SANDING

## Downdraft panels clear the air

**MY WIFE HATES THE LITTLE PILES OF DUST** I leave around the house after I've spent an hour or two sanding in the shop, and I'm sure that some dust has snuck past my particle mask into my lungs. So when a pair of Rockler Downdraft Table Panels showed up in *Fine Woodworking*'s editorial mailbox, I put them to use right away in a shopmade downdraft table that I built using plans posted on Rockler's Web site (www.rockler.com).

The downdraft panels each measure 6¾ in. by 16½ in. and have nonslip rubber grommets mounted in ¾-in.-dia. holes. The setup works great with a portable dust collector, but it was less effective with my shop vacuum, especially with smaller workpieces. Small workpieces leave more holes exposed, reducing suction, so I cut some scraps of ¾-in. plywood into rectangular panels that I can swap with one or two of the ventilated panels when necessary. This helped a lot. The panels sell for $26 per pair. You'll need two pairs to build the downdraft table shown.

—*P.M.*



***Slip-free and sturdy.*** *Rockler's steel Downdraft Table Panels support your work on rubber grommets that prevent damage and absorb vibration.*

MACHINES

## Richline mortiser excels at repetitive work

**IN *FWW* #206, I EVALUATED** a variety of mortising machines. I found the joint-making router jigs to be accurate, fast, and versatile, particularly the JDS Multi-Router. Recently, a new company, Richline Woodworking Machines (www.richlinemachines.com) debuted the Richline model 18-8 mortise-cutting machine, which retails for $1,850, or nearly $1,000 less than the JDS. The tool includes a Porter-Cable router motor unit and two bits. Unlike the JDS Multi-Router, which holds the router in a horizontal position, the Richline holds the router above the stock. One lever plunges the bit into the work; a second moves the stock from side to side. A sliding table adjusts the stock in and out. The Richline provides 8 in. of side-to-side travel and accommodates material up to 3½ in. wide. Mortises can be up to 1¾ in. deep and 1½ in. from the edge of the stock. With the router's vertical orientation and the jig's solid clamping table, you can't cut mortises in end grain. But once the tool is set up, workpieces can be clamped and mortised faster than any other machine I've seen, making it ideal for repetitive work. And at over 170 lb., it's rock-solid and vibration-free, but not really portable.

—Tim Albers works wood in Ventura, Calif.

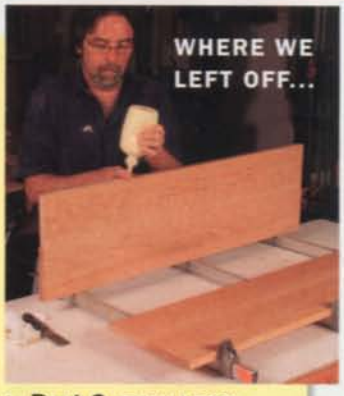
# Creating an attractive tabletop

## Part 3

## Flattening, dimensioning, and smoothing

BY BOB VAN DYKE

In the first two parts of this series (*FWW* #207 and #208), I showed you how to select the right boards to create as harmonious and seamless a tabletop as possible. Then I showed you how to glue those boards together, employing spring joints for extra strength. I also gave tips on breaking down a wide top into smaller subassemblies for easier thicknessing. Now you're ready to flatten the top, cut it to width and length, and smooth the ends, edges, and faces.



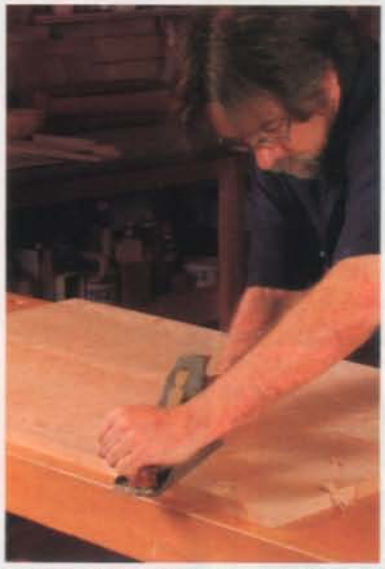

In **Part 2** (*FWW* #208), we spring-jointed the edges and glued up the top.

### Top not perfect? Don't panic

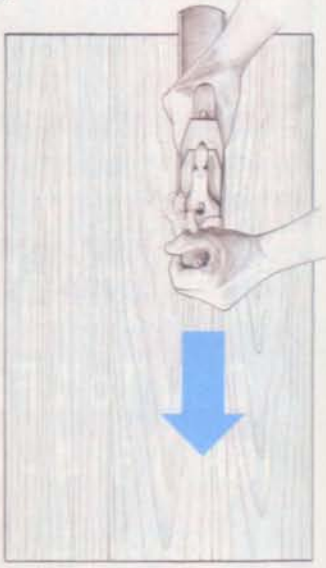
If you started with straight, flat boards and your glue-up went well, your top may be flat enough to proceed to final smoothing. It's more likely, however, that the top will be slightly cupped, or the glue joint between subassemblies won't be perfect.

Don't sweat it. Flattening a top is not difficult. I prefer handplanes for flattening and smoothing. They work faster than sandpaper and guarantee a flat surface. But careful sanding, by power or hand, will work, too (for more on setting up and using a handplane, see Fundamentals: "Handplaning 101" in *FWW* #204). To plane the top, secure it between benchdogs, cupped side up. It should not move when you press on it. If it rocks or deflects, tap in wedges underneath to stabilize it.

With a long handplane (preferably at least a No. 5, but you can use a No. 4 if the top is narrow), begin planing diagonally across the surface. Start at one end and work down the length, overlapping strokes. Check your progress with a straightedge. The plane should be cutting the high spots only. Once it takes a



***Flatten with a handplane.*** *Even if the glue-up went well, there usually will be small steps between boards and a bit of cupping. To remove these defects, first plane diagonally to the grain.*



***Now go with the grain.*** *Clean up marks from the diagonal passes by planing with the grain.*



Photos: Mark Schofield

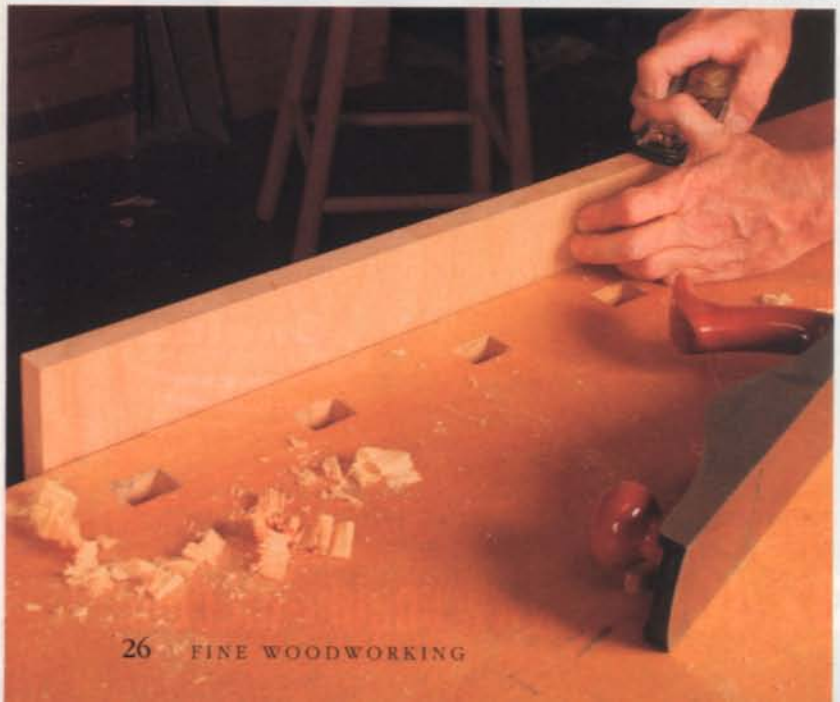
# Two ways to cut to length

### 1. USE A CROSSCUT SLED ON THE TABLESAW

***Does it fit your sled?*** *If your tabletop is narrow enough, use a crosscut sled to cut it to length quickly and safely.*

### 2. ROUGH-CUT, THEN ROUT

***Use a router for wide tabletops.*** *If the top is too big to be crosscut safely on the tablesaw, lay out the cut, and use a jigsaw or a circular saw to cut just outside the line (above left). Then use a bearing-guided router bit riding against a straightedge to trim the waste up to the line (above right). Whichever way you cut the top to length, use a sanding block, a low-angle block plane, or better still a low-angle smoother to clean up the ends of the tabletop (below).*



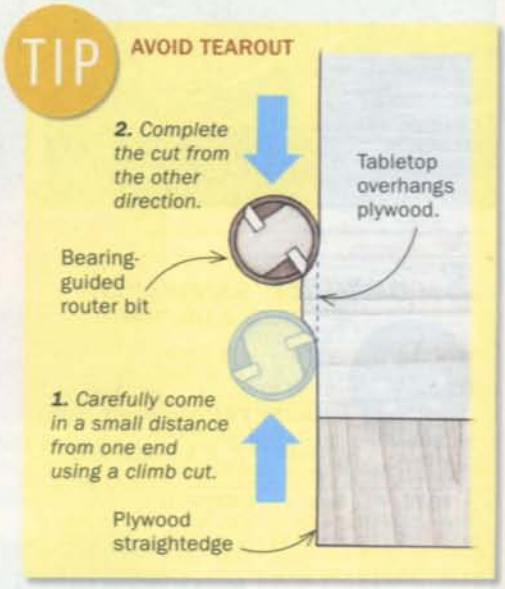
shaving the whole way across, the face is flat. Stop planing.

Begin planing along the length, starting at the far end and working your way back, overlapping the strokes. Here you are just trying to remove most of the tearout from the diagonal planing. Final surfacing comes later. When you are done, flip over the top end for end and flatten the other side.

**Dimensioning: How to handle a large panel**

At this point, the top is still a little bigger than its finished size. To get to the final width, first re-joint one edge using a handplane or the jointer. Rip the top to width on the tablesaw and then joint or handplane the ripped edges to smooth them.

Now that the sides are parallel, crosscut the top to length. This can be tricky, as almost all tabletops are too big for a miter gauge. A crosscut sled is the easiest, safest, and most accurate way to do the job. Cut one end square, then flip the top and cut the other end to finished length. If you used a jointer to prep the edges before glue-up, cut off at least 1 in. from each end of the top. Doing so removes any snipe from the jointer that can weaken the very end of the glue joint. If the top is too large for a crosscut sled, use a square to draw a layout line across the ends and use a circular saw or jigsaw to cut about 1/16 in. outside the lines. Clamp a straight piece of plywood on the line, then flip over the top and use a router with a flush-trimming bit, running against the plywood edge, to clean up the end. A spiral flush-trimming bit works well.




**Smooth the edges**

With the top cut to size, it is time for final surfacing. There are many ways to do this, and you should use tools you are comfortable with. I usually use a smoothing plane, a block plane, a card scraper, and some P320- or P400-grit sandpaper, but many people use cabinet scrapers, random-orbit sanders, or belt sanders. To begin, use a very sharp block plane on the ends to smooth



Drawings: John Tetreault

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## A perfect top

***Tearout revealed.*** *It can be hard to see minor tearout left by handplanes. Lightly sand the surface with P320- or P400-grit paper to highlight the torn-out areas (above). A sharp card scraper quickly removes any tearout you find (right), but be careful not to create hollows.*

out any marks left from the tablesaw or the router. End grain is tough to plane, so take very light cuts and skew the plane. A little furniture wax on the sole of the plane also will help it cut smoothly. To avoid tearing out the long grain of the far edge, stop planing an inch or two before the end and then come at it from the opposite side. Now wrap a piece of P320- or P400-grit sandpaper around a cork sanding block and, with a few strokes, you will have ends that feel like glass.

Remove the jointer marks on the long edges with a handplane or a card scraper. These machine marks and light tearout can be hard to see. To help highlight any tearout, lightly sand the edges with stearated P320- or P400-grit paper wrapped around a cork sanding block. Any tearout will show up because the fine sanding dust will fill in the voids from the tearout.

### Now smooth the bottom and the top face

Once the edges are smooth, it's time to smooth the top and bottom. I generally use a No. 4½ smoothing plane, but you also can use a No. 4. Make sure the handplane is as sharp as possible, the mouth is closed up fairly tight, and it is set for a light cut. Secure the tabletop, bottom face up, between benchdogs, using scrapwood to protect the ends. I plane or scrape only the portion that will overhang the base, but some people surface the entire bottom. I see no point in doing this. The only people who will ever see it are just way too nosey!

Now you are ready to make the top surface perfect. Work slowly and methodically, starting at the far side and working across using overlapping passes. Plane with the grain to avoid tearout in the final surface. If you are getting tearout where two boards meet, try taking light cuts diagonally across the joint. Now sand the surface with P320-grit paper. This step will highlight any areas of tearout. Go over the surface with a card scraper. Because the surface left from the scraper feels a little rough, sand the top again with P320- or P400-grit paper. If you are planning to use a pigment stain on the piece, then sand the whole surface with a coarser paper—usually P180 or P150 grit.

***Break the edges.*** *Use a block plane to create small chamfers on all the edges. This lessens the chances of the top being damaged, makes applying a finish much easier, and feels better to the touch.*

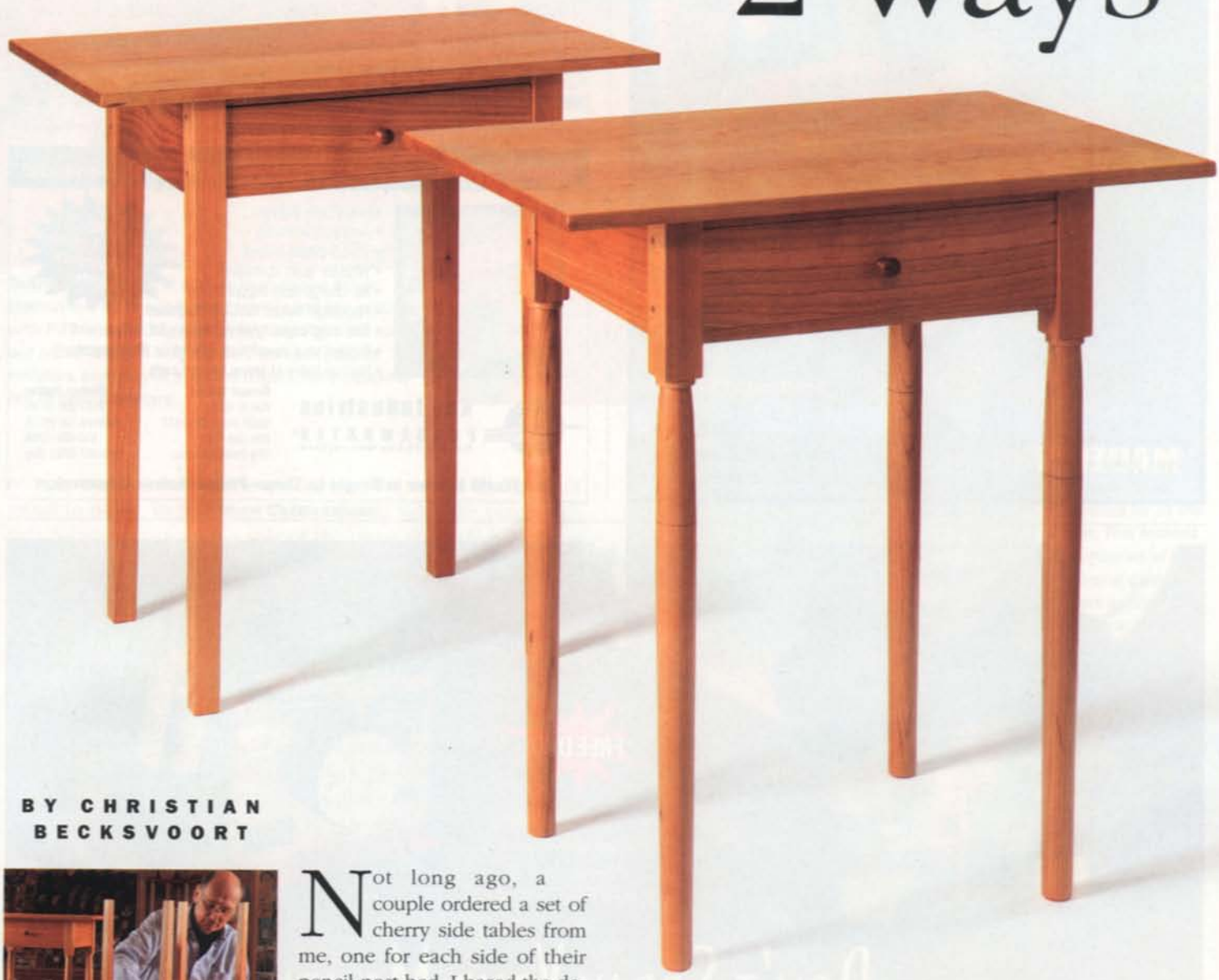
I lightly chamfer all the edges and corners with the block plane (see photo, above). Congratulations: Your top is done, so don't drop it. □

*Bob Van Dyke runs the Connecticut Valley School of Woodworking (www.schoolofwoodworking.com) in Manchester, Conn.*

# Shaker Classic

## Change the legs to change the look

# 2 Ways



BY CHRISTIAN BECKSVOORT

Not long ago, a couple ordered a set of cherry side tables from me, one for each side of their pencil-post bed. I based the design on a Shaker side table from Canterbury, N.H., although virtually every other Shaker community had similar designs. As a surprise (I don't recommend this unless you are very familiar with your clients), I decided to make slightly different versions: one with square tapered legs, the other with turned tapered legs.

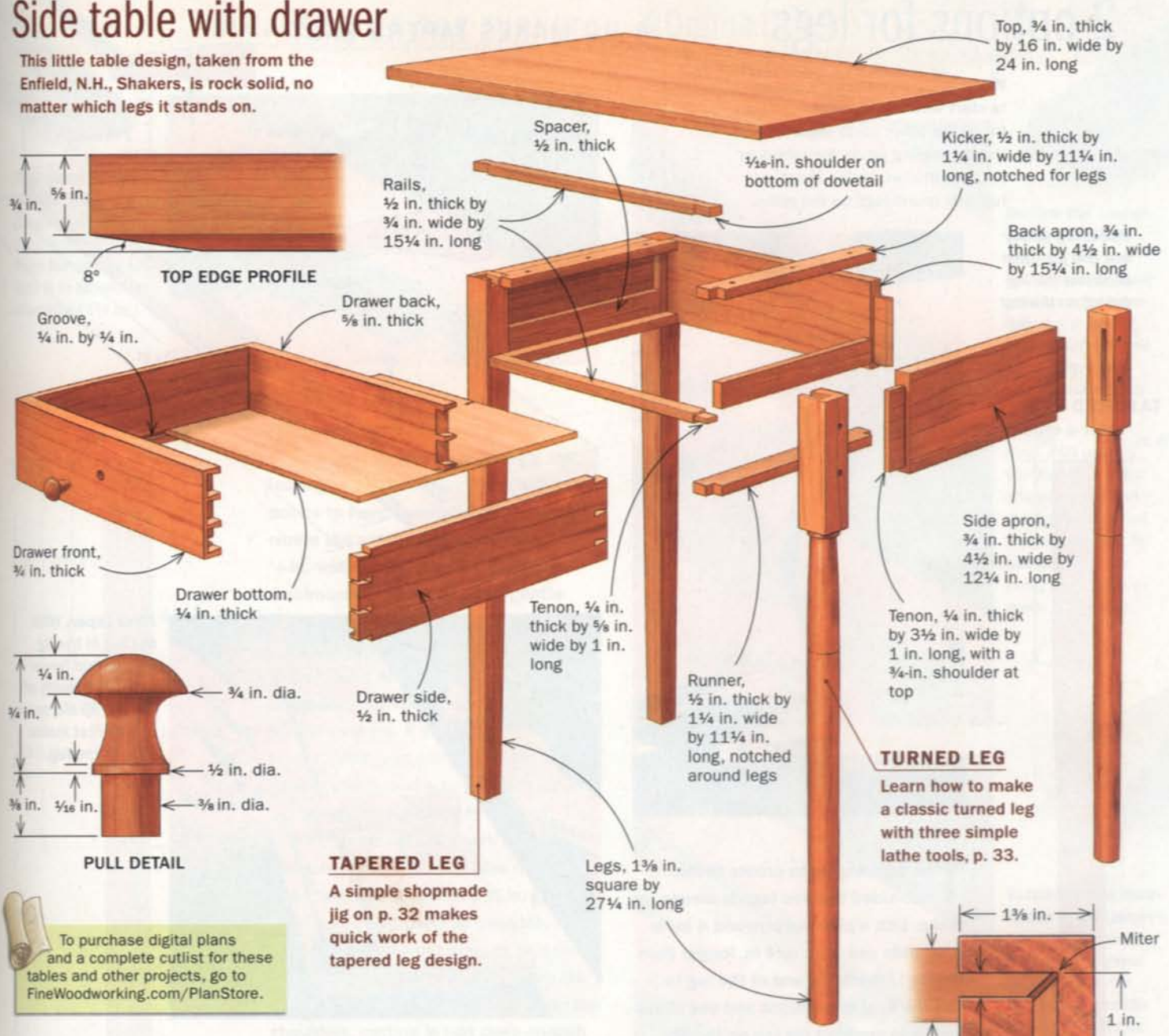
The overall design is a basic, timeless one that can move from bedroom to living room. But notice how the simple leg change alters the whole feel of the table. Tweaking the dimensions or shapes can make a big difference in the look of a piece of furniture. As far as difficulty goes, the table with tapered legs is a very good project to tackle if you're a beginner, and the one with turned legs adds a bit of a challenge. The rest of the construction is standard mortise-and-tenon joinery, a dovetailed top rail, and a dovetailed drawer. I start with the legs, move on to the joinery, add the drawer, and finish.

### Tackle the joinery: mortises, tenons, and a dovetail

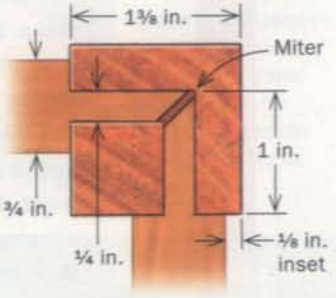
Once the legs are finished (see "2 options for legs," p. 32), the construction is the same for both tables. The first step is to add

# Side table with drawer

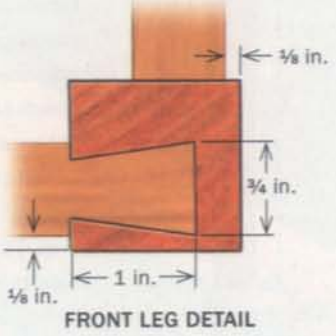
**This little table design, taken from the Enfield, N.H., Shakers, is rock solid, no matter which legs it stands on.**




To purchase digital plans and a complete cutlist for these tables and other projects, go to FineWoodworking.com/PlanStore.

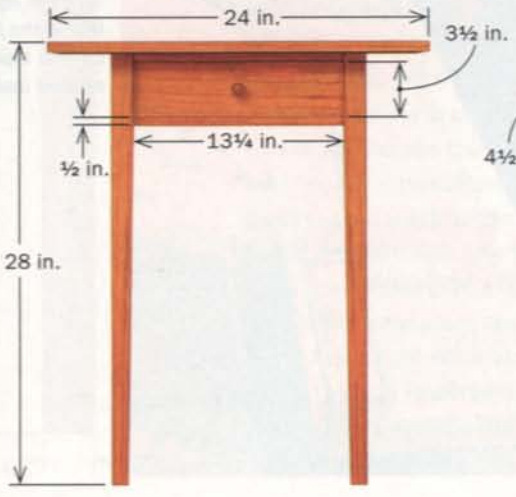



BACK LEG DETAIL

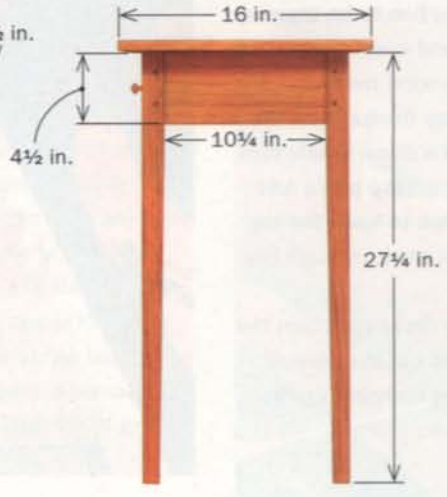



FRONT LEG DETAIL

FRONT VIEW




SIDE VIEW



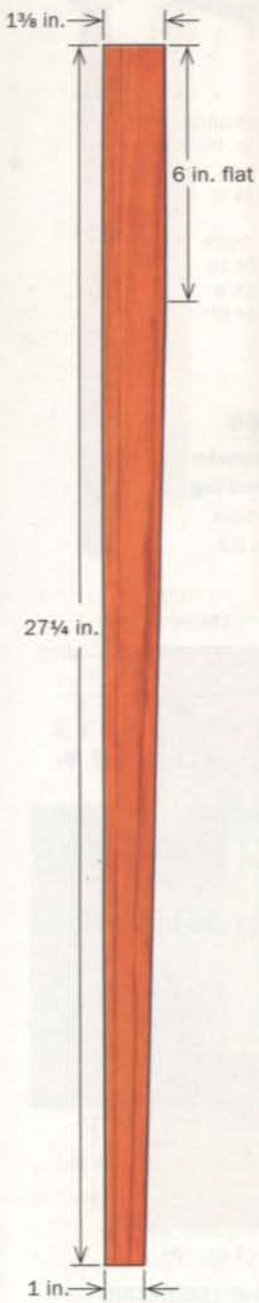

Photo, facing page (top): Dennis Griggs; drawings: David Richards

# 2 options for legs

When building tables, it's logical to start with the legs because they tie all the other parts together. Use a tapering jig on the tablesaw to taper the two inside faces, or turn the round legs on the lathe.

***Use a leg to lay out the jig.*** *Then bandsaw the leg cutout on the top piece.*

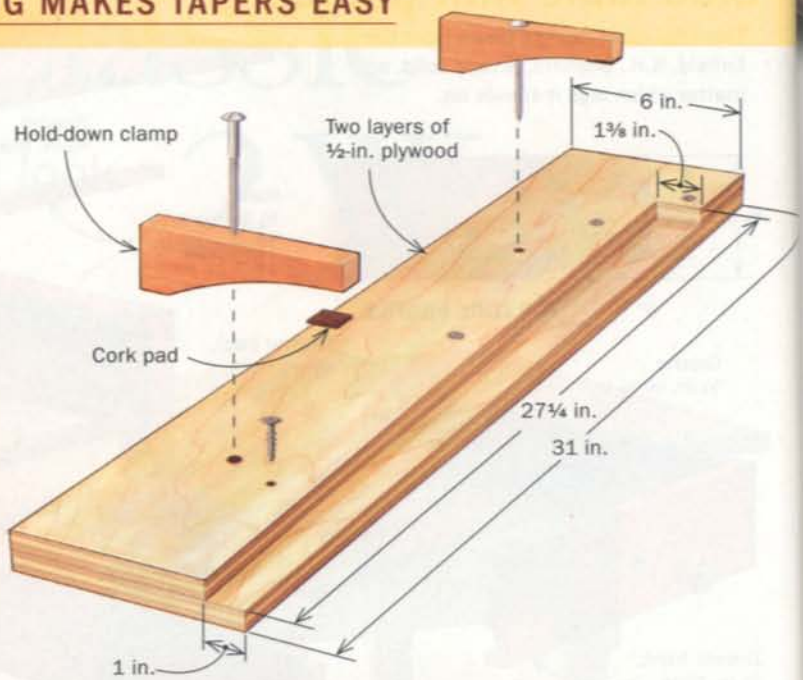
## TAPERED LEG



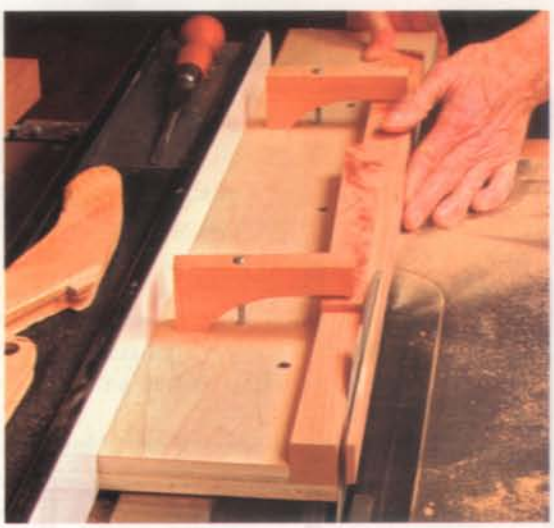

**The tapering jig to create these two-sided tapered legs is simple to make. Use a piece of plywood 4 in. to 6 in. wide and 3 in. to 4 in. longer than the leg. I mark the end of the leg to see the final dimensions and use those marks to position the leg on the plywood. Set the leg on the edge of the plywood with the portion to be tapered flush with the end and overhanging the edge. Then, trace around the leg and cut the leg area away freehand on the bandsaw. Once that's done, screw that piece of plywood to a base piece and add hold-down clamps to keep the leg stock secure as you run it through the tablesaw.**

**After cutting the first taper, turn the leg 90° in the jig and cut the second one. The final step is cleaning up the tapers with a sander.**

## A JIG MAKES TAPERS EASY




***First taper.*** *With the leg in the jig and the rip fence set to the width of the jig, rip the taper on the first inside face of the leg.*



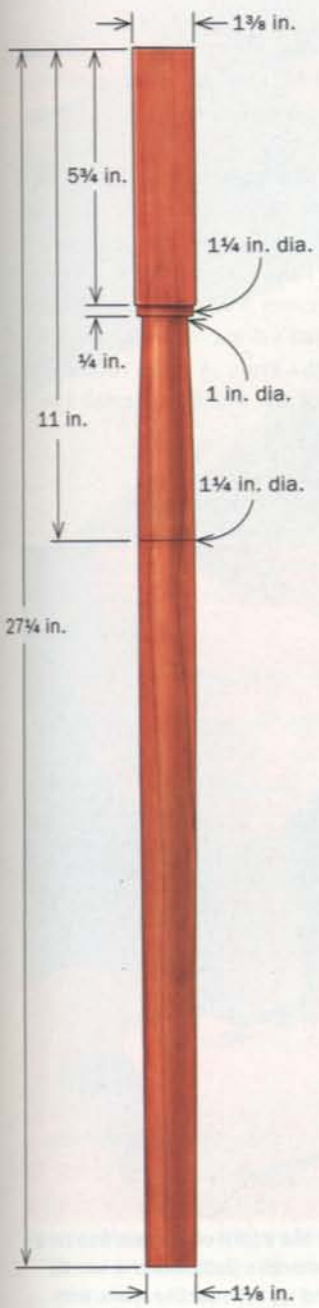
***Second taper.*** *Turn the leg blank 90° in the jig and cut the taper on the second inside face.*



Photos, except where noted: Anissa Kapsales

***Square to round.*** *Using a ½-in. gouge, start to turn the blank round from the line down. Turn it to its widest diameter (1¼ in.).*

## TURNED LEG



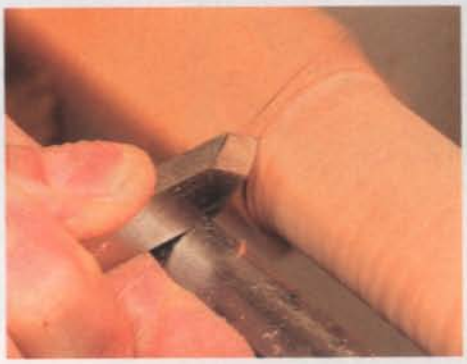

**Although the turned legs aren't as easy as the tapered legs, the turning is pretty basic. There are a few points to keep in mind: the transition where the square top turns round, the ¼-in.-wide ring just under that, the maximum diameter, and the gentle taper down to the bottom of the leg.**

**Going from the square top portion to the round at a 90° angle is a little tricky, since a false move can knock off the corners. If you're not too secure on the lathe, you can start with 1⅝-in.-square stock, and size it to 1⅜ in. after turning to remove any tearout.**

**First, measure and mark the transition location on all four sides of the leg. Then begin turning with a ½-in. gouge as close to that point as possible. Next, with a diamond-point scraper held on edge, carefully cut in at 90°. Move the tool straight in to slice and clean up the shoulders, cutting in just deep enough to form a round. Now clean up the round ring to about 1¼ in. dia. Just under that, cut in another ⅛ in. to reduce the diameter. Mark down 5 in. and cut a thin line at the maximum diameter (1¼ in.). Then use the diamond-point tool to cut to the bottom. To form the swell taper, I use a gouge and turn from below the transition ring to the max point, then taper gently to the bottom. Finish with sandpaper and 0000 steel wool. Add a light bevel at the bottom. On all the legs (tapered and turned), I break square corners with P220-grit sandpaper.**

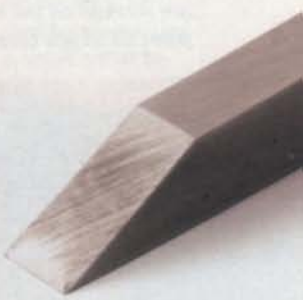
## Online Extra

For a video of Becksvoort turning this leg, go to **FineWoodworking.com/extras.**



***Define the transition point.*** *With a very sharp diamond-point scraper held on edge, carefully cut in at 90°, clearly defining the point where the square collar ends.*

***Create a ¼-in. ring.*** *Still using the diamond-point scraper, establish the bottom part of the ring and cut in another ⅛ in. to bring the diameter down a bit more.*

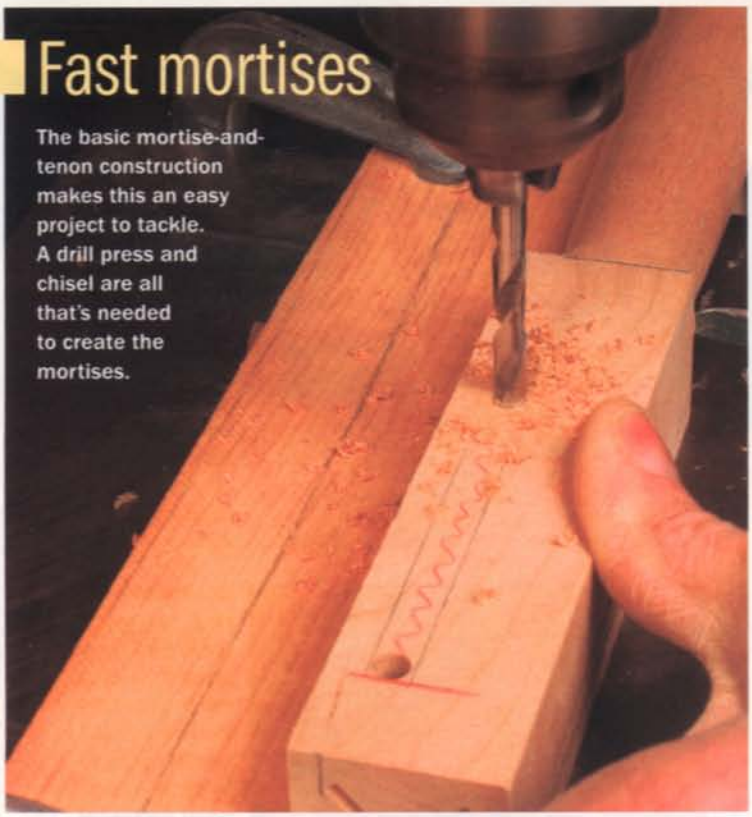


***Establish the maximum diameter.*** *Becksvoort uses a mortising chisel on edge to cut a thin line where the turned leg is at its widest point.*

***Form the swell.*** *With a ½-in gouge, start from below the transition ring and turn a gentle curve up to the thin line, and then taper down gently to the bottom of the leg.*

# Fast mortises

The basic mortise-and-tenon construction makes this an easy project to tackle. A drill press and chisel are all that's needed to create the mortises.



***Waste away material on the drill press.*** *After the mortise locations are marked on the leg, use a fence clamped to the table to align a brad-point bit as you clear most of the mortise.*

the side and back aprons and drawer rails to the legs. I start with the mortises for the back and side aprons and the rail below the drawer. Then I cut the tenons on all of those pieces. The rail above the drawer is dovetailed into the top of the leg, and I tackle that after the mortises and tenons.

**Mortise the legs—**I have a dedicated slot-mortiser for this job, but a drill press and mortising chisel also will work. After you lay out the locations for the mortises, waste away the majority of the material on the drill press with a brad-point bit. Then you can use chisels to clean up the edges and ends.

**Tenon the aprons and lower front stretcher—**I cut the apron tenons on the tablesaw using a dado blade (see "Tenon Shootout" on p. 42 for more on this method). There are three different blade-height settings, one for each cheek and one for the top and bottom edges. By the way, the first cheek-cut height isn't critical; it's the second one that sets the final thickness and fit of the tenons. Also, on legs this small I try to maximize the length of the tenons, so I do end up mitering them.

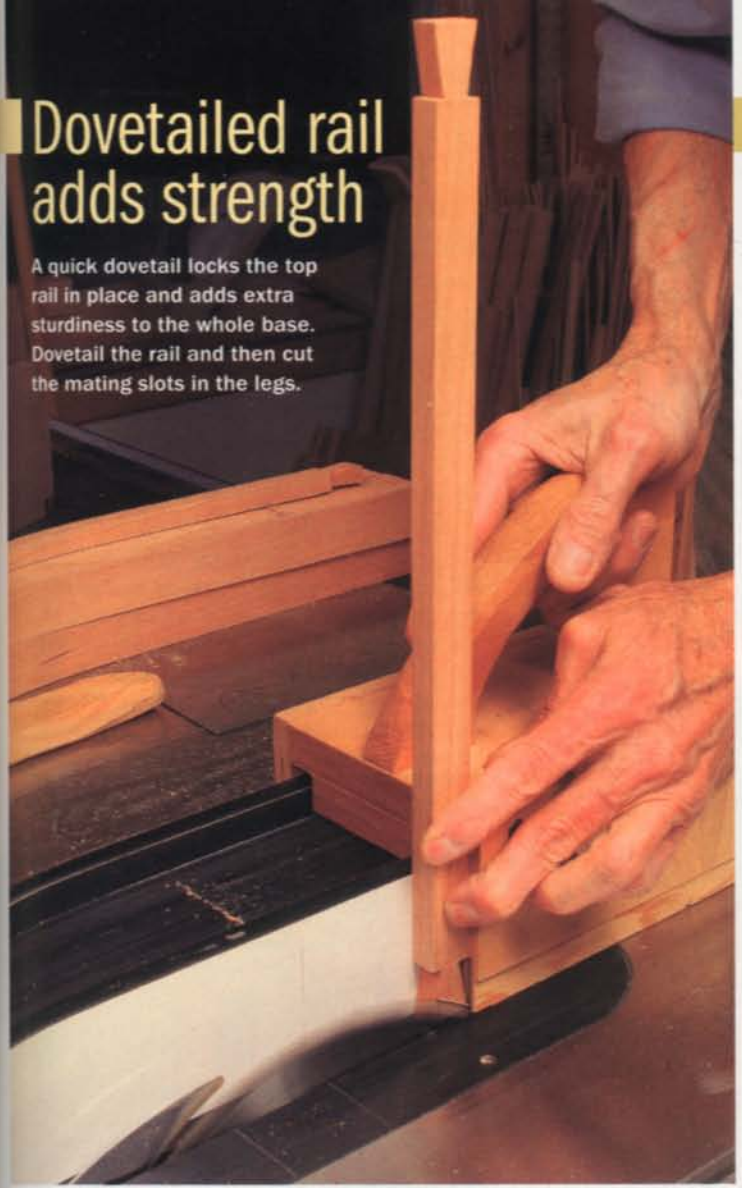
I cut the lower front-rail tenons the same way as I cut the apron tenons. Then I use the shoulder-to-shoulder measurement of that piece to mark out the dovetail shoulders for the upper rail.

**Dovetail the upper front rail to the legs—**Once I have dry-fitted the three aprons and the bottom rail, I lay out the dovetails on both ends of the top rail, cut them with a handsaw, and refine them with a chisel. On the tablesaw, I skim a small rabbet on the underside of the dovetail, which creates a shoulder and helps locate the dovetail on the leg. Once that's done, transfer the dovetails to the tops of the front legs, using a knife. A small router with a ⅛-in. or ¼-in. bit takes out most of the waste material. Use a chisel to clean the corners.

***Clean up the mortises with chisels.*** *Mark the depth of the mortise on a mortising chisel. Starting at the ends of the mortise (left), tap the mortising chisel squarely in place. Finish by cleaning up the mortise walls with a regular bench chisel (above).* *For two ways to cut the tenons, see "Tenon Shootout" on p. 42.*

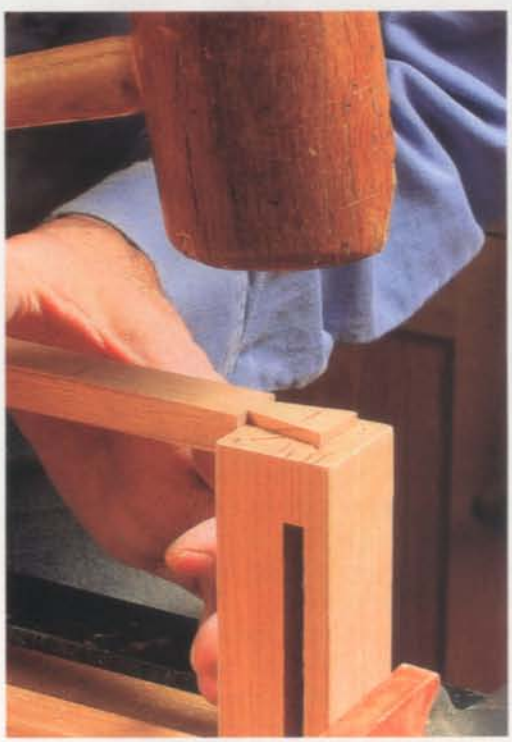
# Dovetailed rail adds strength

**A quick dovetail locks the top rail in place and adds extra sturdiness to the whole base. Dovetail the rail and then cut the mating slots in the legs.**



***Cut a rabbet on the underside of the dovetails.*** *Use a tenoning jig. The shallow lip (1/16 in.) helps when you are marking the dovetail's position on the legs.*

***Transfer the layout to the legs.*** *Dry-fit the lower rail to the legs, and position the upper rail across the top of the legs to transfer the dovetail profile (above). Use a small router to cut close to the line (left) and a chisel to finish the job.*



***Fit the upper rail.*** *A final dry-fit of the rails to the front legs ensures an accurate fit and a stress-free glue-up. These parts will be the first step of the gluing process.*

## Glue up the bases and add runners, kickers, and spacers

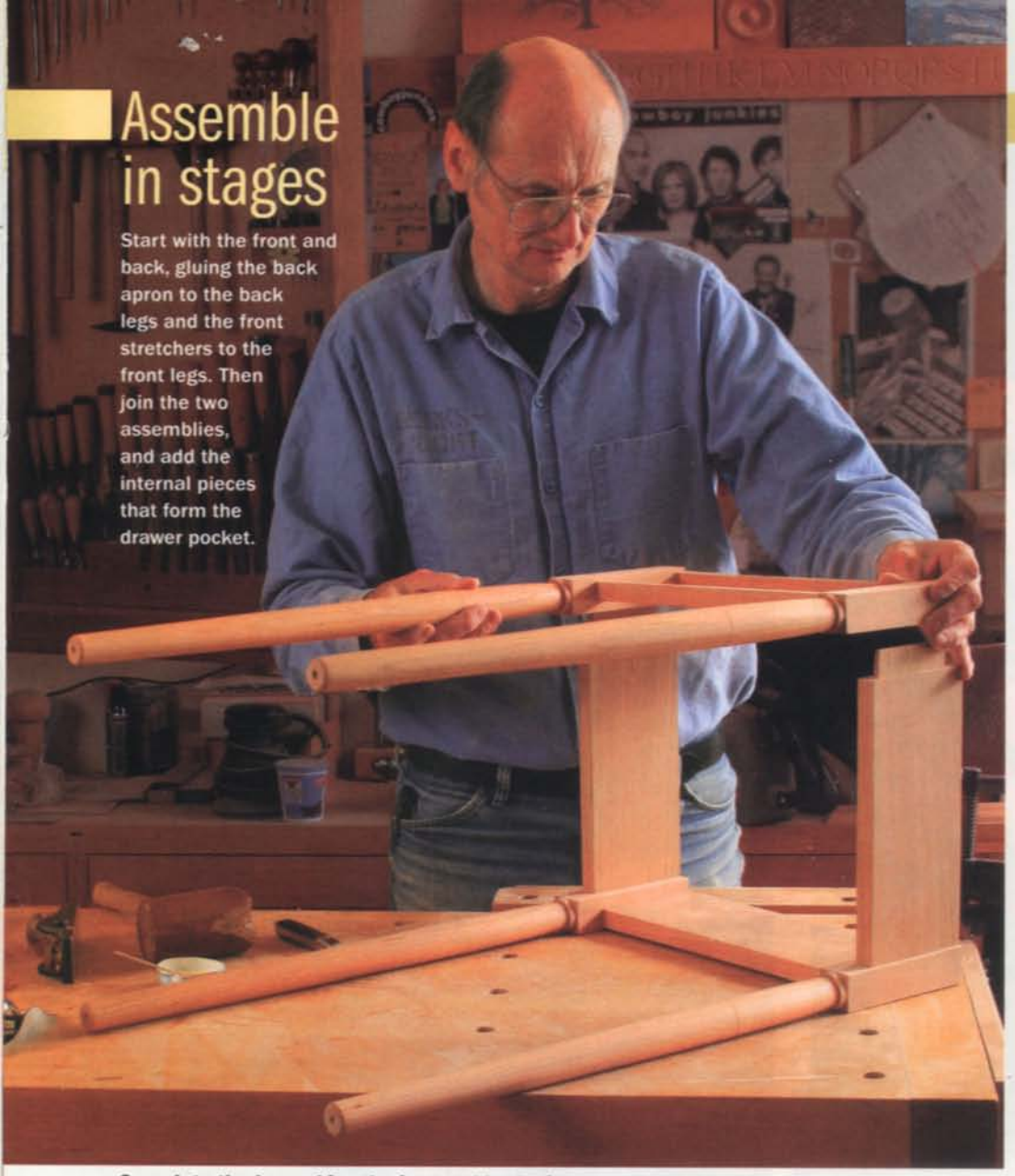
Before adding the runners and kickers, sand the legs, aprons, and rails to P320-grit and glue the bases together. Begin by gluing the front legs to the rails and the back legs to the back apron in two separate assemblies. Once they are dry, add the two side aprons as a final assembly. And once that is dry, you can glue in the runners and kickers.

The drawer runners and kickers (a pair on each side of the drawer) are the same size and shape, simply a strip of wood notched to fit between the front and back legs. The runners sit below the drawer sides and provide the track that the drawer runs on while it moves in and out of the side table. A kicker is a strip of wood that is placed above each drawer side to keep the drawer from tipping down as it is opened and closed. In addition, I use the kicker to screw the top in place. Also, because the sides are inset from the legs, I glue in a spacer just above the runner. This spacer keeps the drawer from tilting left or right.

There is no joinery involved in adding the runners and kickers; they are simply cut to fit the interior, then glued and

## Assemble in stages

Start with the front and back, gluing the back apron to the back legs and the front stretchers to the front legs. Then join the two assemblies, and add the internal pieces that form the drawer pocket.



***Complete the base.*** *After the front and back of the base are dry, add the side aprons.*

***No joinery for runners, kickers, and spacers.*** *The runners and kickers are simply glued and clamped into place (above), flush with the top and bottom of the aprons and rails. Plane the spacers perfectly flush with the inside faces of the legs before gluing them on (below).*

clamped in place, flush with the top and bottom of the aprons and rails. Trim the spacers perfectly flush with the inside faces of the legs.

### Hand-cut dovetails in the drawers

The drawer fronts are cut to fit the openings. I make my fronts ¾ in. thick, the back ⅝ in. thick, and the sides ½ in. thick. I make the back a little thicker than the sides for three reasons: First, thinner sides make the drawer appear more graceful, and you'll seldom pull it all the way out to see the thickness of the back. Second, the added thickness gives a bit more glue surface to the dovetails, resulting in stronger joints on all four corners. Finally, it allows a solid bottom (not plywood) to expand and contract while remaining hidden under the back.

I cut half-blind dovetails in the front and through-dovetails in the back, cutting the tails first. I make the drawer bottoms from resawn, book-matched stock and secure them with a screw and slot in the back to allow for seasonal movement.

I turn the mushroom-shaped knobs on the lathe (see "Authentic Shaker Knobs," *FWW* #196).

### Screw the top in place

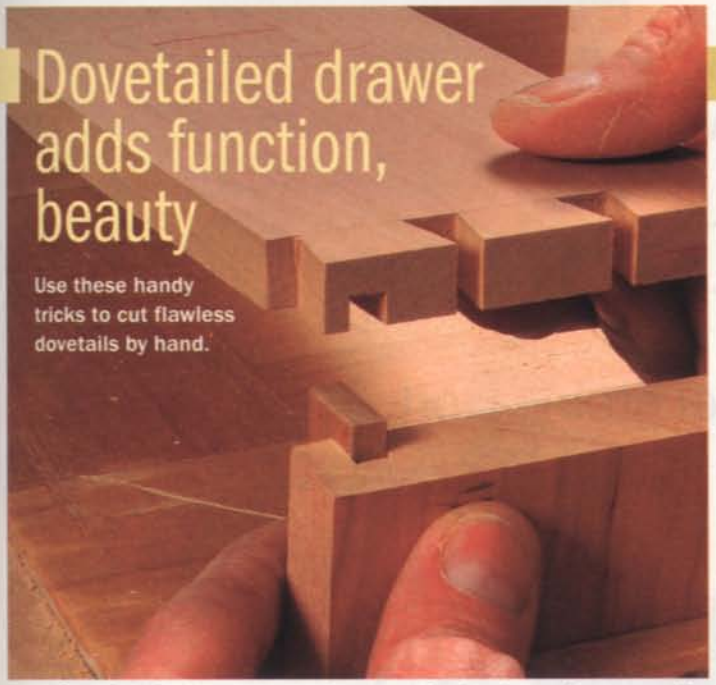
Last, I edge-glue the ¾-in.-thick top, cut it to size, sand it, and use the tablesaw to add a slight bevel to the underside. With the top facedown, I center the base (1½ in. front and back, 4 in. on the sides) and drill three countersunk holes through each of the drawer kickers (one in the center, one at either end) to screw the base to the top. I made the end holes oval-shaped to allow for wood movement.

I give the tables three coats of an oil finish. The first coat is straight Danish oil and the next two coats are a ratio of two parts Tried & True Varnish oil and one part spar varnish. I use only wax on the drawer runners, spacers, kickers, and drawer sides and bottom, to help them run more smoothly. □

*Christian Becksvoort is a contributing editor.*

# Dovetailed drawer adds function, beauty

Use these handy tricks to cut flawless dovetails by hand.



***Transfer trick.*** *Becksvoort runs the groove for the drawer bottom on the tablesaw, and then uses the groove (and a small scrap) to align the parts when transferring the tails to the pin board.*

***Keep it level.*** *Secure the pin board in a vise and use a spacer block to keep the tail board level on the pin board for layout.*

***Solid drawer bottom made easy.*** *Cut the bottom of the drawer back to line up with the drawer groove, so the bottom can slide into place. A single screw secures the solid bottom to the back, with a slot to allow seasonal movement.*

***Shakers used an easy oil finish.*** *After all the construction is finished, Becksvoort uses an oil finish inside and out, but uses only wax on the interior drawer parts.*

# Foolproof Recipes for 3 Favorite Finishes

## Dyes and gel stains work better together

BY PETER GEDRYS


Gel stains have grown in popularity in recent years. Their viscosity and wipe-on/wipe-off application method make them easy to master, and compared with penetrating oil stains, they cause far less blotching on certain woods. However, using them on bare wood is often not the best method. Because of the pigment in gel stains, multiple coats tend to obscure the wood grain. And they come in a limited range of colors.

A better way to use them is in conjunction with dyes. You can apply gel directly over a dye to emphasize the grain and pore structure, or you can seal the dyed surface first and then apply the gel stain. Known as glazing, this is one of the most versatile and forgiving steps in the finisher's arsenal because it's so easy to change or even remove the glaze before it dries. I'll demonstrate on three popular woods—white oak, pine, and mahogany—and give finishing recipes for each.

*Peter Gedrys is a professional finisher in East Haddam, Conn.*

### THREE WINNING LOOKS

**Dye powders come in a huge range of colors and their clarity doesn't obscure the wood. Used on top of the dye, gel stains allow you to tweak the color and highlight the grain.**

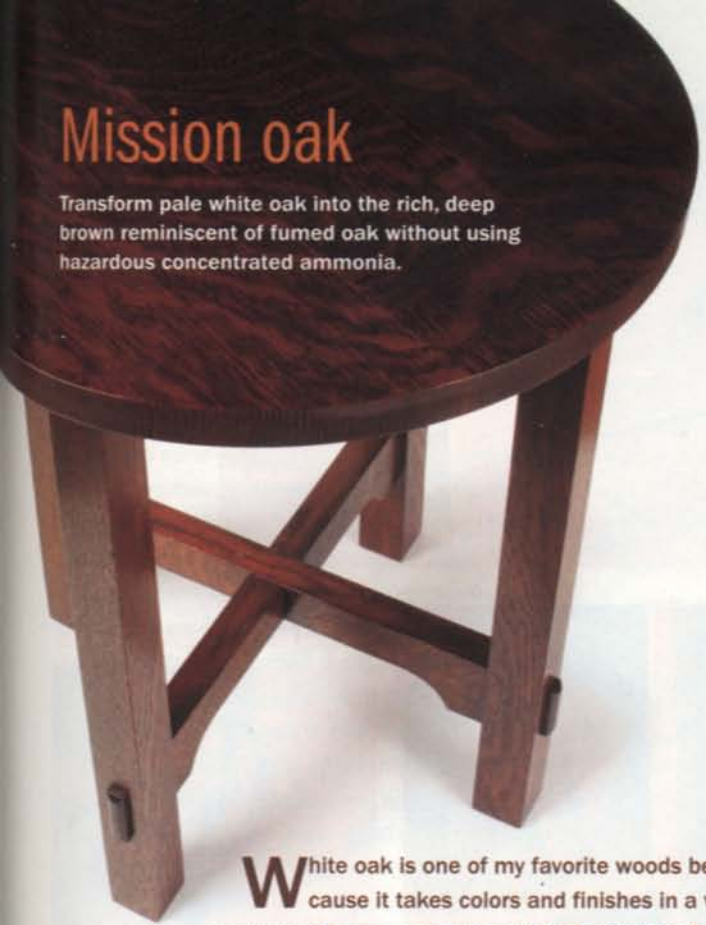





Photos: Mark Schofield

# Mission oak

**Transform pale white oak into the rich, deep brown reminiscent of fumed oak without using hazardous concentrated ammonia.**



White oak is one of my favorite woods because it takes colors and finishes in a very predictable fashion. On this table, I'll show you how to create a deep, rich brown reminiscent of fumed oak, the signature finish of so many Arts and Crafts pieces.

The process starts with a water-based dye, which is used to lighten up or subdue the base or background color of the wood. Water-based dyes are economical and come in a huge range of colors. My choice for this table was Lockwood's English Brown Oak, a cool, deep brown. Dissolve ½ oz. of powder in 8 oz. of warm distilled water, let it cool, and then filter it.

### THE RECIPE

- Lockwood #871 English Brown Oak water-soluble dye
- General Finishes Brown Mahogany gel stain
- Oil-based varnish

After sanding the table to P180 grit, blow the dust out of the pores, wipe the surface clean with a dry cloth, and apply the dye with a small pad. Use a brush to help dab the dye into corners. Be generous applying the dye, but wipe off the excess. Once the dye is dry, wipe on a coat of gel stain directly over it and wipe off the surplus after a couple of minutes. This helps make the grain and pore structure more pronounced, while leaving the ray-fleck pattern pale. I used General Finishes Brown Mahogany, a deep, warm brown. This dye-and-stain combination results in a deep, aged brown like you'll find on many antiques.

Allow the gel to dry completely (about 24 to 36 hours) before applying a topcoat. If you're not sure it's dry, do the smell test: If there is a strong, discernible smell of oil, wait. I applied three coats of an oil-based varnish to give the table decent protection. If you want to use a water-based finish, seal the gel stain first with a coat of de-waxed shellac. Zinsser's SealCoat works very well and can be used at its regular 2-lb. cut.

## DYE COLORS THE WOOD

***Filter first.*** *Before using the dye, pour it through a fine paint filter to remove any lumps of powder.*

***Apply dye liberally.*** *Use a folded piece of cloth or paper towel to dye the wood (above). After a minute or two, wipe off the surplus with a clean cloth (right).*

## GEL STAIN POPS THE GRAIN

***Wipe on, wipe off.*** *Applied straight to the dyed wood, the gel stain packs the pores and emphasizes the grain pattern of the white oak.*

# Antique pine

**Sealing the surface is the secret to an even color on this notoriously blotch-prone wood.**

If white oak is predictable when finishing, pine is anything but. A soft wood, it can take dye stain in a very uneven way and leave dark blotches. If the dyed sample boards indicate blotching, apply one or two washcoats of a 1-lb. cut of SealCoat shellac (three parts shellac with two parts denatured alcohol). When the shellac is dry, sand it with P220-grit paper and clean off the dust.

For this shelf, I used Early American Maple medium-yellow dye. I mixed roughly ¼ oz. of powder in 8 oz. of water so that it would have just enough color to give the pale pine a little boost. When dry, apply a coat of undiluted SealCoat, and when this is dry, sand it with P320-grit paper to flatten the surface.

Now that the surface is sealed, the gel becomes a glaze. Instead of quickly soaking into the wood, it sits on the surface and you can move it around. You can leave it denser in corners to simulate aging, or even remove it altogether if you don't like the appearance. When using any stain in this way, you need to dilute it by about 10% with mineral spirits to extend the working time. Don't overthin, or the gel will become watery and you'll lose the color strength. Instead of mineral spirits, you can add a little colorless glaze base such as Benjamin Moore's Studio Glaze to get even more working time and control over the color.

The gel-stain glaze can be applied with a pad or brush, but if you choose a pad, use a dry China-bristle brush to feather out any application lines. Let the glaze dry prior to topcoating.

Because the shelf won't see as much wear and tear as the table, I used SealCoat shellac as a topcoat (three coats). When brushing on the first coat, use as few brush strokes as you can. If you work the shellac too much, it could pull the pigment and leave a patchy appearance. When the third coat of shellac is dry, lightly sand the surface with P320- or P400-grit paper. A coat of wax is an optional final finish, but it gives the piece a soft look and a nice feel.

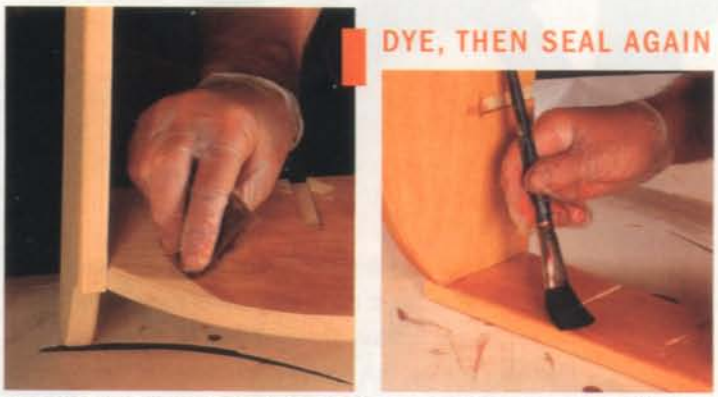
### THE RECIPE

- Lockwood #142 Early American Maple Medium Yellow water-soluble dye
- General Finishes Prairie Wheat gel stain
- Blond shellac

## SEAL FIRST

***Sealing is the solution.*** *This pine needed only a thin, 1-lb. cut of shellac. Wipe it on, let it dry, and then apply the dye.*

## DYE, THEN SEAL AGAIN



***Yellow adds depth.*** *Wipe the sealed pine with the yellow dye (left). Apply a 2-lb. cut of dewaxed shellac (right) to seal the dye before using the gel stain as a glaze.*

## STAIN BECOMES A GLAZE

***Reversible color.*** *When applied to a sealed surface, the gel stain becomes a glaze and can be wiped on and off until the appearance is just the way you want it.*

# Glowing mahogany

**A vibrant dye brings the wood to life while a layer of dark gel stain adds depth to the appearance.**

Instead of the normal mahogany brown, let's have a little fun with this mahogany jewelry box (www.bartleycollection.com). Start with a Bismarck Brown, but don't be fooled by the name; this alcohol-soluble dye is a deep, fiery red.

With an open-pored wood like mahogany, sealing is optional. If you want to emphasize the pore structure, skip this step. Just be aware that the gel will be darker on raw wood. In this case, the grain pattern was nothing special so I sprayed on a single coat of SealCoat shellac. For the glaze (gel stain), I used Bartley Espresso. I added a second coat of glaze to the bracket feet to deepen them. After applying the glaze coats, let the piece sit for a few days to dry completely and then seal it with shellac.

You now have a choice. For a high gloss, rubbed-out finish, follow the steps in my article "Bring Out the Best in Mahogany (*FWW* #197), but instead of varnish, spray on two or three coats of solvent lacquer. If you don't have a spray outfit, aerosol cans are fine for a small project like this. For a softer sheen, smooth the finish with 1,000-grit CAMI-grade wet-or-dry sandpaper or a 1,000-grit Abralon pad, and then rub it down with 0000 steel wool and wax.

### THE RECIPE

- Lockwood #350 Bismark Brown alcohol-soluble dye
- Bartley Espresso gel stain
- Solvent-based lacquer

### SOURCES OF SUPPLY

**LOCKWOOD POWDERED DYES**
www.wdlockwood.com

**GENERAL FINISHES GEL STAIN**
www.generalfinishes.com

**BARTLEY GEL STAIN**
www.lawrence-mcfadden.com

## TRY AN ALCOHOL-BASED DYE

***A brighter option.*** *Powders dissolved with denatured alcohol are more vibrant.*

***Seal by spraying.*** *When sealing an alcohol-based dye with shellac, spray it on. Brushing or wiping could pull the dye and leave a blotchy appearance. SealCoat is available in an aerosol can.*

## GLAZE IS A COOLER BROWN

***Another shot of color.*** *Wiped on over the shellac, the Espresso gel stain becomes a glaze. Use a dry brush to remove pad marks.*

# Tenon Shootout

## Tablesawn or hand-cut? Two experts go *mano-a-mano* to champion their favorite techniques

Associate Editor Matt Kenney livened up one of our staff meetings not too long ago when he mentioned that he likes to cut tenons by hand. A passionate and experienced woodworker, Kenney tends toward hand-tool techniques.

But he really ignited the conversation when he went a step further and said the work can be done faster by hand than by machine. Art Director Mike Pekovich, with more than 70 pieces of furniture under his belt, disagreed. Pretty soon we had a contest brewing.

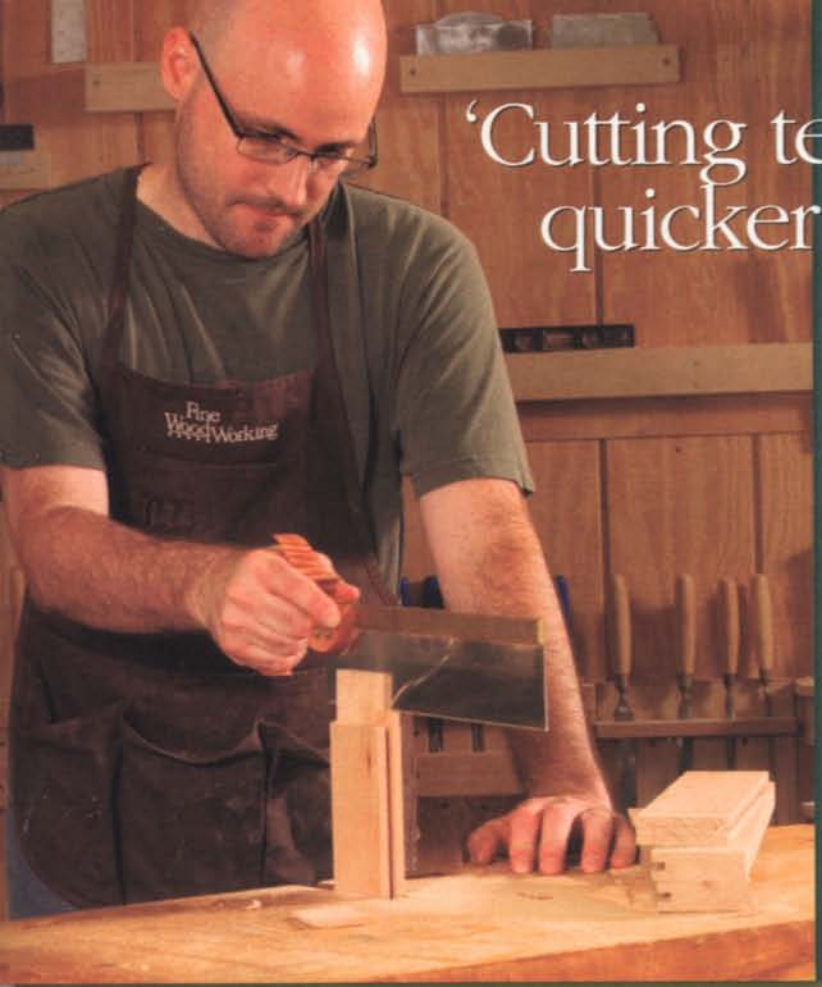
To settle the argument, Matt and Mike each cut the tenons for a pair of cherry door frames—eight haunched tenons in all. We milled all the stock and cut the mortises in advance, centered on the stock.

Associate Editor Steve Scott acted as timekeeper. Matt finished his frames in 129 minutes; Mike was done in 35. Still, once the dust settled, we all agreed that the stopwatch didn't tell the entire story; the real lessons were in the tips and techniques that we'd witnessed.

**Online Extra**

Tune in to **FineWoodworking.com** at 1:30 p.m. EST Thursday, Jan. 21, to watch Matt and Mike in a live rematch.

Photos, this page: Michael Pekovich



# 'Cutting tenons by hand is quicker than you think'

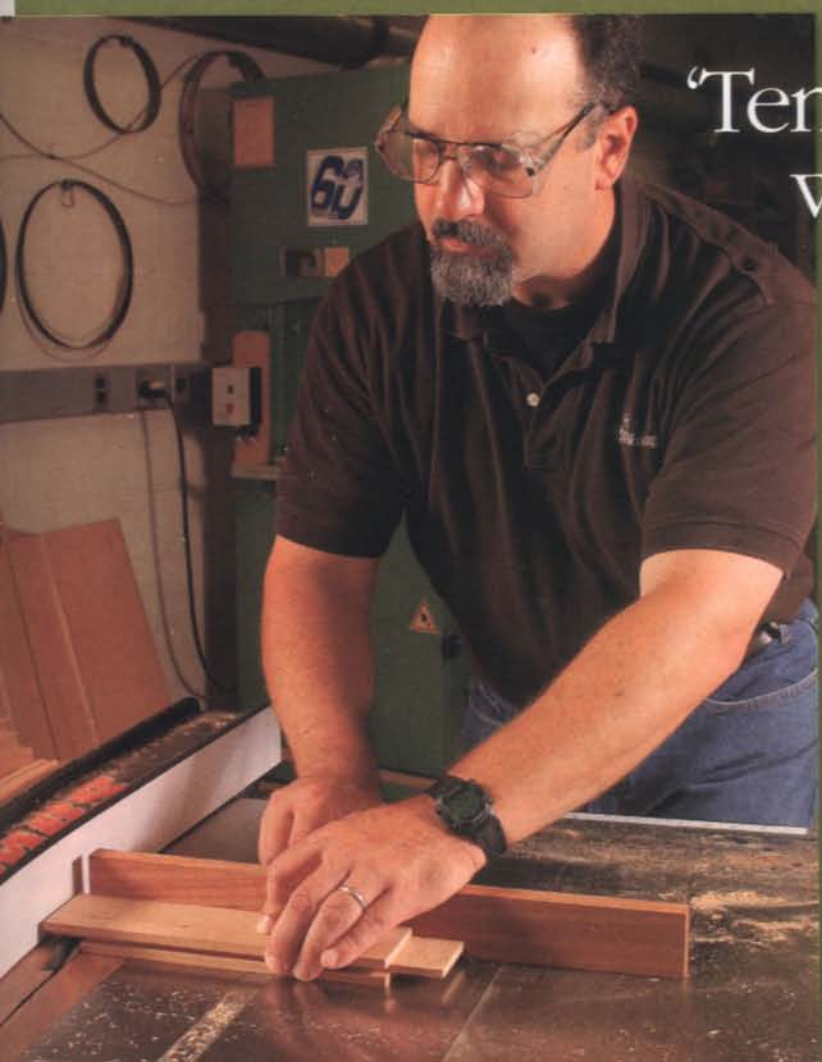
BY MATT KENNEY

I've been cutting joinery with hand tools since I began making furniture, when I didn't have the money or the space for big woodworking machines. Nowadays, I still prefer hand tools—especially for joinery. Machines are fast, but I've found that I don't gain much in time or enjoyment by using them.

Cutting the tenons for this pair of doors, for instance, shouldn't take too much longer by hand than it does with a stack dado cutter at the tablesaw. You can make the process efficient with a few tricks for cutting crisp, clean tenon shoulders and cheeks that need only minimal trimming for a good fit.

And the additional time it does require is time well spent. After all, it's time spent woodworking.

The competitors started with enough milled stock for two frames, with mortises already cut. Then we started the clock.

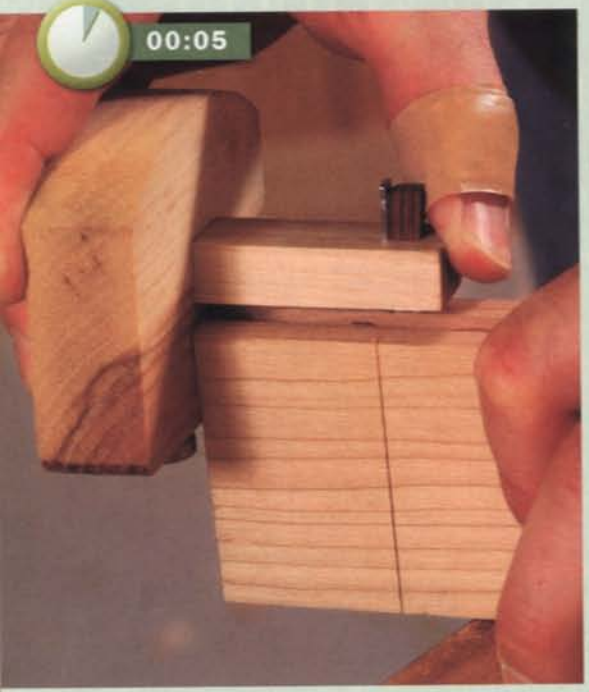


# 'Tenons in no time with a tablesaw and dado set'

BY MICHAEL PEKOVICH

I've tried various methods of cutting tenons. I've cut them by hand, on the bandsaw and the tablesaw, and even routed them. Each method has advantages, but I've found the quickest and most accurate is using a dado blade on the tablesaw. It takes a few minutes to get set up, a process that requires a handful of scrap pieces milled to the exact thickness and width as the frame parts. But once the setup is done, the dado blade not only removes stock quickly, it cuts the cheek and shoulder in one pass. And because the stock lies flat on the saw table, the tenon is guaranteed to be parallel to the workpiece and consistent in thickness. Plus, all the tenons end up exactly the same size. Speed, accuracy, and repeatability: three good reasons to use the tablesaw and a dado blade to cut tenons.

## BY HAND: CAREFUL LAYOUT IS KEY

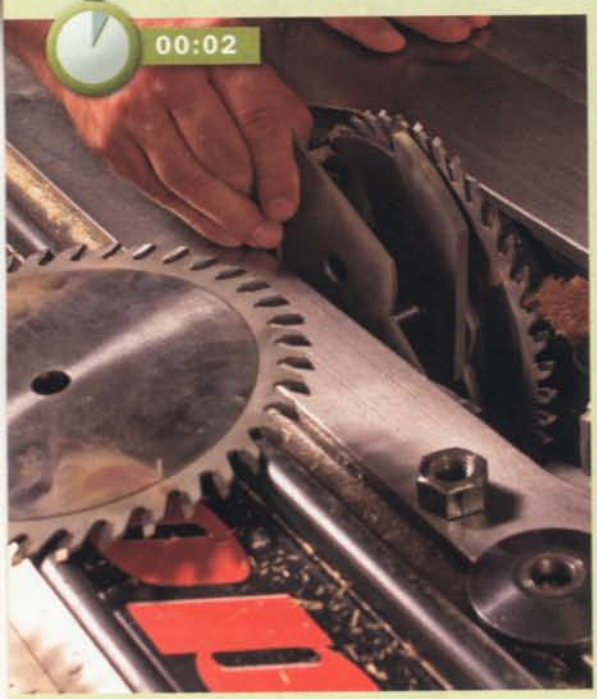



***Begin by marking the tenon shoulders.*** *Use a cutting gauge for clean, deep lines. Wheel or pin gauges don't cut as crisply. Set the gauge to the depth of the mortise and make three or four passes, cutting a little deeper each time.*

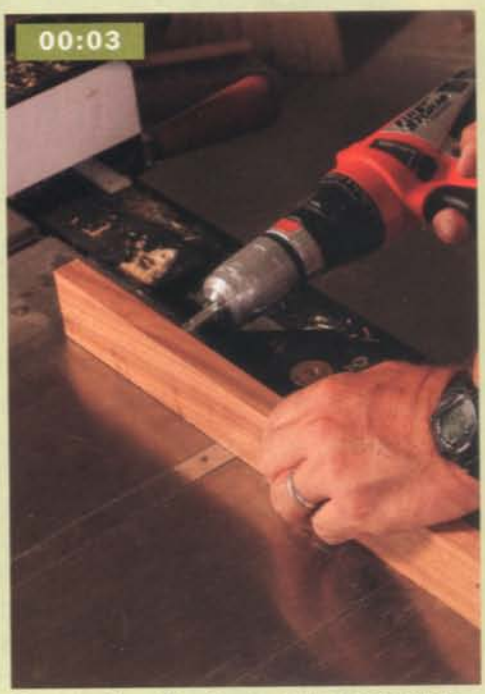

***Pick up the mortise width.*** *With the fence against the front face of the stile, set a mortising gauge to the width of the panel groove, which is the same as the mortise width.*


***Mark the tenon thickness.*** *Again, keep the fence on the front face. Scribe the end grain and the edges down to the shoulder line.*

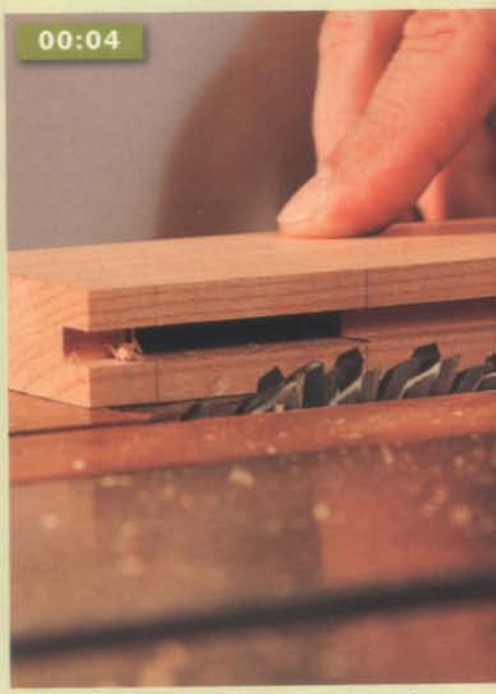
## WITH POWER: NO LAYOUT, JUST TEST CUTS




***Install the dado blade.*** *Pekovich uses a sharp, high-quality dado set to make tenons, forming the shoulders and the cheeks in just a few quick passes.*




***Prepare the miter gauge.*** *A good dado blade should leave a chip-free shoulder, but a backing fence on the miter gauge is needed to prevent any chipout on the back end.*




***Set the blade height.*** *Place a mortised frame part next to the blade and raise the blade until it's just below the mortise. This should yield a tenon that's too thick—a good starting point for a series of test cuts in scrap.*



Photos, except where noted: Steve Scott


***Mark the haunch.*** *First, set the cutting gauge to match the distance from the edge of the stile to the mortise. Then use this setting as shown to mark the end grain on the tenon.*


***Secret to a clean shoulder.*** *Using a chisel, make a series of shallow passes to cut a groove about 1/16 in. deep on the waste side of the scribe lines. This reveals more of your deep scribe lines and helps establish the top of the shoulder.*


***Cut the shoulders using a backsaw with crosscut teeth.*** *The chiseled groove provides a square reference surface to guide the saw. It also seats the saw below the surface of the workpiece to prevent marring. Stop cutting when you reach the panel groove.*


***Sneak up on a snug fit.*** *Raise the blade in small steps and remove stock from both faces of your test piece. Stop when you can just get a corner of the tenon into the mortise. Don't leave the tenon too thick. This only creates more fine-tuning—and more chances for error—later.*


***The fence controls the tenon's length.*** *Use a combination square to set the fence position.*


***It's time to cut tenons.*** *To avoid chipout at the end of the tenon, start at the end and work toward the shoulder. Maintain downward pressure on the stock to keep it flat on the tablesaw top. After you've cut the entire face, check for an even cut and take a second pass if necessary.*

## BY HAND: SAW THE TENONS AND TRIM THEM TO FIT

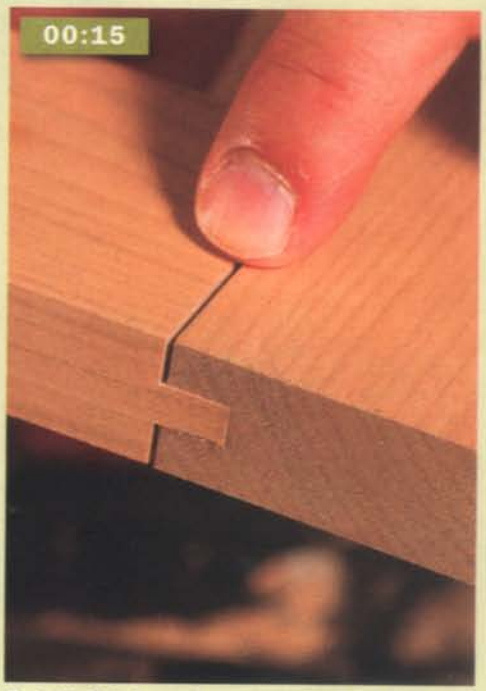

***Cut the cheeks with a ripsaw.*** *Clamping the rail at an angle lets you sight along two layout lines (end grain and near edge) for greater accuracy. Cut just proud of the lines, and adjust the rail to vertical as soon as the saw reaches the far corner. Then finish the cut.*


***The haunch comes last.*** *Start the cut at your layout line on the end grain, and saw down to the shoulder cut that matches the depth of the panel groove.*


***Trim the cheeks.*** *Test-fit each tenon and remove excess thickness with a rabbet block plane or shoulder plane until you get a friction fit. If the tenon is too wide, pare the edge with a chisel.*

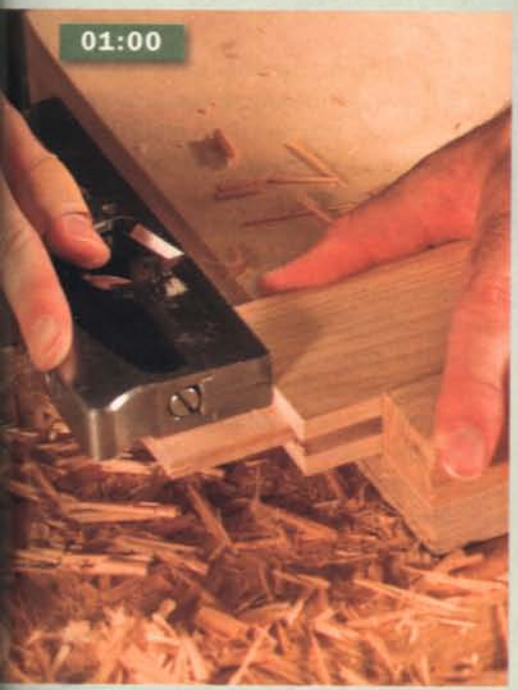
## WITH POWER: CUT THE HAUNCHES AND FINE-TUNE THE FIT


***OK, a tiny bit of layout.*** *This frame joint requires a haunched tenon, one with an extra bump to fill in the panel groove on the end of the stile. Mark a tenon with the depth of the panel groove. Use this mark to reset the tablesaw fence before cutting the outside shoulder.*




***Test fit.*** *This haunch has bottomed out before the joint is fully seated, leaving a gap. Adjust the fence for a slightly wider cut.*


***Ganging up on the saw.*** *Once the setup is dialed in, the workpieces can be run over the dado set as a group to cut all of the haunches at once.*




***Check the shoulders.*** *If necessary, trim the shoulders square and flush to the line left by the cutting gauge. This should take just a few passes with a shoulder plane.*

**01:27 FIRST FRAME, 02:09 FOR BOTH FRAMES**

# What they learned

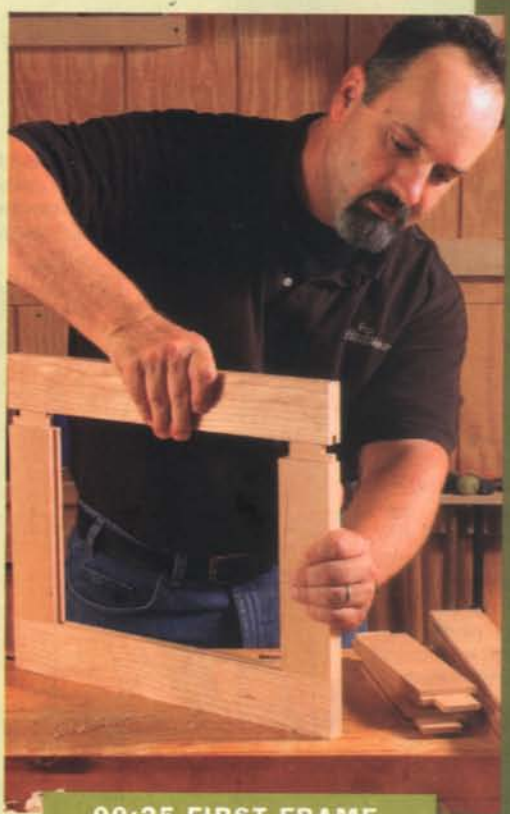
### MATT: MY FAITH IS UNDIMMED

I expected Mike to cut great joints, and he did. But I didn't expect him to do it in 35 minutes. That's impressive.

Still, even though I'm the one who started this whole debate, the results only reinforce my feeling that the time involved isn't that important to me. In fact, if I were making another pair of doors today, I'd probably take a little more time in laying out and sawing the joinery.

As impressive as Mike's results were, they're not enough to make me give up what I love most about woodworking. I enjoy working with hand tools to relax and test my skill, and I like the look and feel of truly handmade furniture. I appreciate the process as much as the product. With hand tools, the process requires more skill and practice but it's also much quieter and more satisfying. And I never had to worry about losing a finger to the voracious teeth of a tablesaw blade.


***Trim to fit using a chisel or a shoulder plane.*** *Before trimming the whole tenon, be sure there isn't a thick portion just at the tenon end. Trimming from the tenon's rear face keeps the front face of the workpiece aligned with the rest of the frame.*



**00:25 FIRST FRAME, 00:35 FOR BOTH FRAMES**

### MIKE: TABLESAW'S SPEED GETS ME QUICKLY BACK TO THE BENCH

I was impressed at how fast Matt was able to hand-cut tenons. I figured it would take him half a day to get through them. An hour a door is not bad and certainly a more enjoyable experience than making sawdust at the tablesaw.

I guessed the task would take me only about 15 minutes. And that's about how much time I spent at the tablesaw. What surprised me was that I spent as much time fine-tuning the joints at the bench as I did cutting them. Even with power tools doing most of the work, it still took some hand work to get to the finish line.

I envied Matt's quiet time at the bench, but I think I'll stick to the tablesaw for tenons. As much as I like hand tools, I don't see a benefit in using them for this task. The tablesaw's speed and accuracy means I'll get to pick up my dovetail saw and handplanes that much sooner. And the handcrafted results from these tools will really enhance the finished piece.

One of the challenges of building a small, decorative box is deciding how to align and attach the top to the base. The most common way is hinges, but they can be time-consuming and fiddly to install. The simple rabbet joint works fine and leaves an attractive, clean look, but it can be troublesome, too.

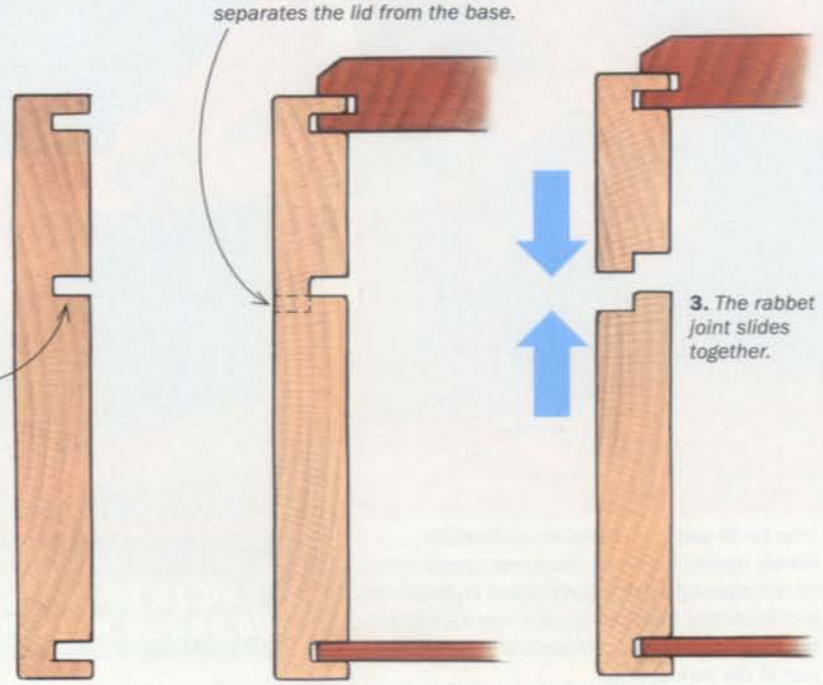
The traditional method is to create a solid box, cut off the lid on the tablesaw, and then use a bearing-guided rabbeting bit to rout a rabbet on the inside of one piece and the outside of the other. You finish the joint by either squaring or rounding one set of corners and finessing the joint for a good fit. Simple to explain, harder to accomplish. Cleaning up and fine-tuning the inside rabbet is tedium

# 2 Fast Ways to

## Think out of the box

### THE TRADITIONAL METHOD, STREAMLINED

**The traditional method is to cut the box apart on the tablesaw and then rabbet the two parts, which is tedious and fussy. This method combines those steps into one. Also, because the section you need to take out is only the width of a single sawkerf, you can use wood with figure or swirly grain, and you'll end up with almost no jump in the pattern.**




Drawings: John Tetreault

defined, and is done mostly by hand-sanding. I'm sure that's what kept my father, Helge Nyberg, an extremely accomplished woodworker, from using a rabbet joint on anything but the fanciest box. The joint is seductive, however.

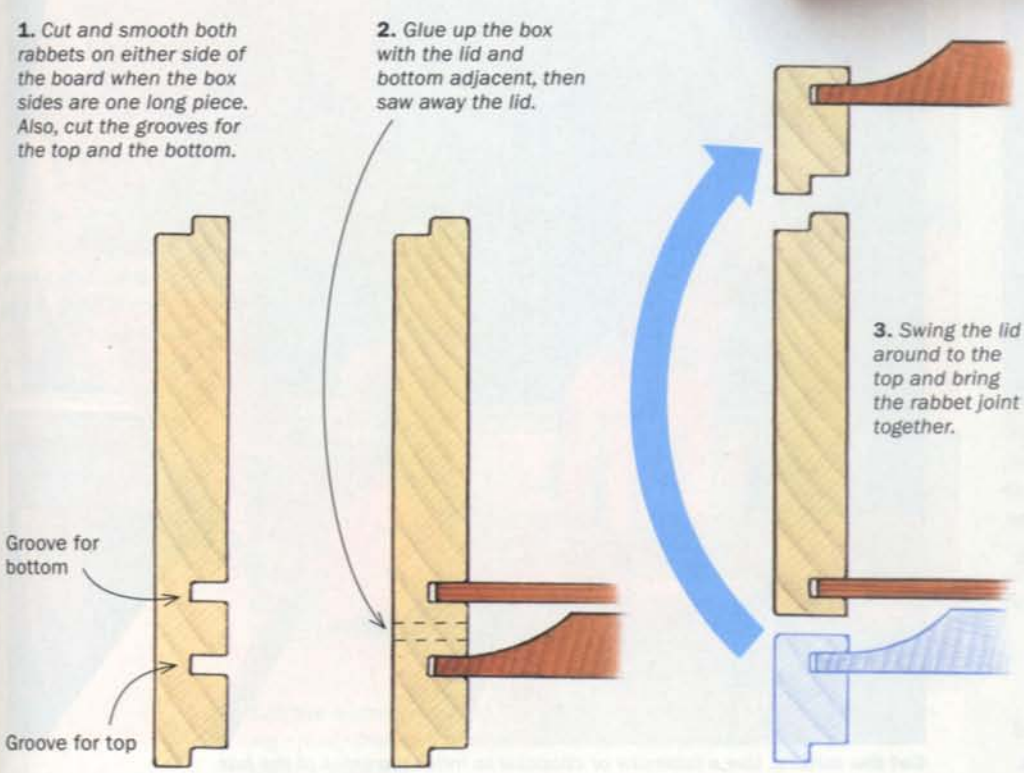
My cousin Carl taught me a way to streamline the traditional method for a rabbeted lid, and then I came up with a radical new way that I call "the inside-out box." Either technique is much simpler than cutting the rabbets after the box has been glued up. The inside-out method works so well that I use it for functional boxes as well as for fancy work. I'd bet even old Dad would consider it.

*Bill Nyberg is a woodworker in Marlton, N.J.*

# Build a Box

## to simplify a rabbeted lid

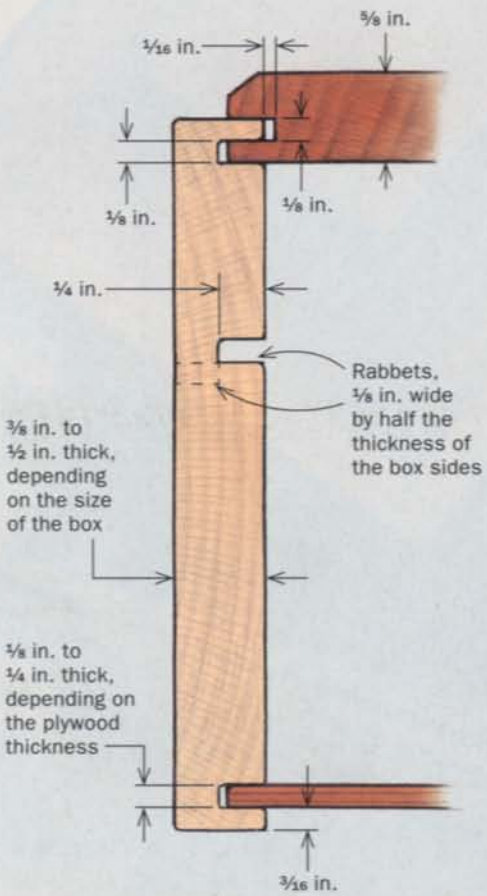
BY BILL NYBERG




### THE REVOLUTIONARY INSIDE-OUT BOX

**Even the streamlined version of the traditional method leaves an inside rabbet in the lid that is difficult to clean up. But Nyberg found a way to build the box inside out, letting him sand the rabbets before assembly. The downside of reversing the box and lid (see drawing at left) is poor figure and grain continuity. So choose fairly straight-grained boards. Vertical patterns such as tiger maple or small, random figure such as bird's-eye also work well.**

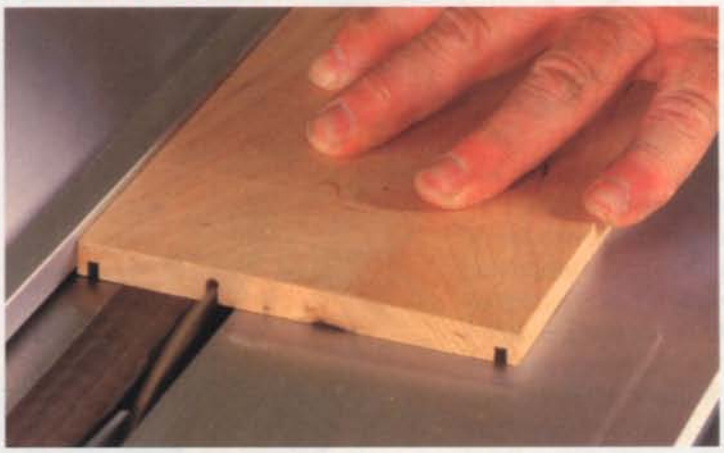
# Option 1: Cut one rabbet before assembly, one after




**Take all four sides from one board. Mill it to the right thickness and width (taking into account the width of the rabbet), but leave it a little long to allow for planer and jointer snipe and possible redos when mitering.**

**While you're at the tablesaw, instead of just cutting grooves for the top and bottom of the box, cut the inside rabbet along the entire length of the workpiece. Now miter the corners and assemble the box, inserting the top and the bottom. You can use the masking-tape clamping method ("Tape: Unsung Hero of the Shop," *FWW* #205) or 45° clamping cauls, as shown. Once the glue has dried, use an offcut from the box sides to set the tablesaw fence so that the kerf creating the outside rabbet will be alongside the inside one. Also use the offcut to set the blade height so that it just meets the inside rabbet. Make the cut on all four sides, separating the lid and creating the rabbet joint at the same time.**

## CUT THE FIRST RABBET



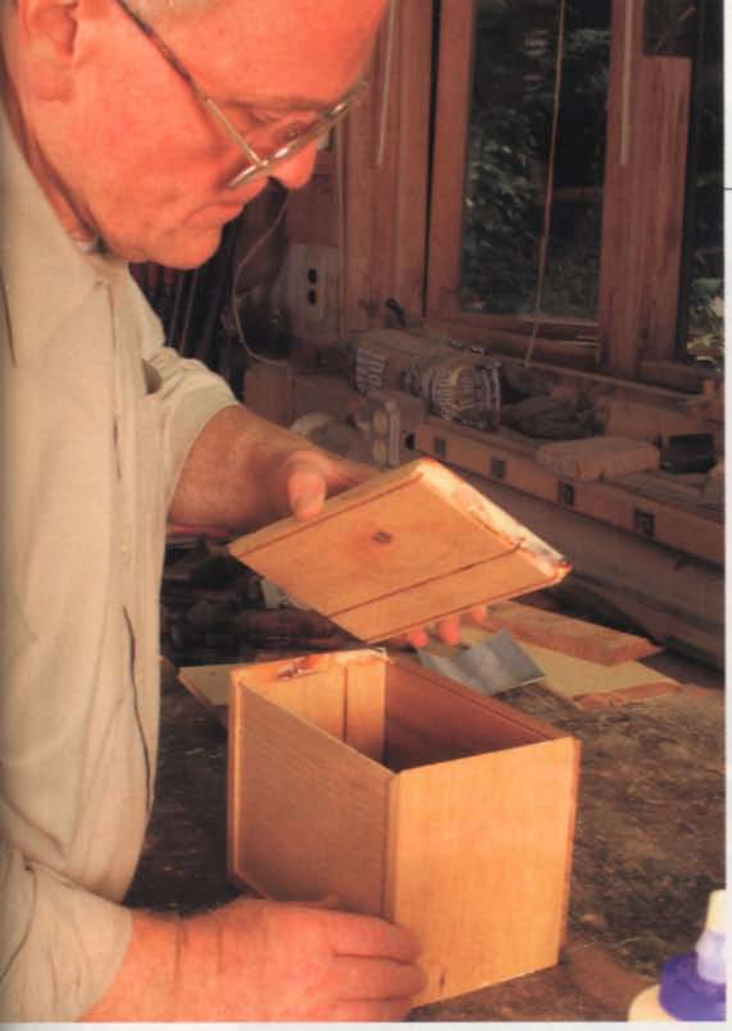
***One piece, three grooves.*** *While the sides of the box are one continuous piece, cut grooves for the top and bottom panels, and then cut a third groove that becomes the inside rabbet. Use a rip blade for these cuts; it leaves a square kerf.*

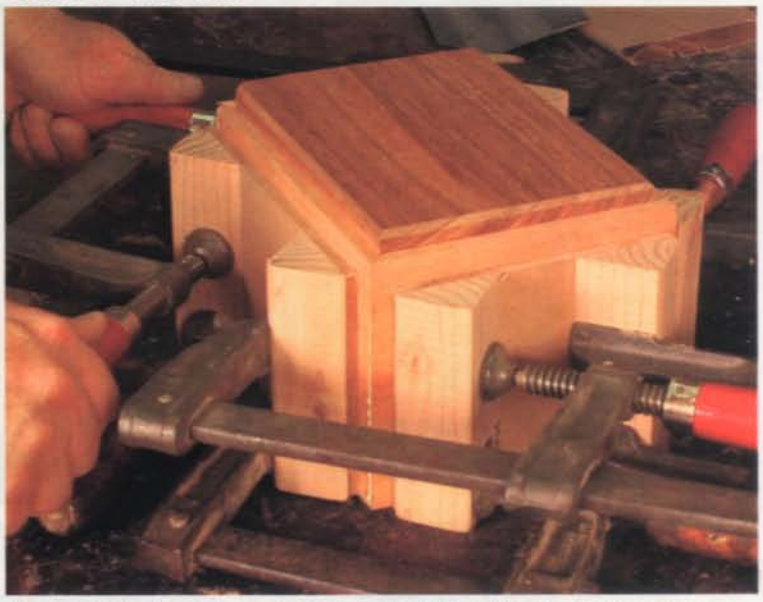
***Cut the miters.*** *Use a tablesaw or chopsaw to miter the sides of the box.*



Photos: Mark Schofield

## GLUE UP THE BOX



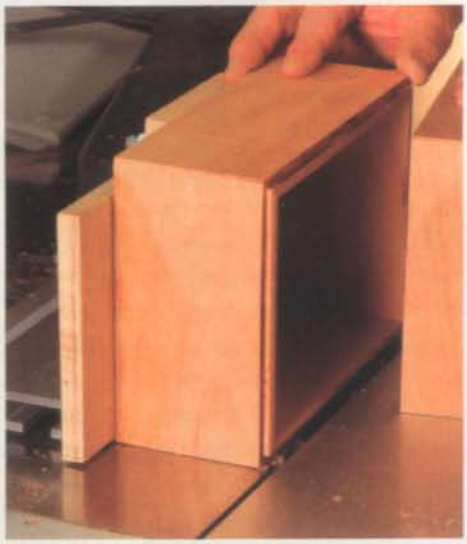


***Assemble the box.*** *You can reinforce the miters with biscuits. In any case, apply glue to the mitered ends, place the top and bottom panels in their grooves, and assemble the box (left). Use 45° blocks, glued to ¼-in.-thick MDF, to align the clamping force with the joint. Use light force from clamps resting on the bench to align the cauls with the box sides, and then apply the upper clamps, which are more centered on the joint (above).*

## CUT THE SECOND RABBET

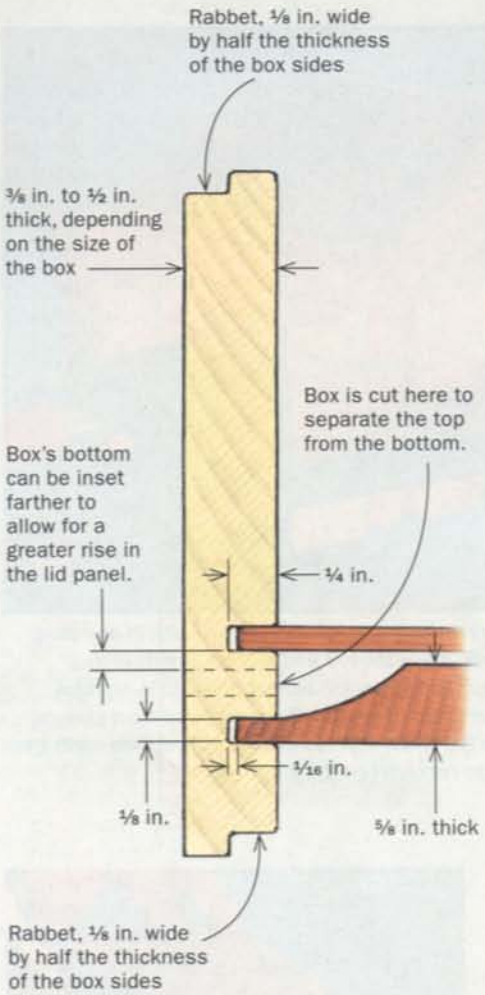
***Align the rabbet joint.*** *Use an offcut from the box sides to set the tablesaw fence so that the outside rabbet will just touch the inside one.*

***Cut the outside rabbet.*** *Run all four sides across the blade, maintaining steady pressure against the fence. A tall auxiliary fence provides greater stability.*

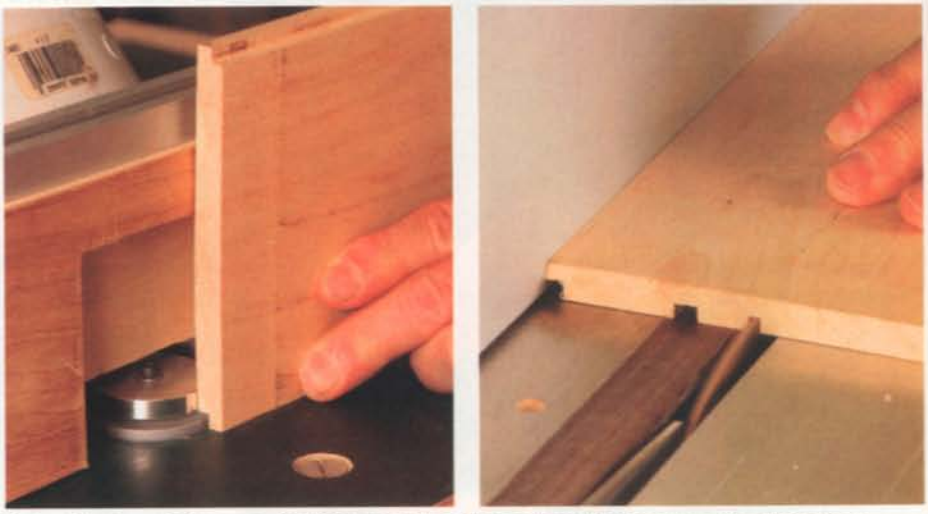


***The rabbet revealed.*** *Once the fourth side has been cut, the lid will come away, revealing the two halves of the rabbet joint. Sand or plane the rabbets to clean up the saw marks and fine-tune the fit.*

# Option 2: Make the rabbets before making the box




## CUT ALL THE JOINERY



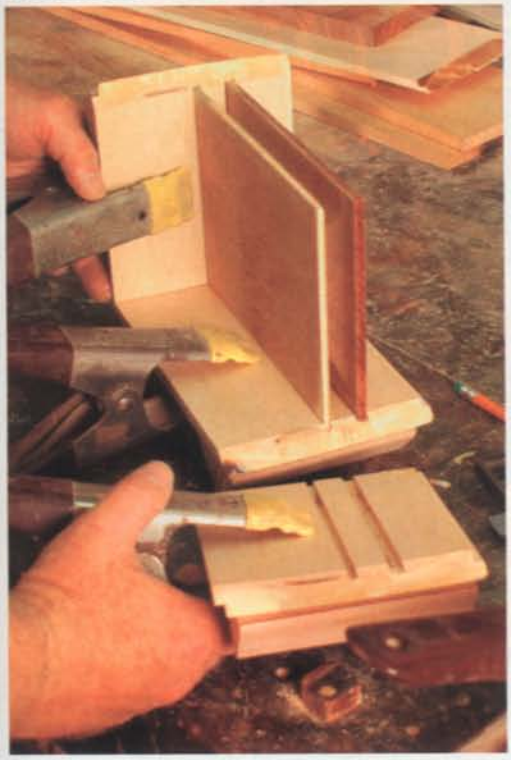
***Cut rabbets and grooves.*** *Cut the two parts of the rabbet joint on opposite edges of the board (left). Then cut the grooves for the top and bottom panels (right).*

***Easy cleanup.*** *Trim and clean both continuous rabbets with a shoulder plane and a sanding block. Use a short section cut from one end to tell when the rabbet joint comes together flush.*

**Mill the board to the same specifications as the first method. Cut a rabbet along both long edges, but on opposite faces, the way you do when shiplapping boards. You can do this with a bearing-guided rabbeting bit in a router, with the same bit or a straight bit in a router table, or with either a regular or dado blade on the tablesaw. Set the depth of the rabbets to just under half the thickness of the wood.**

**Next, cut grooves for the top and bottom panels. Their precise location is determined by the design of the box and the thickness of the lid panel. A full-size drawing is sometimes helpful to decide exactly where to cut the grooves and where you'll eventually cut apart the box. Before mitering the sides, use a shoulder plane**

## ASSEMBLE THE BOX INSIDE OUT



***Use the cauls again.*** *Because the box is open, you can use a spring clamp to hold the cauls to the box sides. Place the top and bottom panels in their grooves with the outsides facing each other, and assemble the box. Align these miter joints carefully, as any inaccuracy will affect the fit of the rabbets.*

**and/or a sanding block to trim and clean up the two fully exposed continuous rabbets. Now assemble the box.**

**After the glue dries, cut apart the box between the top and bottom panels, switch the positions of the two pieces, and fit them together. If the fit is not perfect, it can be adjusted easily by trimming the half with the exposed rabbet. The interior rabbet is already finished and can be left alone.**

**Among the benefits of this method is that when the bottom and top are separated on the tablesaw, minor inaccuracies are easier to deal with than if the cut had formed the joint. Joints leave little room for error, but nobody knows if you sand away another fraction of an inch of the top or bottom.**

## RIP IT AND FLIP IT

***Cut the box in two.*** *Set the blade height just greater than the thickness of the sides, and cut between the hidden top and bottom panels in a carefully marked location.*

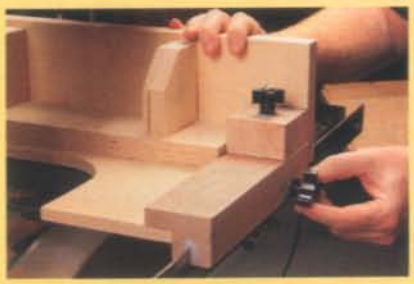
***The inside-out box.*** *With the cuts complete, the top and bottom of the box are revealed (left). Sand away the saw marks on the top and bottom edges (below). The rabbets should need very little trimming.*

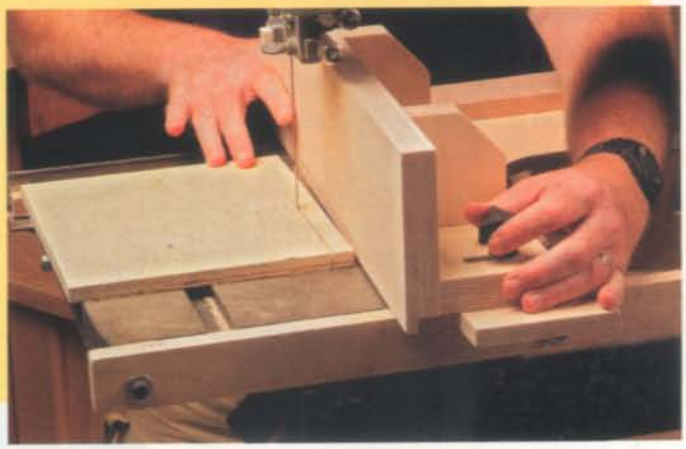
# Make Your Own Bandsaw Fence

BY PATRICK SULLIVAN

## Smooth-sliding fence lets you rip and resaw with precision

The fence rides on an angle-iron rail in front and a threaded knob locks it in place (right). It also pivots to compensate for blade drift (below).





When I first bought my 14-in. Delta bandsaw, I figured it would be used only for curved work, like rough-cutting cabriole legs, so I didn't bother purchasing a fence for it. In my shop, the tablesaw was the workhorse that I depended on for almost everything, but especially for straight cuts.

That shortsighted decision has come back to haunt me, as I've gradually found many reasons for making straight cuts on the bandsaw, including resawing and stopped cuts such as inside corners. Without a good fence, I've had to improvise by clamping a piece of wood to the table. But clamping to the underside of the bandsaw table isn't easy because of the ribs down there, and setting the fence to make a straight cut requires loosening and resetting the clamps—sometimes it takes multiple tries.

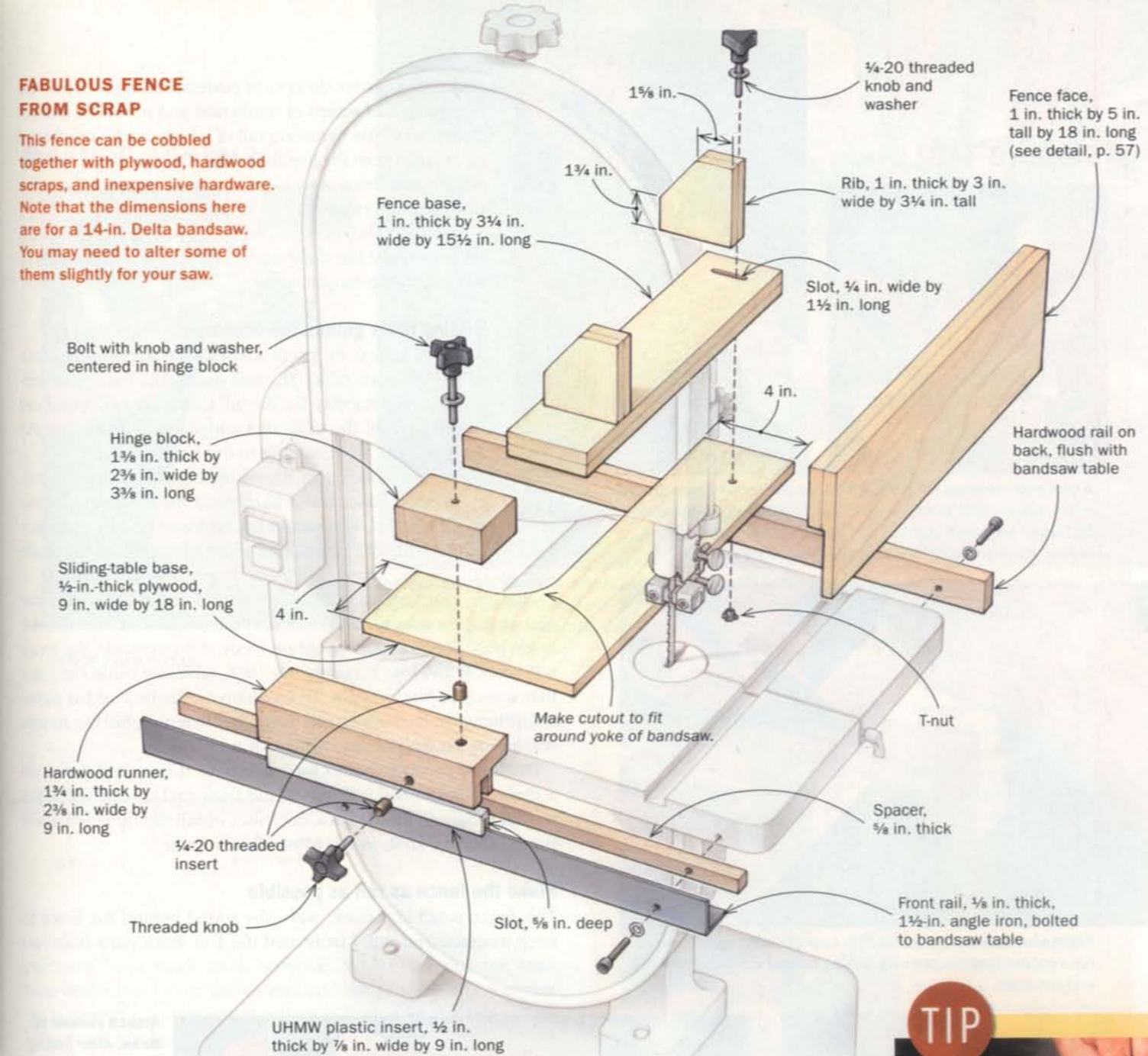
Recently I ended all of that nonsense by building my own bandsaw fence. Although I'd seen various aftermarket fences around, they were expensive. And not all of them adjust easily for blade



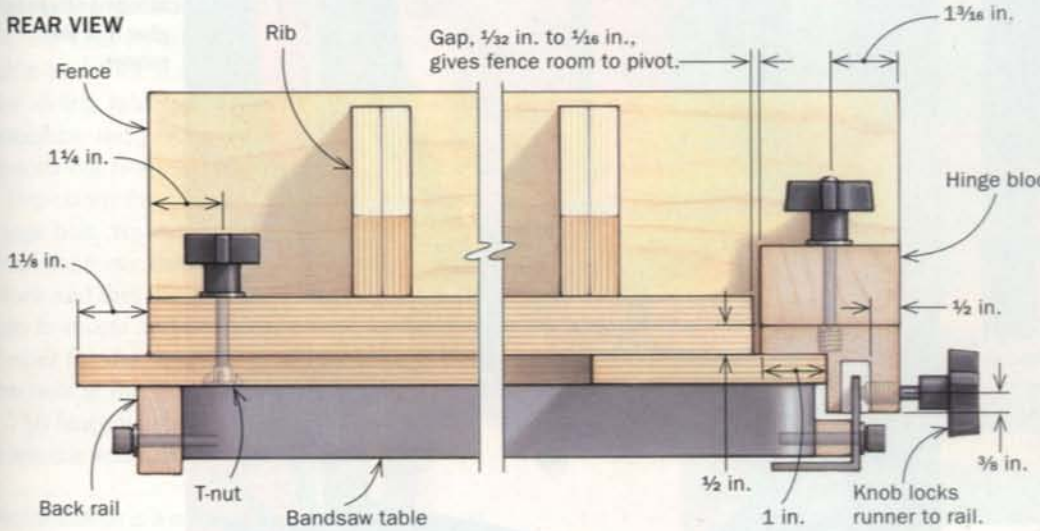
Photos: Michael Pekovich; drawings: Christopher Mills

## FABULOUS FENCE FROM SCRAP

**This fence can be cobbled together with plywood, hardwood scraps, and inexpensive hardware. Note that the dimensions here are for a 14-in. Delta bandsaw. You may need to alter some of them slightly for your saw.**




**REAR VIEW**




TIP

***Railwork.** A hardwood spacer pushes the rail away from the front of the bandsaw table so the fence can ride on it. Drill the holes in the rail a bit oversize so you can adjust it flush with the table.*

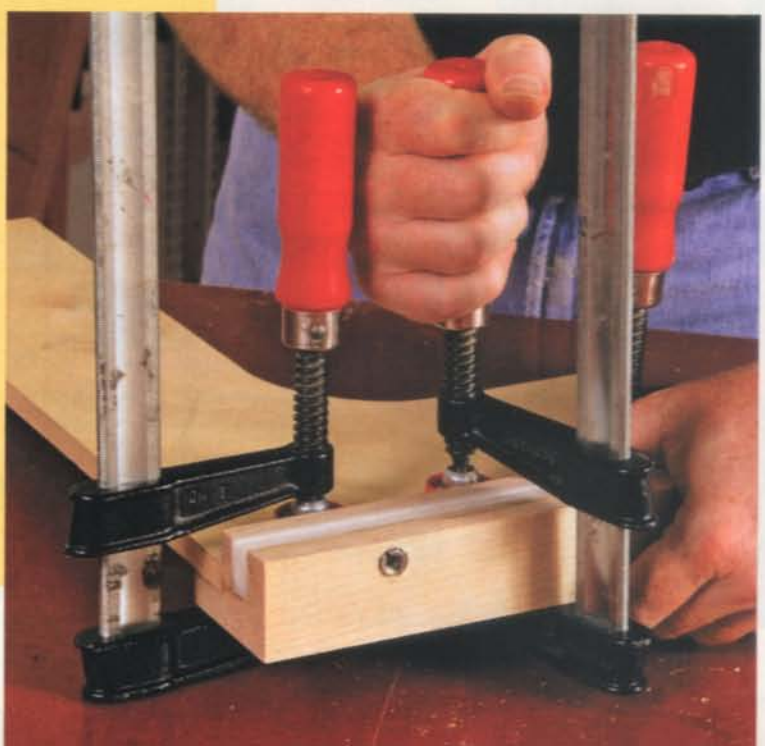
TABLE

SLIDING TABLE


***A slot with no slop.*** *Glue the UHMW plastic insert into a groove in the runner (left). Once the glue dries, cut a slot into the plastic insert ⅝ in. deep (right). It should be wide enough that the runner slides smoothly on the angle-iron rail without play.*

***Right-size rabbet.*** *The runner fits over the sliding-table base. For a rabbet that fits perfectly, scribe around the bandsaw table and the base.*

***Insert threads.*** *The runner locks to the front rail with a threaded knob. Before assembling the sliding table, install the threaded insert for the knob.*



***Attach runner to base.*** *After cutting the plywood base to size and shape, glue it to the runner.*

drift (most blades do not cut perfectly straight). This one is made out of scraps of hardwood and plywood, and requires very little hardware (all of which can be purchased at Amazon.com for less than $30). Despite these humble origins, the fence is rock-solid, smooth as silk, adjusts for drift, and offers up to 9 in. of rip capacity.

Note that this fence is sized for a 14-in. Delta saw. You'll have to adjust the dimensions and hardware locations to suit your own bandsaw.

### Sliding table guides the assembly

The first task is to install a rail and spacer on the front of the bandsaw table. This rail guides the fence and provides all the stability for the jig. I added a hardwood rail to the back of the table that supports the fence beyond the bandsaw table, adding to the rip capacity.

The fence rides on a sliding table, which has two parts: a plywood base, and a hardwood runner that rides the angle-iron rail in front. The runner has an insert of ultra-high molecular weight (UHMW) plastic that's slotted to fit over the angle iron and makes the runner glide easily on the rail.

Glue the insert into the groove (I used Titebond III). After the glue dries, cut a ⅝-in.-deep slot into the plastic that fits over the angle iron. The slot must be cut perfectly; if it's too wide, the fence will wobble and lose accuracy. My ⅛-in. tablesaw blade cut a slot that was close but too tight. To creep up on the fit, I added paper shims between the runner and the tablesaw fence until the runner was riding on the rail smoothly with no play.

The fence pivots to adjust for blade drift. It is locked down via a threaded knob and a T-nut on the back end. Locate the T-nut so that it doesn't hit the back rail. Also, install the threaded insert for the locking knob in the front of the runner.

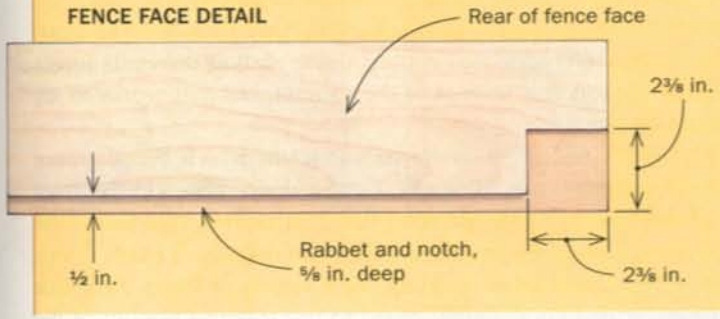
### Make the fence as tall as possible

This fence is tall and thick, with ribs added behind the fence to keep it square and stiff. I laminated the 1-in.-thick parts from two

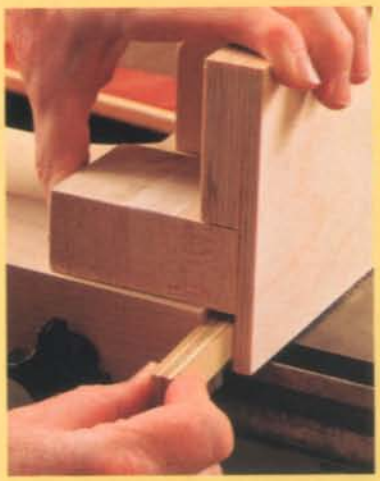
## FENCE ASSEMBLY

***Recess for the block.*** *Rout the rabbet for the sliding-table base, then make way for the hinge block using a plunge router and fence (left). Glue the fence face to the fence base (above), using the ribs to keep the assembly square. Note that the fence is shown here on its side.*

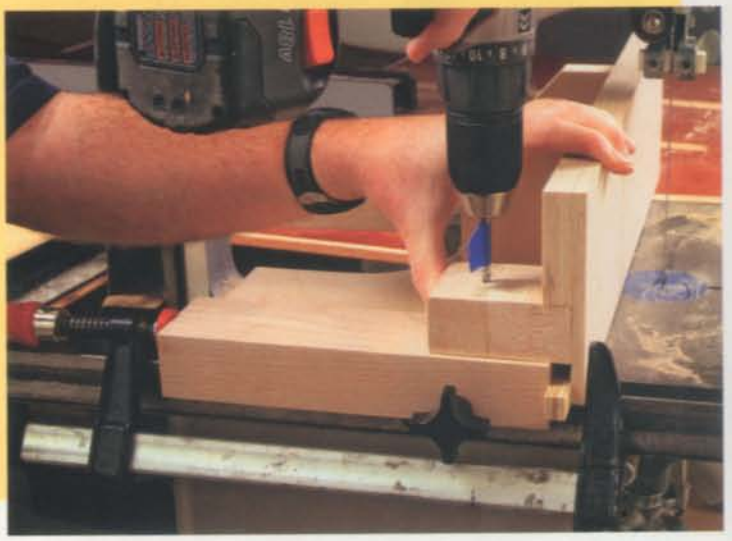
**FENCE FACE DETAIL**




**GETTING HINGED**



***Room to move.*** *To maximize the pivoting action of the fence, you need extra space at the front. Insert a ½-in. spacer between the fence face and runner (left), then drill the pivot-bolt hole in the hinge block at the drill press and glue it into its recess. Let the glue dry, then drill through the hinge block and into the runner (below) to create a pilot hole for the threaded insert that will hold the pivot bolt.*



pieces of ½-in.-thick birch plywood. When you glue the fence base and fence face together and add the ribs, be sure the glue-up is perfectly square and the base is flush with the edge of the rabbet at the bottom of the fence face.

### Put it all together and get ripping

Do the final assembly right on the saw table. Attach the sliding table and lock it in place on the rail. Now place the fence on the sliding table and install the threaded knob on the back. To maximize the pivoting action, the front of the fence needs to be spaced out from the end of the runner (see photos, right).

Dry-clamp the hinge block in place to mark the location of the hinge bolt. You want the hole for the bolt to be far enough away from the fence that you can get a hand drill in there. Remove the block and drill the hole in it at the drill press. Now glue the block into its recess and drill a pilot hole through the block and into the runner for the threaded insert that holds the hinge bolt. Enlarge the hole at the drill press and install the insert.

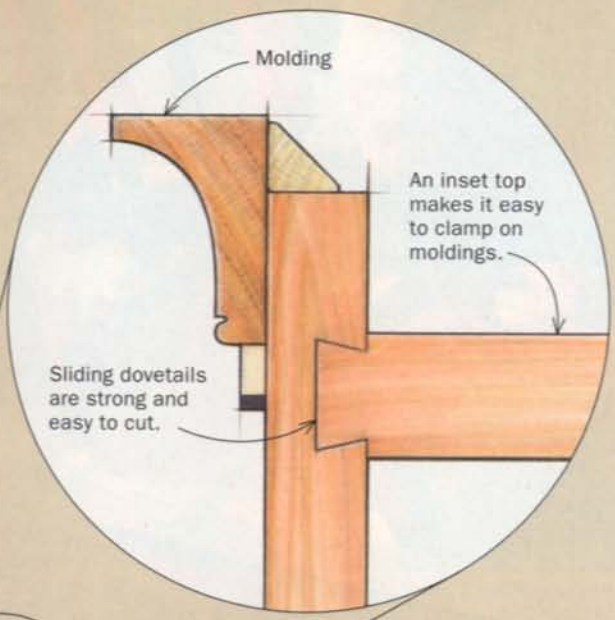
This fence will give solid service for decades. To use it, just make a test cut and adjust for drift as needed. □

*Patrick Sullivan is a woodworker in Carmel Valley, Calif.*

# A Better Way

## Sliding dovetails and an unorthodox face frame make the case stronger, better looking, and easier to build

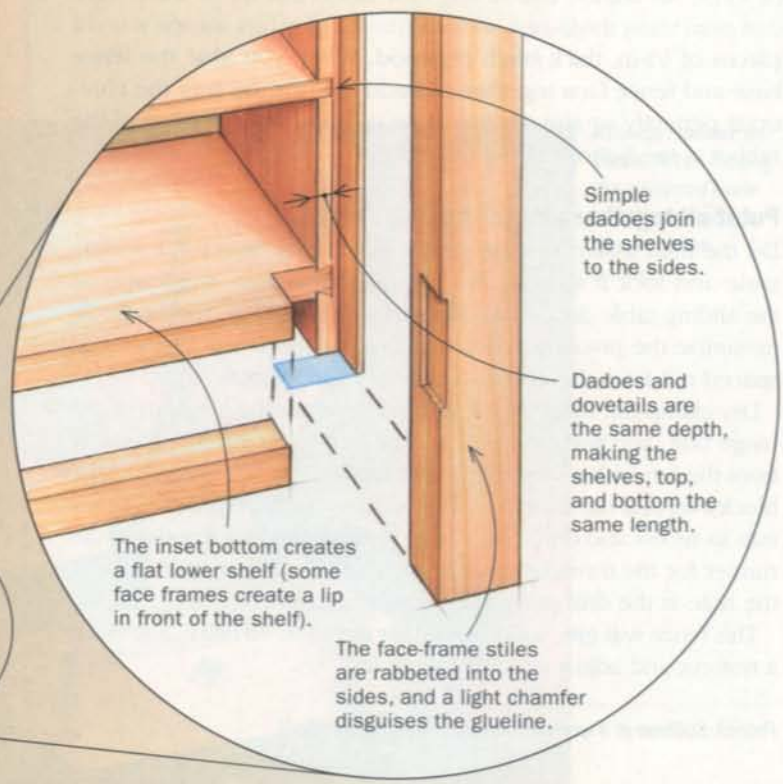
BY GARRETT HACK



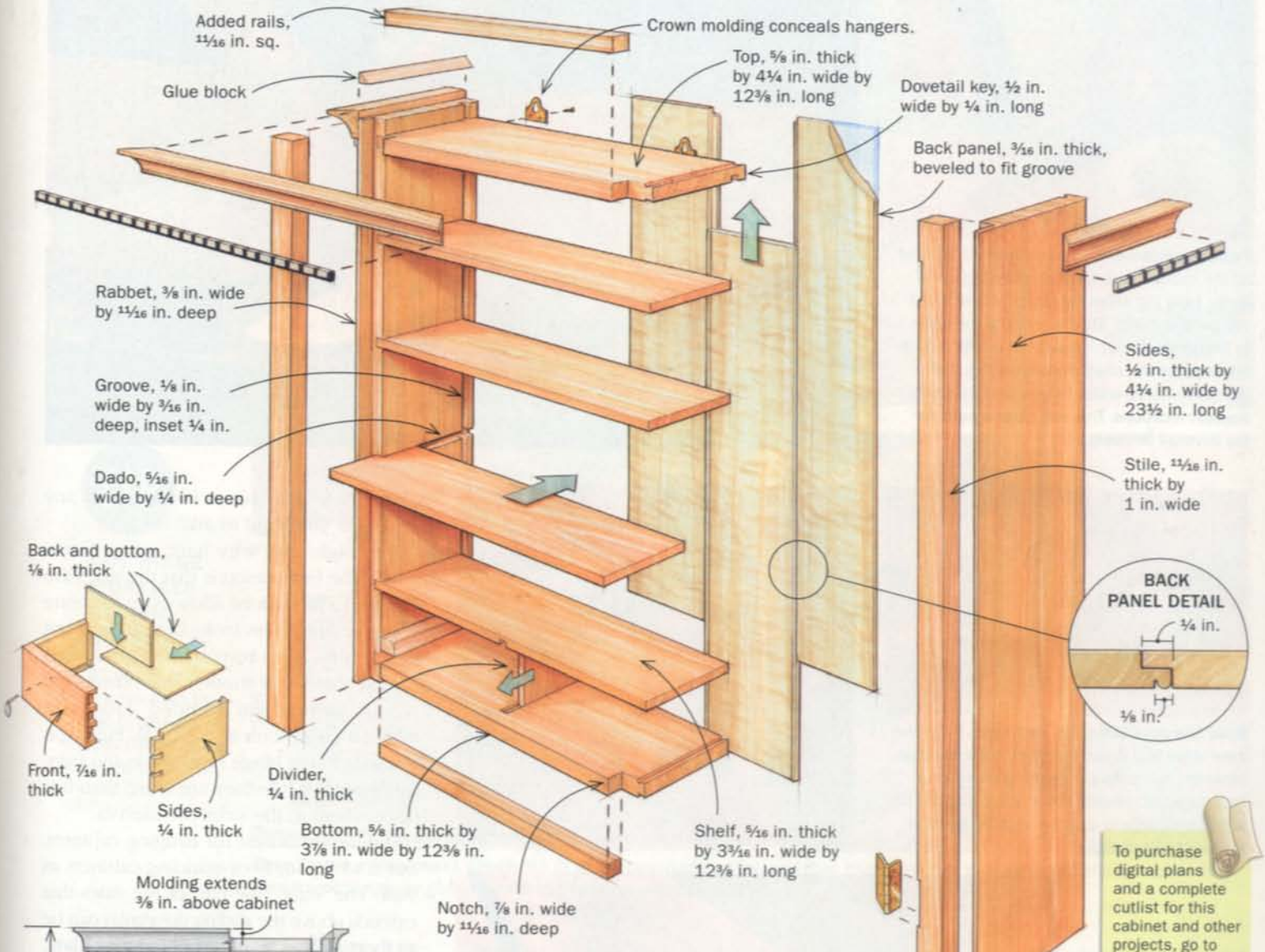

I made this nice little wall-hung cabinet to hold tools, but it could easily find a spot inside a home and hold small knickknacks. What's interesting about this project is the uncommon way I build the case. The process is efficient, and it yields a strong and very attractive piece with a lot of room for design variations.

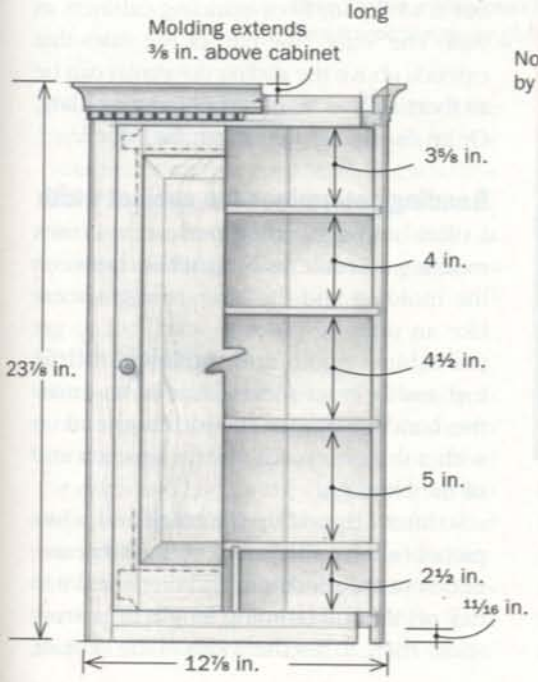
The main joints are sliding dovetails, which are rock-solid and easily made with a tablesaw and router. Using sliding dovetails forces me to inset the top and bottom of the cabinet, but that works to my advantage, as you'll see.

Also, I use an unusual face-frame variation, which blends more seamlessly with the case. Basically, I cut a deep rabbet in the front edges of the case and glue the stiles into that rabbet. That leaves the glueline very close to the corner, where I can disguise it easily with a chamfer, a bead, or a bit of banding, for a variety of looks. Note that the rails are added later, simply glued to the top and bottom of the



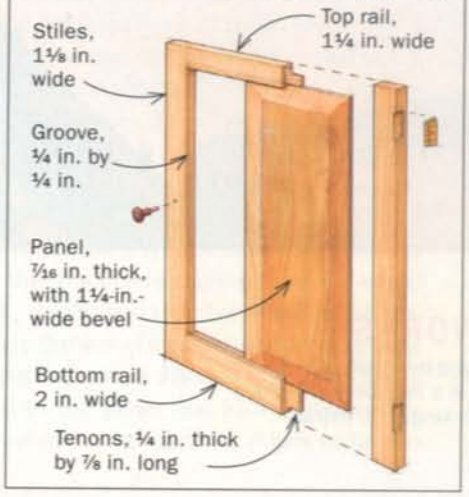
# to Build Wall Cabinets



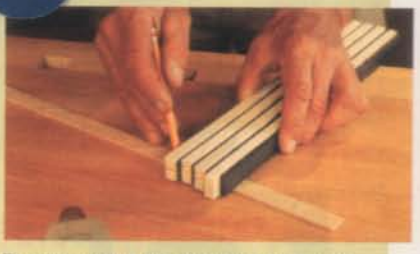

**DOOR**

All door-frame parts are 11/16 in. thick; overall dimensions are 10 5/8 in. by 20 5/8 in.




To purchase digital plans and a complete cutlist for this cabinet and other projects, go to FineWoodworking.com/PlanStore.

**TIP** **SIZE THE CASE TO THE BANDING**

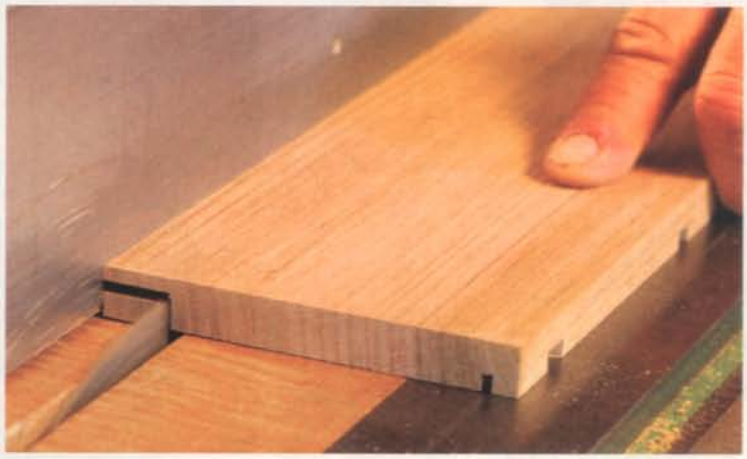


*To ensure that the banding ends with black stripes on each end, mill the banding stock first and tick off the exact case width on a story stick.*

Photos: Michael Pekovich; drawings: Bob La Pointe

***Perfect alignment, guaranteed.*** *To be sure all the dadoes and dovetail slots align perfectly, tape the sides together (above) when you cut the joints. Start by cutting the sides to length on the tablesaw, then install a dado blade to cut the shelf dadoes (right). Cut the same 5/16-in.-wide dadoes at the sliding-dovetail locations. This will clear a path for the dovetail bit (below).*

***Rout the dovetail slots and keys.*** *With the case sides still taped together, set a dovetail bit at the same height as the dadoes and rout the slots (above). Without moving the bit, adjust the fence to cut the keys in the case top and bottom (right).*



***A few more steps.*** *After grooving the sides and top for the back panel, rabbet the sides for the face frame (right).*

**VIDEO WORKSHOP**

Watch Hack build this tool cabinet from start to finish in a members-only video at FineWoodworking.com/extras.

case. These also act as blocking for any moldings you want to add.

You might ask, why have a face frame at all? The first reason is that the sides are thin and a face frame allows you to create whatever thickness looks best at the front edges. Also, it lets you run through-dadoes for the shelves. Without a face frame, you would have to cut stopped dadoes to create a clean look at the front. Finally, it is easier to cut hinge mortises in the face-frame stiles while they are loose than it is to cut them in the sides themselves.

The design is best for hanging cabinets, but it works for floor-standing cabinets as well. The "ears" (the part of the sides that extends above the sliding dovetails) can be as short as ¾ in. and hid behind a molding. Or an overhanging top can be added.

### Banding determines the cabinet width

I often add a banding under the crown molding to serve as a transition between the molding and the case. It might seem like an unusual place to start, but to get the cabinet width and the length of the top and bottom pieces, I need to know this banding length. The idea is to end up with a uniform black square on each end of the banding.

So after I ripped up the black and white pieces (ebony and holly) on the tablesaw, I laid out the sandwich and then used it to tick off the full banding length on a story stick. Then, to get the width of the cabinet,

# Assemble in an orderly fashion

**Shelves first.** *Start by gluing the shelves into their dadoes and clamping them in place (above). Slide the case top and bottom into place from the rear (right).*

**TIP**

**CUT HINGE MORTISES BEFORE ASSEMBLY**

*It's easier to cut the mortises for the hinges in the stile before gluing it into the case.*

**Face frame comes next.** *Check the fit of the face-frame stiles, and then glue them into their rabbets (left). Complete the face frame simply by gluing rails to the case top and bottom (right).*

I had to subtract the slight overhang of the banding. Last, I marked the length of the crosspieces on the story stick. Because the dadoes and dovetails are the same depth, you can cut the shelves, top, and bottom to the same length with the same setup—another bonus.

### Cut the joinery

Start with the sides of the case. Leave them a bit long and tape them together as shown (facing page). Mark the finished length of the sides and lay out the dadoes for all the crosspieces (even the sliding dovetails start out as dadoes). After cutting those dadoes, move to the router table to turn the dadoes for the top and bottom of the case into sliding dovetails. The next step is to cut the dovetail keys on the top and bottom of the case. Run both sides of the dovetail past the bit, and creep up on a nice fit. The dovetail key should slide partway in with only a small amount of pressure.

Now you can rabbet the sides and notch the top and bottom of the case for the face-frame stiles. Plane the stiles to fit perfectly later.

### A raised back in three pieces

You can put any type of back into a cabinet like this, but I use a three-piece solid-wood back, shiplapped together. This lets me distribute the wood movement over four gaps instead of two. It also allows me to add a bead to the joints that looks great inside the cabinet. I beveled the edges to fit into a small groove in the sides and top, making the back look like a raised panel.

### Finish off the shelves

Now you can complete the shelves. They've been cut to final length, but should still be a little thick. Take time now to plane them by hand or power to fit their dadoes.

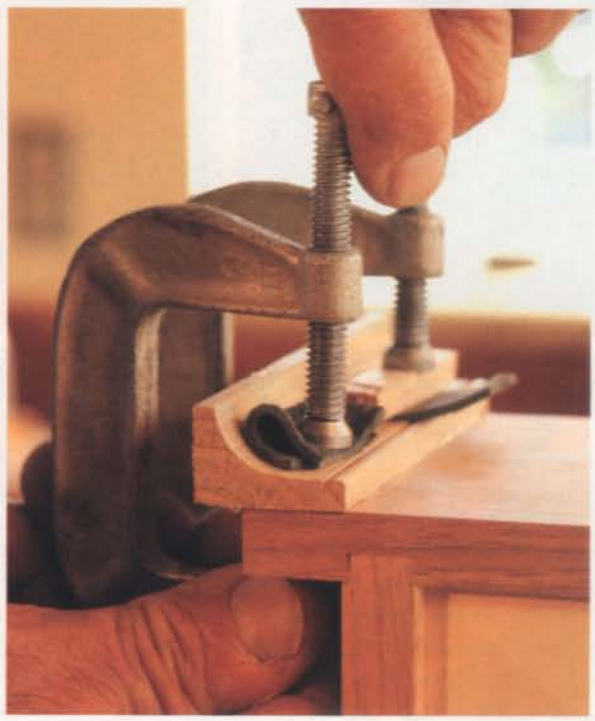
I add a vertical divider under the bottom shelf. That allows for two small drawers, or one drawer and an open shelf. Note that the bottom dado for the divider doesn't extend all the way to the front, so it must be a stopped cut, made with a router.

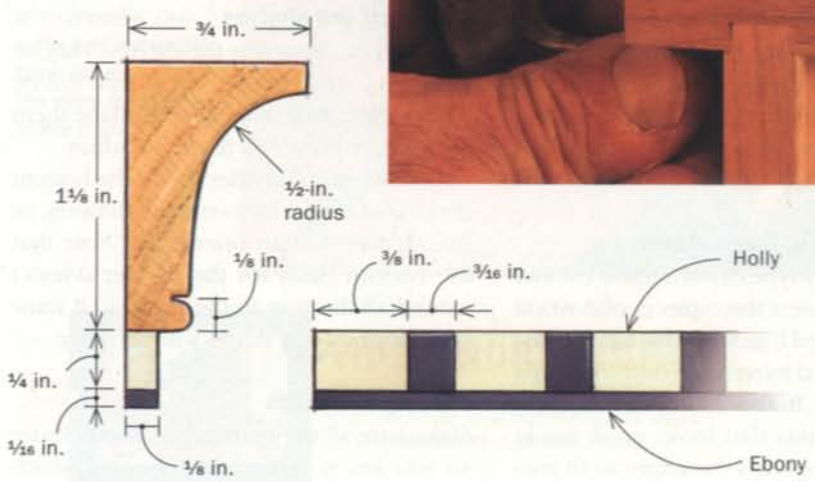
### Glue up in stages

Make sure all the parts are marked clearly so you know where they go and which

***Install the divider and back.*** *Press the divider into place (above) and plane it flush after the glue has dried. The back consists of three shiplapped boards that are beveled to fit the grooves in the case sides and top. Slide them in from the bottom (right) and nail them to the shelves.*

***Add the molding.*** *The "ears" that extend beyond the dovetailed case top provide a convenient clamping surface for the molding. A bead, cut with a scratch stock (above), is a nice transition for the banding.*






end is which. Follow the stages shown in the photos. Use only a small amount of glue on the beginning of the dovetail slot and key. Too much will cause the joint to swell and bind. Check the case with a square as you assemble it.

## Finishing touches make the difference

There are lots of ways to finish off the top of a wall cabinet. It needs something; otherwise, it looks too much like a box. I used a cove molding, with that little banding just below it. One advantage of this case construction is the extra pieces (I call them "ears") that stick up beyond the sliding dovetail to give it strength. They are the perfect place to clamp those moldings. They were so short that I wasn't worried about cross-grain movement. With a deeper cabinet, I might screw them on from the inside, running the back screws through slotted holes. Of course, the front molding can always be glued on with no issues.

You can use any method you like for the door, drawer, and even the back of the cabinet. This approach to construction is very versatile, and works for cabinets of all sizes with all kinds of molding and decoration. That's why I love it. □

*Garrett Hack is a contributing editor.*

## How to make decorative banding


***Just a bundle of sticks.*** *Glue up alternating strips of dark and light wood into a sandwich. Surface one side and crosscut the sandwich into ¼-in.-thick strips.*


***Rip the other edge.*** *Rip the crosscuts into 3⁄16-in.-thick strips on the bandsaw. Clean up the saw marks with a block plane.*


***Start at a corner.*** *Glue the banding in place one segment at a time. Rub a block of wood over the banding (right) to seat it in place. No clamping is necessary.*

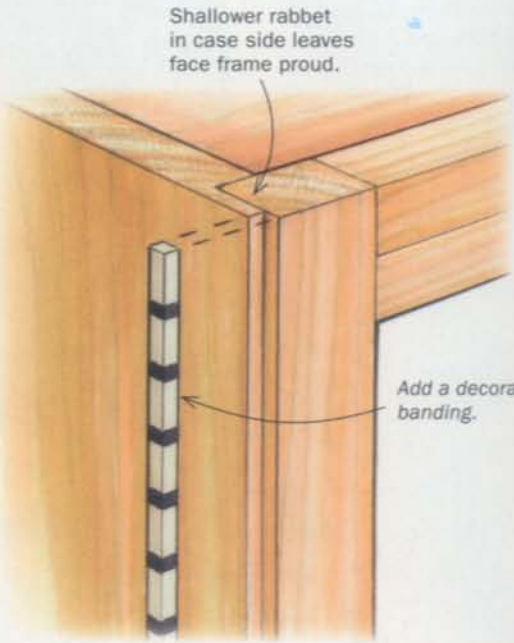

***Finish off the bottom.*** *Hack added a thin strip of ebony to the bottom edge of the banding to create a pleasing border. Again, simply rub it on to attach it.*

## A chamfer hides the glue joint

***Begin the chamfer below the molding.*** *Hack begins a stopped chamfer ½ in. below the molding. He starts the chamfer with a chisel, bevel down, and continues it to the bottom of the case with a block plane. Deepen the chamfer until one edge lines up with the glueline.*

### ANOTHER CORNER OPTION

**Cut a shallower rabbet in the case sides and fill the resulting space with a banding.**

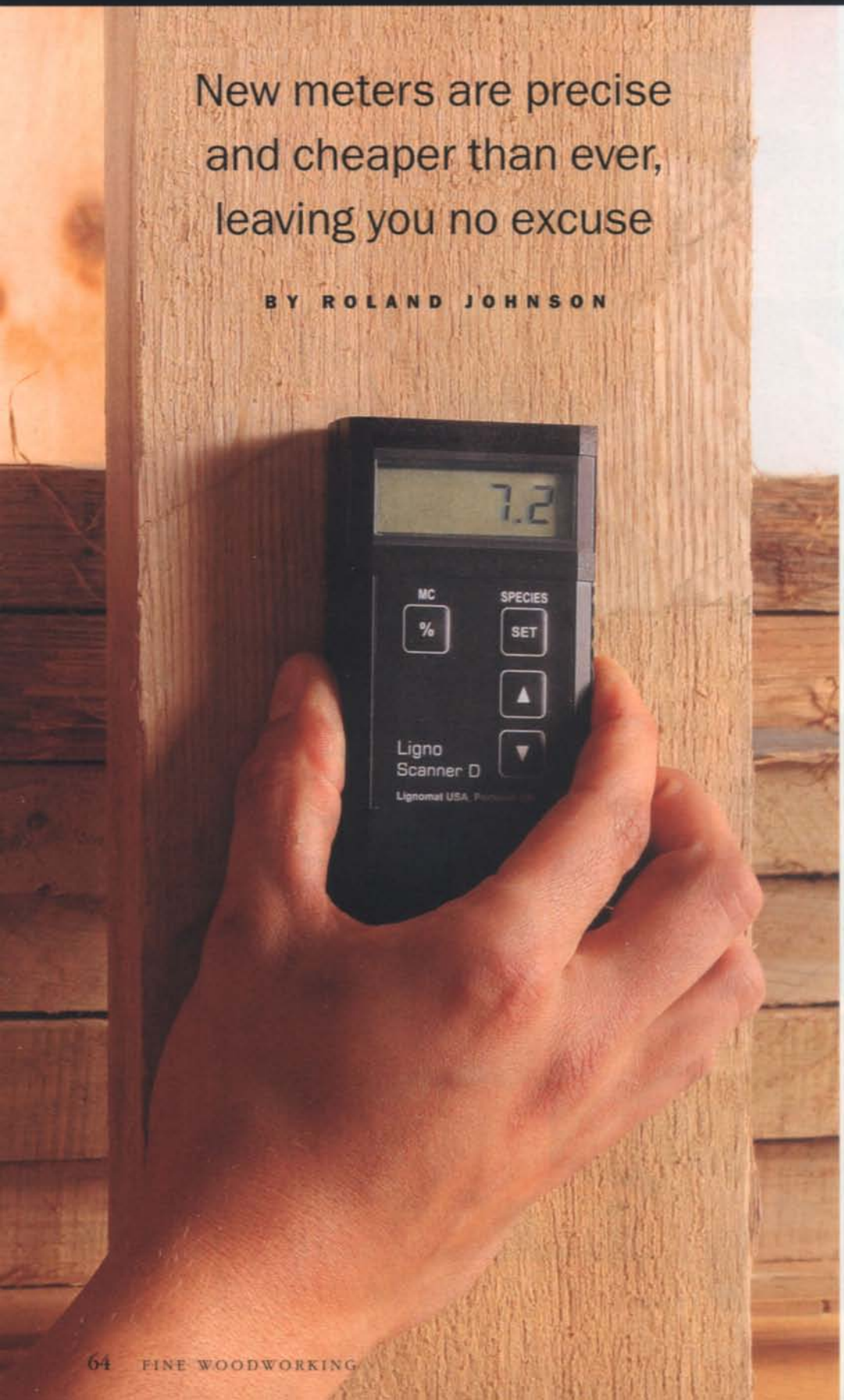


TOOL TEST

# Everyone Needs a

## New meters are precise and cheaper than ever, leaving you no excuse

BY ROLAND JOHNSON




Wood movement is one of the most perplexing situations for woodworkers. Increases or decreases in moisture can warp panels, crack tabletops, delaminate glue-ups, loosen or split joints, and generally wreak havoc.

Knowing how much moisture is trapped in a board helps you during the milling process, when fitting parts, and even when making repairs. It's essential to know when the moisture content (MC) is low enough in a pile of rough lumber to start milling it to size (below 12%, depending on the region and season). If the wood continues to move after milling, you'll have finished parts that warp and cup. You also need to know that all the boards for one project have the same MC, which helps ensure that movement occurs at the same rate in all the parts.

You can determine the MC of lumber using a mathematical formula, but it's not easy. You need to cut a section of the board, weigh it, dry it in an oven for a period, weigh it again, then put it in the oven and repeat until the board stops losing weight. Finally, you have to dig out a calculator and punch in some numbers. The process can take a couple of days—not very convenient.

A much quicker way to monitor MC is to use a moisture meter. According to our surveys, most *FWW* readers don't own one. That's a shame, because these tools can help any home-shop woodworker avoid the damaging effects of wood movement in a project. And today's moisture meters are more affordable than ever.

For this article I started by testing a whole range of meters, both pin-type and pinless, from bargain brands to high-end models suitable for a lab. Many of the expensive models simply offered more options than most home shops need, with no more accuracy. So I pared down the list to meters under $200—a good entry-level price point. After using both types, I concluded that pinless are the best choice

Photos: Thomas McKenna

# Moisture Meter

## Know when wood is ready to use

***Be a smarter lumber buyer.*** *A meter will give you an idea of how long the wood will have to sit before it's dry enough to use.*

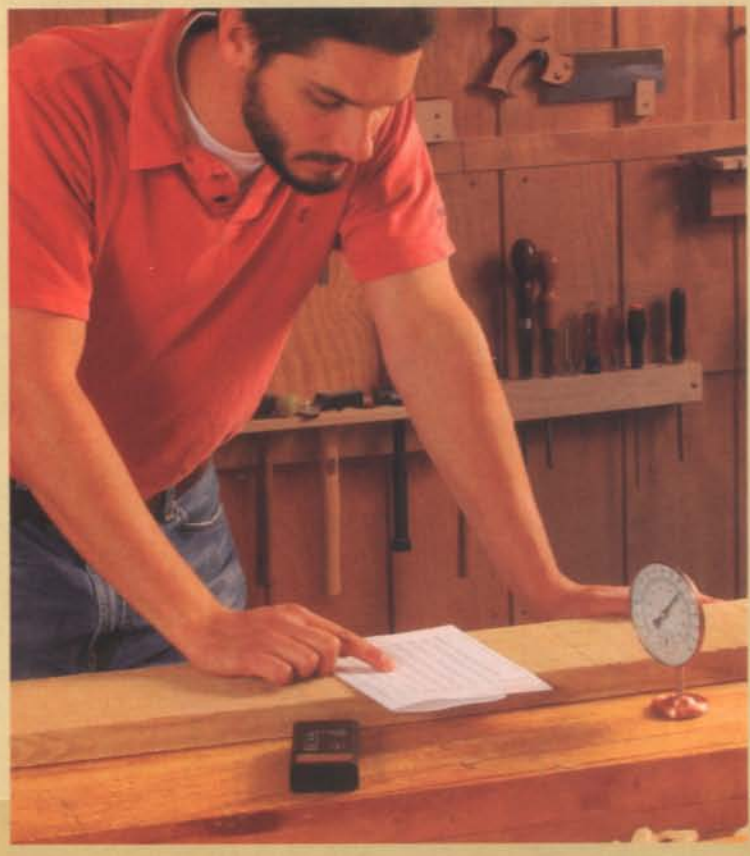
***Compare new wood to old.*** *New lumber should have the same MC as the other wood that's being used in a project to ensure that all parts will move at the same rate.*

**Most woodworkers discover the relationship between moisture content and wood movement by accident. Ever had a board warp after you've milled it to final size? You can avoid problems like this by using wood that is dry enough. Many articles suggest you leave rough-milled lumber alone until it "acclimates," meaning it has reached equilibrium with the moisture content of your shop—that's the point at which the wood is no longer taking in or losing moisture. The surest way to know the wood is ready is to check it with a moisture meter and then compare the reading to your shop's equilibrium moisture content (EMC).**

**EMC is determined by temperature and relative humidity levels. To find the number, first print out the EMC chart (see Online Extra). Measure the relative humidity and temperature with an inexpensive hygrometer (Amazon.com) and look up those numbers in the chart. Let's say your shop is at 70°F with relative humidity of 55%. In that setting, wood will reach EMC at about 10%. (If your shop has an EMC consistently above 12% or 13%, you'll have wood movement problems when you bring furniture into the drier environment inside your house. In that case, you may want to take measures to reduce your shop's humidity levels, which is beyond the scope of this article.) You also can use your shop's EMC number at the lumberyard. Bring the meter and that figure with you so you can check the MC of the wood you plan to buy. This will give you an idea of about how long it may take the board to acclimate to your shop. Again, when the MC of the new wood is the same as the EMC of the shop, the lumber has acclimated and will remain stable.**

### Online Extra

To download a printable EMC chart, go to **FineWoodworking.com/extras.**

***Know when to mill.*** *When wood reaches its equilibrium moisture content (EMC), it has acclimated to the shop environment and will remain stable. To find the EMC figure, measure the relative humidity and temperature with a hygrometer and plug those numbers into our EMC conversion chart.*

# Know how to build for the season

**You must pay attention to the season in which you are building and understand how wood will behave based on that season. In most places, the average EMC doesn't vary that much. But even a 2% change can mean a lot. In general, a 1% moisture change in hardwood will result in a bit less than 1/32 in. of expansion or contraction per 10 in. of board width. A 2% moisture difference results in a dimensional change of 1/16 in.**

**If your locale experiences seasonal moisture changes, drawers, doors, and any other trapped part must accommodate those changes. If you are making drawers during winter in the Midwest, you'll need a fair amount of drawer-height clearance between the sides and carcase or those drawers won't open in July. Conversely, if you fit a solid-wood door to its frame during summer, you want the gaps almost too tight so they'll still look good when dry winter shrinks that door. If you want to get really precise, you can compare the EMC of your shop to the EMC of your house to determine whether you need to leave extra space or keep parts tighter.**

***Mind the gap.*** *If your shop location experiences seasonal changes, humidity will rise and fall. That means furniture parts will move, so adjust the gaps in doors and drawers to accommodate future expansion or contraction.*

for home-shop woodworkers. I'll explain why, and compare five pinless meters.

### How moisture meters work

A moisture meter sends what amounts to an electrical charge into the board. Wood is a good electrical insulator, and water is a good conductor. As the wood's MC goes up, electrical conductivity increases; as the MC decreases, conductivity decreases. Meters measure that conductivity and generate an MC reading.

**Two types of meters**—With pin-type meters, you drive two pins into the wood. The meter measures the resistance (absence of moisture) between the pins and converts the number to a percentage of moisture in a certain specific gravity of wood fiber.

Pinless meters are held against a board and generate a radio-frequency field (electromagnetic wave) that passes through the wood and bounces back. It's like sonar for wood. The meters check for power loss or changes in electrical capacitance (which vary according to moisture content and wood density), interpret the data, and then generate an average number for the MC.

**Why pinless is better for woodworkers**—Frankly, pin-type meters, which were originally designed for the softwood lumber industry, are hard to use in hardwood. Manufacturers recommend that the pins penetrate one-quarter the thickness of the board—that's about 3/16 in. for a 3/4-in.-thick board. The thicker the wood, the deeper you have to push the pins. That's OK if you are working with Douglas fir, but pushing the pins into white oak or hard maple takes some effort and you could bend or damage the pins. On top of that, the pins poke holes in the wood.

Pin-type meters are ultimately better than pinless meters only for determining the exact moisture content of a specific area on a board. That's not very useful for the typical home-shop woodworker who just needs an average reading of a board's MC. However, if you consistently work with thick wood and are willing to do a bit of destructive testing, pin-type meters can be used to show the exact core MC of the board. For those interested in that kind of testing, check out my ratings of pin-type meters at FineWoodworking.com/extras.

Pinless meters are dirt-simple to use, and you don't need to disturb the surface of a board to take readings. They work not

# 5 good meters under $200

### WAGNER L609 SHOPLINE

**Source:** www.amazon.com

**Street price:** $190

**Accurate:** Yes

**Species correction:** Take reading, consult chart

**Comments:** Reads to ½-in. depth; narrow sensor pad allows MC reading in materials as narrow as 1 in.; must hold down button to maintain reading; LED display doesn't provide an exact MC number.

### LIGNOMAT LIGNO-SCANNER S

**Source:** www.lignomat.com

**Street price:** $185

**Accurate:** Yes

**Species correction:** Program meter

**Comments:** Reads to ¼-in. depth so it's hard to get accurate readings in thick stock; comes with carrying case; easy-to-read digital display.

### ELECTROPHYSICS CT100 DIGITAL

**Source:** www.electrophysics.on.ca

**Street price:** $200

**Accurate:** Yes

**Species correction:** Program meter

**Comments:** Reads to 1-in. depth; species correction knob is located on top of meter and is easy to knock out of adjustment when taking a reading; easy-to-read digital display.

### ELECTROPHYSICS CT12

**Source:** www.electrophysics.on.ca

**Street price:** $112

**Accurate:** Yes

**Species correction:** Take reading, consult chart

**Comments:** Easy to operate; reads to 1-in. depth; large knob makes it harder to fit into a pocket; gives reading via a dial and indicator light, which doesn't provide an exact MC number.


### LIGNO-SCANNER D

**Source:** www.lignomat.com

**Street price:** $185

**Accurate:** Yes

**Species correction:** Program meter

**Comments:** Easy to operate; reads to ¾-in. depth; comes with carrying case that hooks onto belt; shuts off automatically; easy-to-read digital display.

## SPECIES CORRECTION

All meters are calibrated for a specific wood species. To get the accurate MC of other woods, you need to make a species correction by reprogramming the meter or by adding a conversion amount from a chart. Programming the meter is a more convenient option: Once it is done, the meter holds that setting.

only on rough stock but also for checking the MC of a finished piece, which is especially important for repair or restoration work. They also come in handy when you make a mistake in a nearly completed piece. Say you botched a drawer or door but don't have enough lumber to make another one. Before you make the replacement part, you can use a pinless meter to determine if the MC of the new wood matches the project wood.

### The best pinless meters

I tested the meters for accuracy and consistency, eliminating models that proved inaccurate. I used them in thick and thin lumber, narrow and wide stock, and in roughsawn lumber. I checked the MC in lumber that had been indoors for a while and in wood that was stored in my shed, exposed to outdoor temperature and humidity swings.

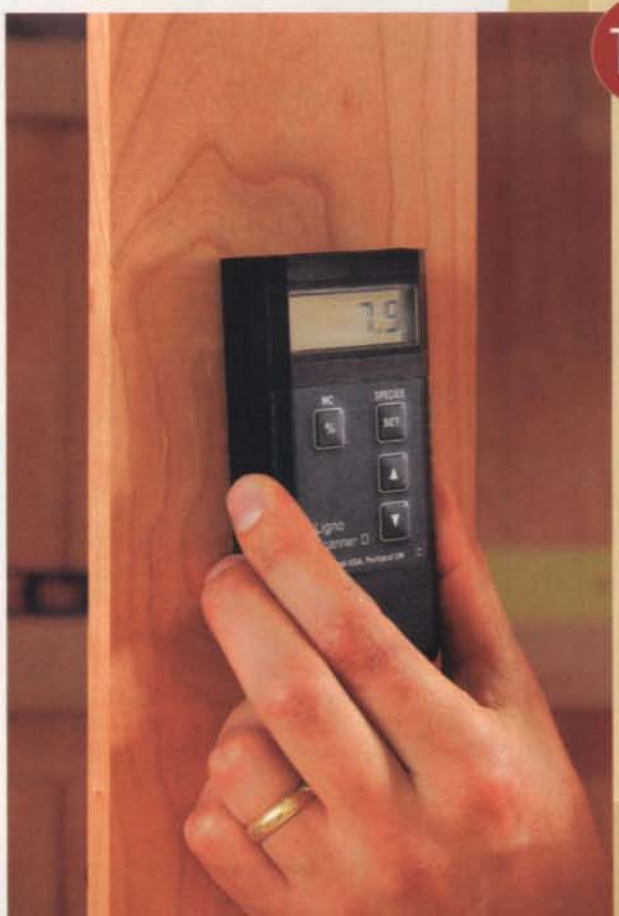
I chose the Ligno Scanner D for best overall. This is a sophisticated meter that's easy to use. I picked the Electrophysics CT12 as best value. It's easy to use and has a very appealing price. □

*Contributing editor Roland Johnson knows the moisture content of all the wood in his shop.*

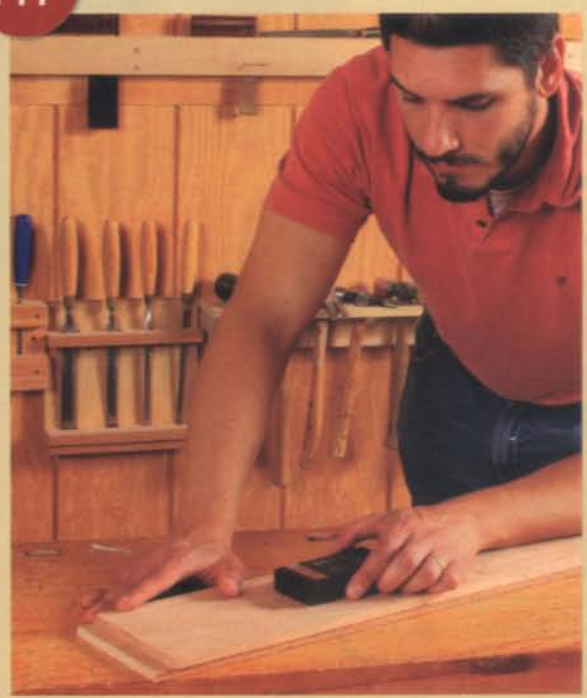
## How to get accurate readings

***Remove the fuzz.*** *Roughsawn lumber can throw off the reading of a pinless meter by as much as 2 percentage points. It helps to shave an area smooth near the center of the board to get a better reading. Most lumber dealers will allow this if you ask first.*

***Steel and metal can throw off results.*** *Avoid taking a reading while the board is on a tablesaw top or other steel surface. The thinner the board, the more the reading will vary. On this ¾-in.-thick board, the reading varies by a full percentage point when placed on the tablesaw (left) vs. when held above it.*



TIP **CHECKING THIN STOCK**



If you are checking the MC of stock thinner than the maximum reading depth of the meter, don't place the wood on a bench. The meter will factor in the MC of the benchtop and throw off the results. Either hold the stock in midair (far left) or stack similar boards to get a reading (left).

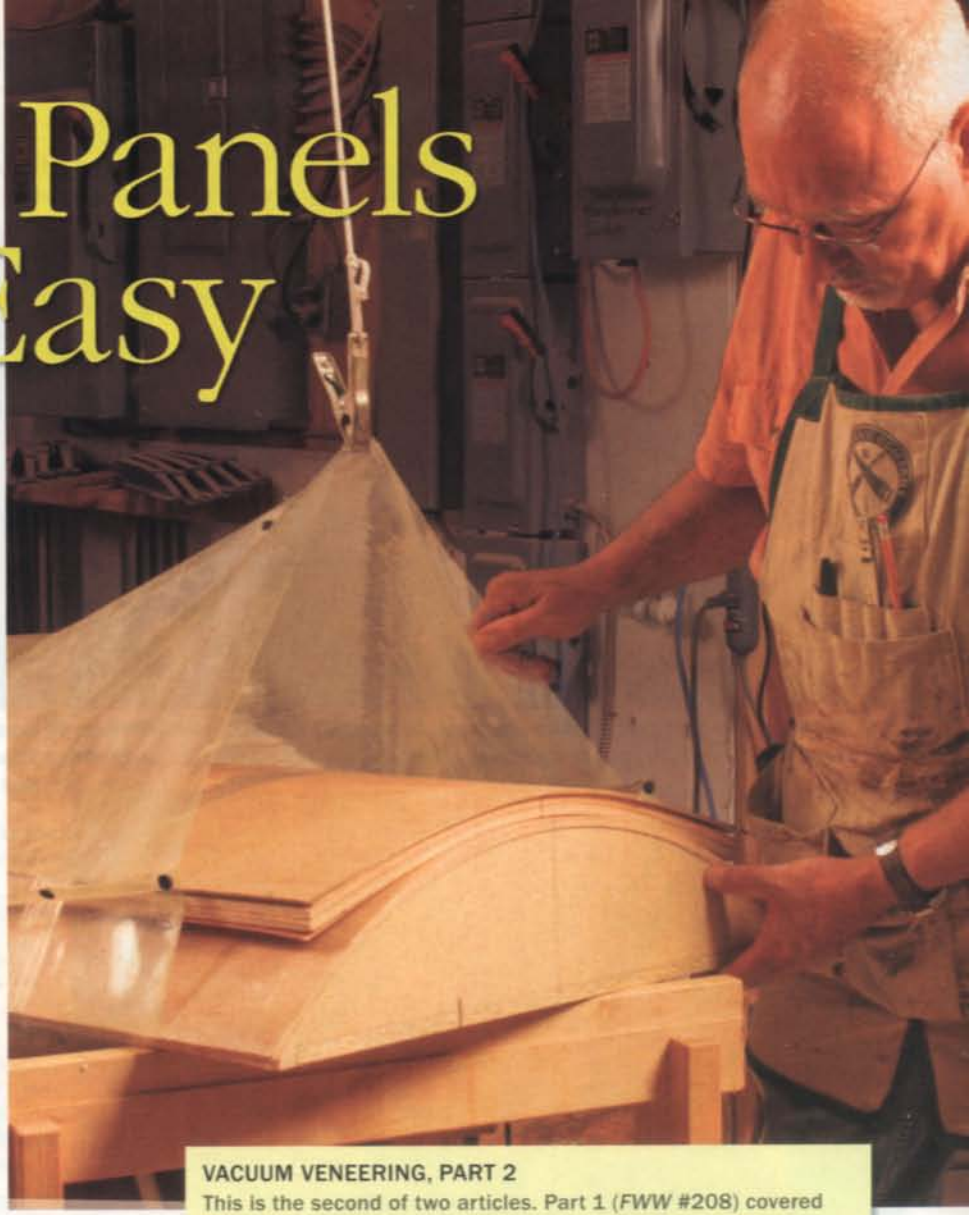
# Curved Panels Made Easy

## With a vacuum press and 7 tricks, beautiful panels are in the bag

BY MICHAEL C. FORTUNE

Furniture with curved panels stands out from the crowd. But common approaches to making them are imperfect. When made from solid wood, either by shaping thick planks or coopering thin staves, curved panels aren't very stable. You can make a more stable panel by laminating several thin plies between a pair of forms, because the plies are arranged at right angles to one another. However, making the perfectly mated forms is tedious, and distributing pressure evenly across them is not easy.

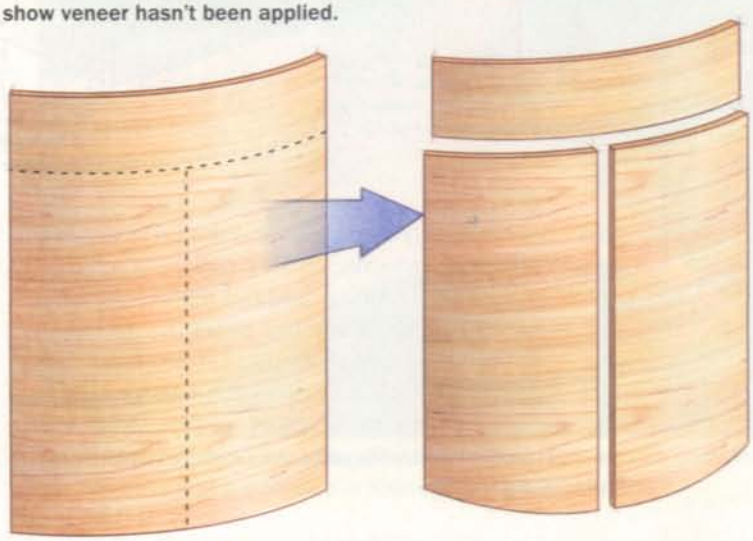
The answer is a vacuum-bag system. With a vacuum press, you get the stability of a laminated



**VACUUM VENEERING, PART 2**
This is the second of two articles. Part 1 (*FWW* #208) covered choosing a vacuum-bag system and veneering a flat panel.

## First trick: MAKE MULTIPLE PARTS FROM ONE CORE

**To simplify the door and drawer panels for this bedside table, Fortune laminated a large core in the vacuum press and then cut out the smaller pieces. Note that the grain on the core runs horizontally because the show veneer hasn't been applied.**

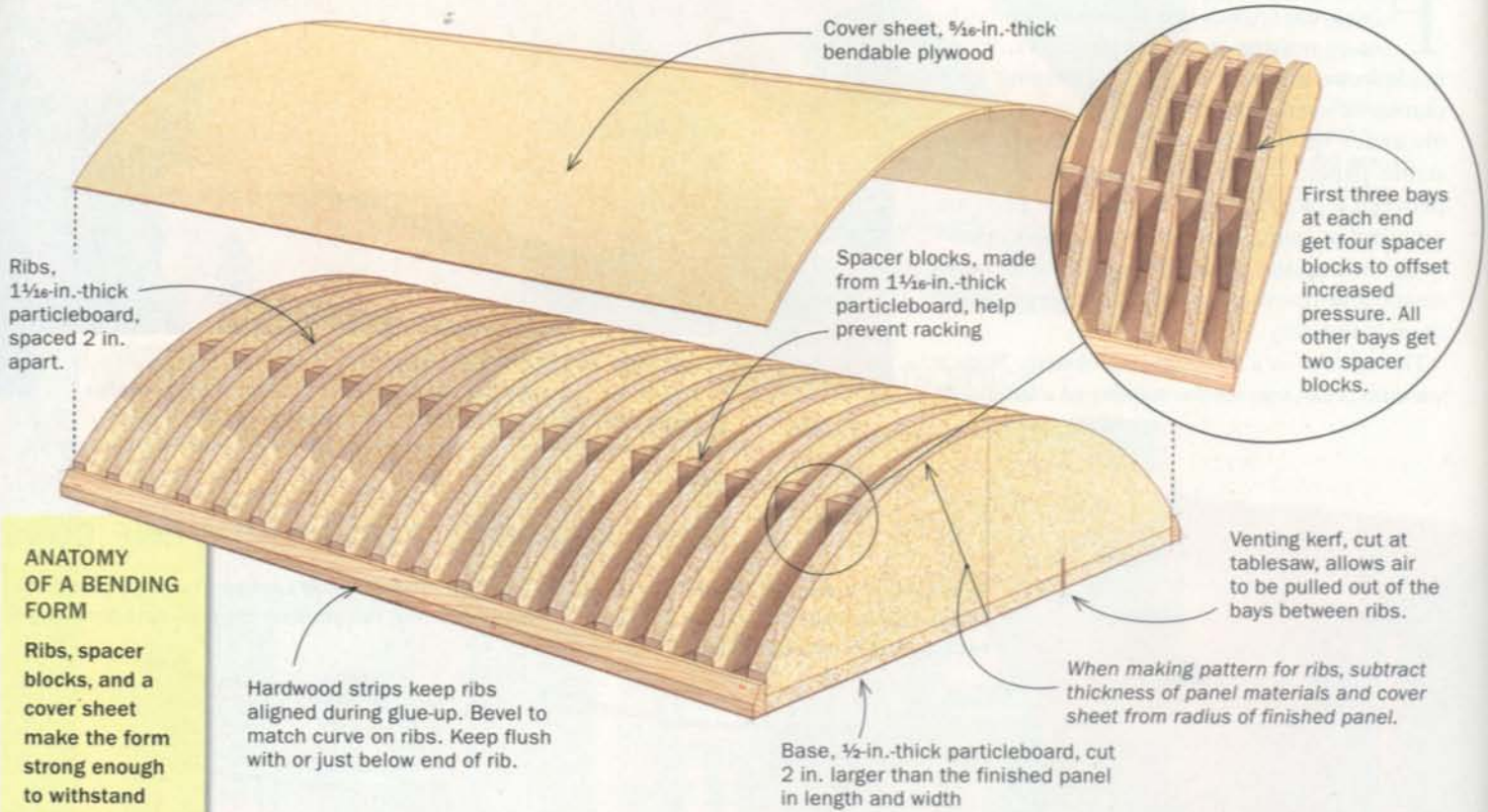


# Trick 2: USE THE BAG TO MAKE THE FORM

**Curved panels require a ribbed bending form, designed to hold its shape under the extreme pressure of the vacuum press. Glue up the entire form at once in the bag to create even pressure and a uniform surface, which is necessary to get a strong bond between the panel plies.**

***Beveled strips keep ribs aligned on the base.*** *If not held in place on both sides, the ribs will slide out of alignment in the vacuum bag.*

***Pattern jig creates matching ribs.*** *Fortune cuts his pattern oversize, then adds a fence and some toggle clamps to make routing the ribs quick, safe, and accurate.*




**ANATOMY OF A BENDING FORM**

**Ribs, spacer blocks, and a cover sheet make the form strong enough to withstand the vacuum's pressure.**

panel but need only one form, and the press applies pressure evenly across the entire panel.

Most of my work is curved, and I've refined my techniques for making the form and panel. My methods are not difficult, and they allow you to pursue exciting design possibilities. I won't cover the basics of buying and setting up a vacuum-bag system. That was covered in Part 1 ("A Vacuum Press Makes Veneering Easy," *FWW* #208).

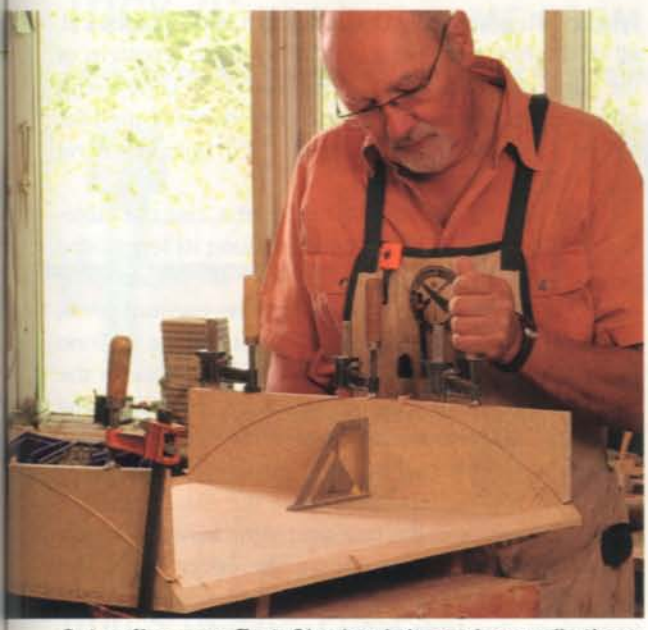
## Simple materials work for most panels

Except for the edge-banding, a laminated curved panel is made up of glue, a core, and show veneer.

Titebond Cold Press for Veneer glue is great for laminating because it remains workable long enough to lay up the panel and get it in the bag. It's also non-toxic, inexpensive, and flexible enough to accommodate the movement of the plies. However, when the show veneers are arranged decoratively, as with parquetry,



Photos: Matt Kenney; drawings: John Hartman



**Outer ribs come first.** *Glued and clamped manually, these prevent the other ribs and spacer blocks from sliding toward the ends of the form.*

**Add the inner ribs.** *The ribs are 2 in. apart. Spacer blocks hold them perpendicular to the base.*

the pieces are taped together and the grain can run in various directions. In these situations, I use Unibond 800 because its alcohol base greatly reduces the risk of the individual pieces rolling up or moving about.

Bendable plywood (also known as wiggle wood) is usually my first choice for the structural plies. It is extremely flexible: Pieces 3/16 in. thick can be bent to a radius as tight as 10 in.; 5/16-in.-thick pieces bend to a 14-in. radius. This material has three plies: a very thin inner ply sandwiched between two thicker plies. The grain on the outer plies runs in the same direction, which is why bendable plywood is so flexible. But you don't want a floppy panel, so you add structural plies of veneer, laminated at a right angle to the grain direction on the outer plies of the bendable plywood, to lock it in the desired curve and make the panel stable. If the grain on the veneer and bendable plywood ran in the same direction, the panel would look like a potato chip.

However, if the curved panel will be supporting any significant weight, like a chair seat would, use lauan rather than bendable plywood. Lauan isn't as light or flexible, but it is stronger.

## Bending form needs to be strong

I use my bending forms to laminate and square the panel core, and to apply show veneer to the outside curve of the panel. Vacuum presses apply tremendous pressure from every direction. To prevent the bending form from collapsing, I make it by gluing a series of ribs, reinforced with spacer blocks, to a flat base, and then covering the ribs with a sheet of bendable plywood. I use 1/2-in.-thick particleboard for the base and 1 1/16-in.-thick particleboard for the ribs and

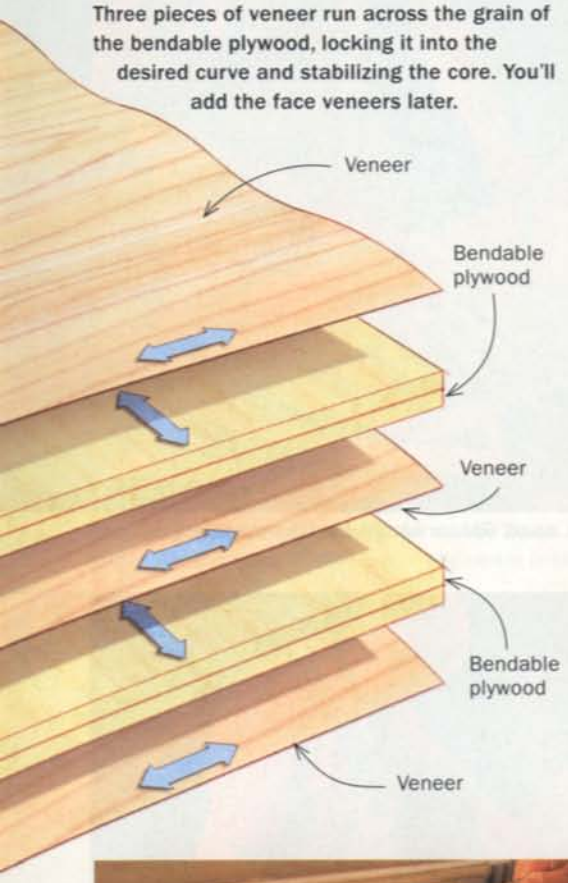
**In the bag.** *The press applies uniform pressure from all directions, so there won't be any bumps in the form. Leave it in the bag overnight.*

TIP

**Packing tape keeps the glue off the form.** *Also, mark a centerline and use it as a reference to align all the plies on the form.*

# Trick 3: CROSS-GRAIN SANDWICH MAKES A RIGID CORE

**Three pieces of veneer run across the grain of the bendable plywood, locking it into the desired curve and stabilizing the core. You'll add the face veneers later.**




***Spread glue on the plywood only.*** *Moisture in the glue would curl the veneer if applied directly to it. Fortune uses a notched spreader to get a thin, even coat.*

***Thin caul spreads pressure.*** *A ⅛-in.-thick piece of hardboard keeps the top veneer flat. Cut it oversize to hold plies tight to one another at the edges of the panel.*

***Keep panel core on centerline.*** *Fortune aligns the bendable plywood, veneer, and cover sheet on the form's centerline, holding them in place with packing tape, to ensure that the panel has a symmetrical curve.*

### WHERE TO FIND BENDABLE PLYWOOD

Bendable plywood, also known as wiggle wood, flexply, and wacky wood, can be found at local plywood and lumber dealers. If it's not in stock, the dealer should be able to order it for you.

spacers. To get a panel that is smooth and symmetrical, all of the ribs must be identical, so make a pattern of the curve and then rout the ribs flush to it. Glue a strip of hardwood, beveled to match the curve of the ribs, to either side of the form's base. Then, glue in a rib at each end of the base.

Before gluing on the remaining ribs, use the tablesaw to cut a kerf through the base along its length and to one side of the center. This kerf allows air to be pulled out of the form's interior by the vacuum press, ensuring that the ribs and cover sheet receive uniform pressure. Use the vacuum press itself to glue in the remaining ribs, the spacers, and the cover sheet. The press applies even pressure from every direction, producing a smooth and uniform curve—impossible to achieve if you use clamps to glue the ribs in place.

Let the form sit in the bag overnight. When you take it out, draw a centerline down the cover sheet, and then apply clear packing tape over the entire surface to prevent glue from sticking to the form.

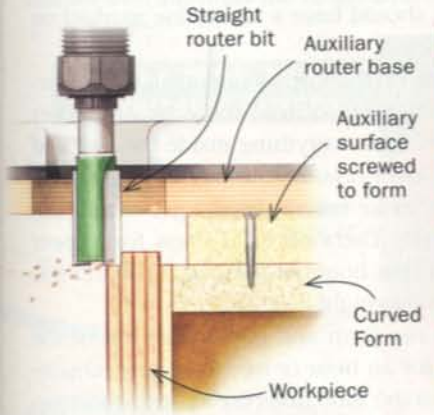
### Laminate the core and apply the edging

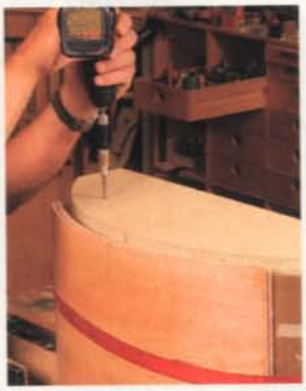
I laminate curved panels in three steps. First, I make the panel's core. Then I band the core's edges with solid hardwood. I apply the show veneers last.

To make a ¾-in.-thick panel core, you'll need two pieces of 5/16-in.-thick bendable plywood and three pieces of veneer. One piece of veneer is glued between the bendable plywood, the other two to the outside faces. Cut the bendable plywood and veneer about 1 in. oversize in length and width. Mark a centerline on the ends. Spread the glue on the plywood. If you spread glue on the veneer, it will roll up like a

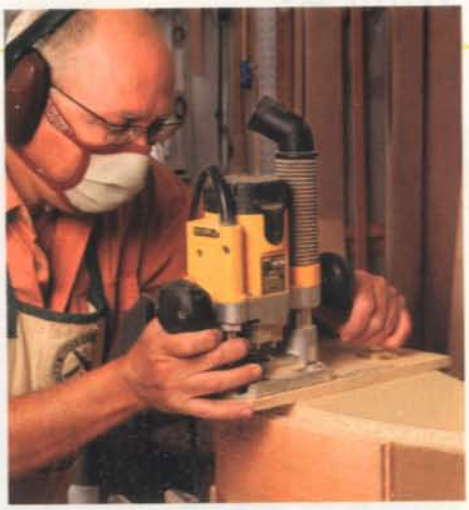
# Trick 4: USE THE SAME FORM TO TRIM THE ENDS

**Bonus: The bending form becomes a router jig for trimming the curved ends of the core.**



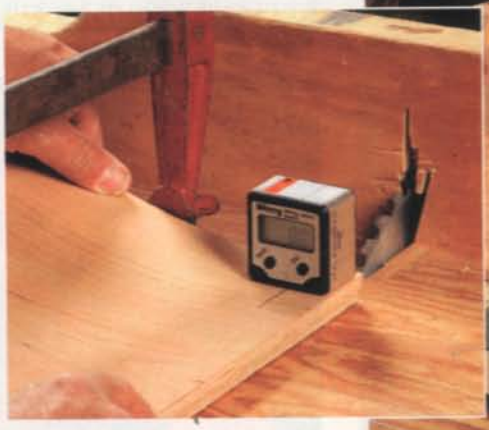
***Attach an auxiliary surface to the form.*** *Running the router on it allows you to move the panel up past the edge of the form, which in turn keeps the spinning bit from damaging it. To avoid tearout, work around the outside of the panel rather than trimming the full width in one pass. A long auxiliary base helps Fortune balance the router.*

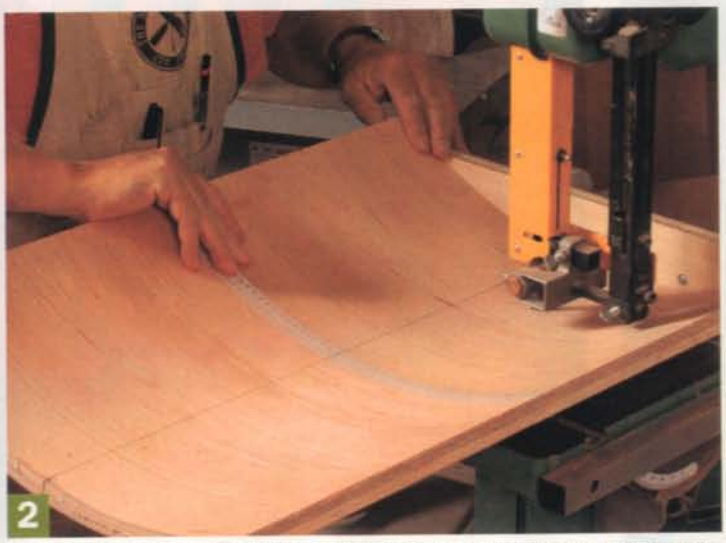


# Trick 5: DIGITAL GAUGE DIALS IN THE EDGES

**Use a digital angle gauge to ensure the tablesaw cuts are square to the panel's faces.**

**1** ***Square edges at the tablesaw.*** *Fortune uses a Wixey angle gauge to set the edges flat on a crosscut sled (right). The pencil line marks the finished edge of the panel. Support the underside with a block of wood, clamp the panel in place, and make the cut. The edge will be square to the face of the panel.*





**2**

***Cut out the drawer front.*** *The safest way to separate the drawer front is at the bandsaw. A steady hand, well-set-up bandsaw, and sharp blade will give a clean and straight edge.*

**3**

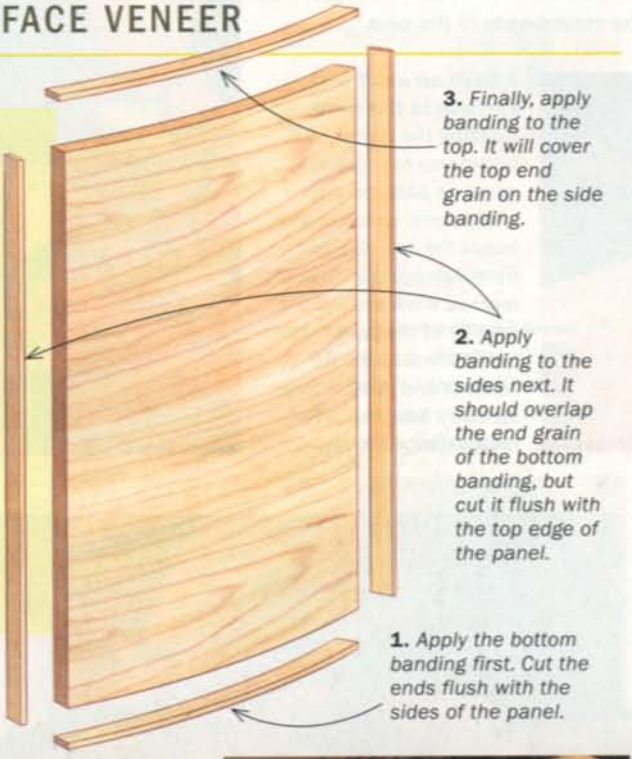
***Cut the panel to make doors.*** *Fortune again used a Wixey angle gauge, this time straddling the centerline, to adjust the panel so that the cut is square to the faces of the panel.*

# Trick 6: BAND EDGES BEFORE GLUING ON FACE VENEER

**TIP**

**HIDE END GRAIN WITH SMART BANDING**

**Mitered edge-banding hides its own end grain, but it is tricky to apply. Use butt joints instead, starting with the bottom piece. Unless you go in for a close inspection, the end grain won't be noticeable.**




tube. After spreading the glue and stacking the plies, top off everything with a ⅛-in.-thick hardboard cover sheet, ¼ in. larger all around than the panel core plies. The cover sheet should have a centerline marked on its face and two ends.

Place everything on the form, aligning all the centerlines. Use packing tape to hold the core and cover sheet to the form. Seal everything inside the bag and turn on the vacuum press. As the bag is pulled tight around the form, make sure it doesn't get caught under the panel core. Titebond Cold Press for Veneer glue needs just a few hours in the bag. Unibond 800 should be left in overnight.

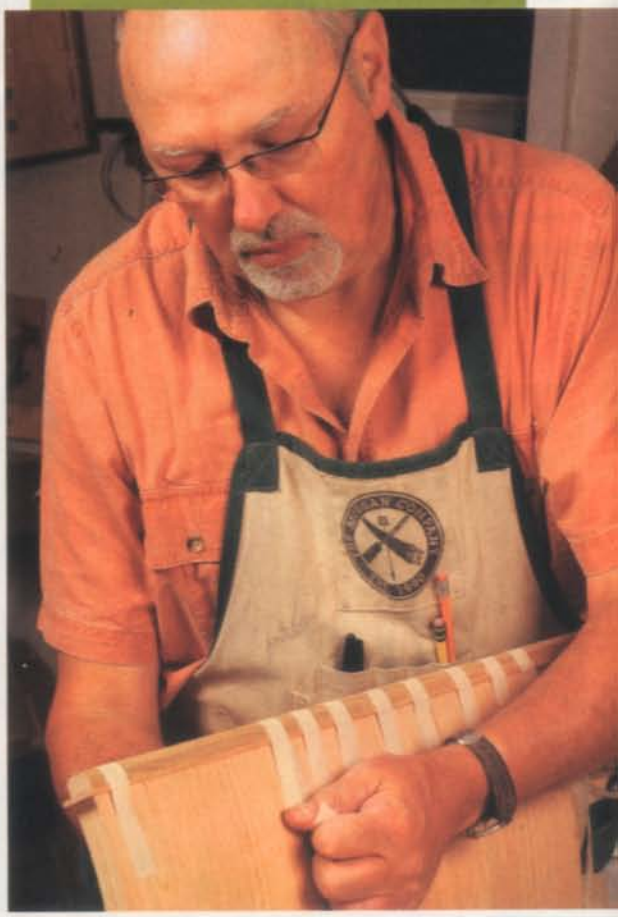
After you take the form and panel core out of the bag, let them sit for an hour or two to let any remaining moisture from the glue dissipate. Then square up the panel core. I square the curved ends with a router and the straight edges at the tablesaw.

After the core is square, glue on the edge-banding. I glue on the piece that will be least visible first and the one that will be most visible last, which minimizes the amount of visible end grain. Keep the edging no more than ⅛ in. thick. If it's any thicker, there will be differences in wood movement between the solid-wood

**BANDING THE ENDS**

***Cut out curved banding.*** *In most cases that's all you need, but if the banding will be highly visible, like on the top of a drawer, you can laminate it from thin plies (and rip it into thin strips), so the grain follows the curve. Glue banding on the bottom first, using a caul to apply even pressure across its full width and length. Rout the banding flush. To prevent tearout, start in the middle and work down the curve.*

**BANDING THE EDGES**

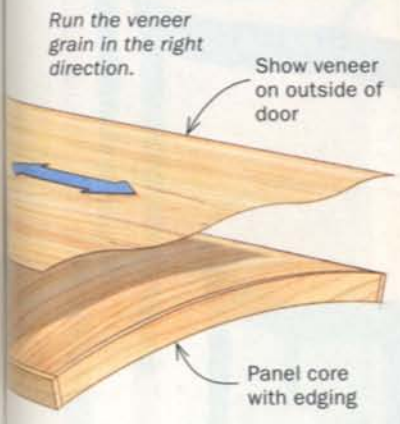


***Tape instead of clamps.*** *Because the panel is curved, clamping across it can be tricky. Instead, place a caul over the banding and use tape to apply pressure.*

# Trick 7: FACE VENEERS GO ON ONE AT A TIME

**Veneer for the outside of the curve can be done with the form, but for the inside, do away with the form and press the veneer directly to the panel.**

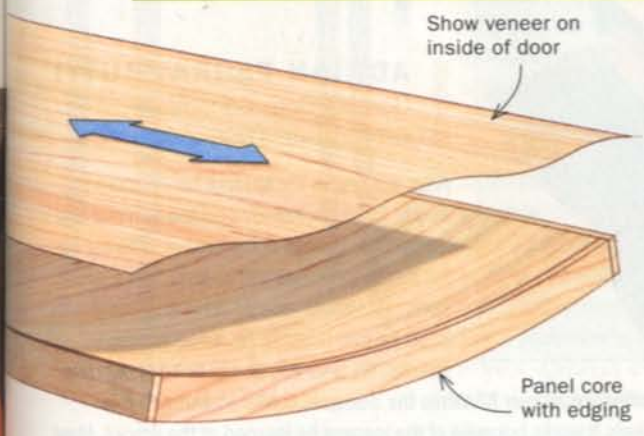
## USE THE FORM TO GLUE THE OUTSIDE VENEER




***Fence in the panel.*** *The process is much the same as it was for the panel core, but this time nail small fences on each side of the door panel to hold it in place, and use a ⅛-in.-thick hardboard cover sheet.*

***Trim the veneer.*** *Use a utility knife or razor blade to cut away any overhanging veneer. Cut with the grain, and keep the blade angled slightly away from the panel.*

## NO FORM NEEDED ON INSIDE VENEER




***No form needed.*** *The panel is strong enough to hold its shape while the veneer is pressed into the curve. Tape a cover sheet over the veneer.*

banding and the laminated panel, and the glueline between the two will be noticeable.

### Apply show veneers one at a time

The show veneers must be applied in two steps. The outside curve can be done using the form, but the inside curve might not match the form perfectly. Any gaps between the inside curve and the form will leave bubbles between the panel core and show veneer. Fortunately, the core is strong enough to hold its shape under the pressure. So you can just flip the panel, concave side up, and the bag will mold the veneer to it. Each show veneer needs about 45 minutes in the bag. After the veneers have been glued in place, chamfer the edges of the panel to hide the glueline between the show veneers and the banding. □

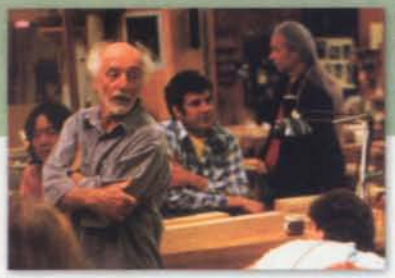
***Create suction without a platen.*** *A piece of gutter guard helps air to escape the bag, and a small block connects to the air hose. The grooves in the bottom of the block provide channels that allow the air to escape. After attaching the press's hose, turn it on. The bag will pull tight around all of the panel's surfaces.*

*Michael Fortune (www.michaelfortune.com) designs and builds furniture near Peterborough, Ont., Canada.*

# readers gallery

## THE KRENOV LEGACY

James Krenov made a great impact with his body of work and his passionately influential writings, but it was his time in the classroom at the College of the Redwoods (CR) Fine Woodworking program and the students he taught, as well as those attending after his retirement and death, that will prove to be his greatest memorial. These students are today's brightest teachers, writers, and woodworkers. Although Krenov was sometimes accused of encouraging only work that bore a similarity to his own, his students' work proves otherwise. While many chose to emulate his designs, more decided to take his lessons and apply them to their own aesthetic. Here are just a few former CR students and the diverse and exemplary work they continue to create.



### ADRIAN FERRAZZUTTI

Guelph, Ont., Canada
CR student, 1996–1998

After working in the student bench room for nearly 18 years, Krenov decided to move into a small back room at the school. Offering his bench to Ferrazzutti, he said, "It's a good spot; you should take it." After this, Ferrazzutti knew he had to make his woodworking special. He says this ebony, holly, and maple vanity has "Jim's influence all over it." While the design is unlike anything Krenov made, Ferrazzutti feels it works because of the lessons he learned at the school. Most of the construction methods are CR-taught: The veneers are shopsawn and jointed with a wooden plane; the drawer pocket has "let go," which means the fit tightens up as the drawer is pulled out. The dovetails are hand cut (pins first), and attention to detail is paramount. In addition to making custom furniture, Ferrazzutti writes about and teaches woodworking. PHOTO: JOHN HOWARTH

### SETH JANOFSKY

Alameda, Calif.
CR student, 1993–1994

This tall display cabinet blends exacting craftsmanship, a Japanese-influenced aesthetic, and an understated yet striking choice of woods (cherry, oak, and pine). Those are characteristics frequently seen in Krenov's work, particularly the subtle marriage of woods in a single piece. Janofsky makes custom furniture in his shop at the old Alameda Naval Air Station near Oakland.

**Online Extra**

Many of these featured artists have graced the pages of *Fine Woodworking*. For links to their articles and features, go to **FineWoodworking.com/extras.**

## CRAIG VANDALL STEVENS

Sunbury, Ohio
CR student, 1991–1993

Stevens built this English elm, maple, and spalted maple cabinet while a student at CR. He decided, with Krenov, to base the design on one of Krenov's pieces but to work from a single photo without being privy to the overall dimensions, radius of the coopered door, amount of flair to the legs, and other measurements. Once the piece was finished, Krenov revealed the dimensions of the original. Stevens says, "I felt as though in the end, I had designed my own cabinet—which was Jim's intention all along." Stevens makes one-of-a-kind furniture pieces, always striving to work at the high level of craftsmanship he learned from Krenov. PHOTO: STEVEN WEBSTER

## JULIE GODFREY

Shelburne Falls, Mass.
CR student, 1992–1993, 1999–2000

Godfrey, a woodworker and marquetry teacher, spent two years under Krenov's guidance. In between, she studied marquetry with Silas Kopf. The second year at CR was her opportunity to "integrate marquetry with Jim's unmatched sense of design and proportions." Although the high contrast and mixed media of this sideboard seem at odds with the more subtle nature of Krenov's work, the flared legs, upturned ends, carved handles, and careful craftsmanship certainly don't. Godfrey was eight months pregnant when building this sideboard, so her husband Jamie pitched in to help complete it.

PANELS: CHARLES CHU
PHOTO: KEVIN DOWNEY

## WILLIAM WALKER

Bainbridge Island, Wash.
CR student, 1982–1984

"To read Jim's books is a treat, but to work alongside him was very special," Walker says. "He had great instincts in combination with plenty of energy." Although Krenov rarely made tables and chairs, Walker feels this white-oak set was made with a very Krenovian approach. The shape of the top is taken from the curving grain of the wood, the arching stretchers relate to that grain as well, and the thickness of the top and stretchers changes between the legs. Walker builds furniture and does architectural commissions.

# readers gallery continued

## BRIAN NEWELL
Fort Bragg, Calif.
CR student, 1989–1990

Newell remembers admiring Krenov and at the same time being incapable of following direction. "Luckily," Newell says, "he blessed my independence and encouraged my insurrection." Newell also recalls that "Jim Krenov could choose and use wood like no one else." He strives for the same in his pieces, including this Macasser ebony and pearwood desk. Newell works and teaches woodworking from his own shop in northern California and is organizing cultural woodworking tours of Japan, where he lived and worked for over a decade. PHOTO: YOSHIAKI KATO

## GREGORY SMITH
Fort Bragg, Calif.
CR student, 1992–1994

Smith has been an instructor at CR since 2002. At the same time, he continues to do commission work as well as his own designs, which can be seen frequently in galleries across the United States. Smith was drawn to CR to learn firsthand the approach to woodworking that Krenov explored in his books. He was "blown away by the collective knowledge held there and love of craft that all the instructors taught." This teak and afzelia chest is a large version (19 in. deep by 37 in. wide by 22 in. tall) of a smaller jewelry box Smith had made. PHOTO: JOHN BIRCHARD

## MARK EDMUNDSON
Sandpoint, Idaho
CR student, 1995–1997

As a two-year student at the College of the Redwoods, Edmundson learned a lot from his fellow classmates and instructors, but the opportunity to watch Krenov work at his own bench was invaluable, he says. This Edward Barnsley-inspired desk (cherry, maple, and wenge) displays one of Krenov's most important lessons, the careful consideration and use of grain. Edmundson used veneers sawn from the same board for the top drawer box. He builds cabinets and furniture in his shop in northern Idaho. PHOTO: BOB GREGSON

## J-P VILKMAN

Portland, Maine
CR student, 1998–1999

This mahogany, oak, and ebony storage bench wears its Krenov influence in the flared legs, frame-and-panel construction, fine details, and carefully selected grain patterns. It is the overall high level of craftsmanship in this piece and in all his work that Vilkman attributes to Krenov's teaching. Vilkman is an artist-in-residence in the Maine College of Arts Woodworking and Furniture Design program. His most recent work is highly sculptural with complex curves and intricate veneering.

## ROSS DAY

Poulsbo, Wash.
CR student, 1986–1987

Like others, Day says Krenov opened his mind with his emphasis on technical excellence as well as "leaving your fingerprints" on your work. This chair (cherry with bamboo caning) is simple and light, yet strong. Day recognizes its quiet grace as a product of his time with Krenov. In addition to building custom furniture in his home shop, Day teaches furniture design at Bellevue College in Bellevue, Wash. PHOTO: MIKE SEIDL

## DAVID FINCK

Banner Elk, N.C.
CR student, 1984–1986

Finck also watched closely as Krenov pursued his own work. "Jim's ability to convey the emotional content of his approach to the craft to a group of students was mesmerizing," Finck says. This red-oak lamp is made with the care and attention Finck learned at the school. All the wood surfaces were planed with a Krenov-type plane, and harsh edges were made "friendly" (as Krenov would say). Finck has his own studio, where he gives woodworking instruction and builds one-of-a-kind furniture, lighting, and guitars. He also makes plane irons and wrote *Making and Mastering Wood Planes* (Sterling Publishing Co., 2000), which has a foreword by Krenov.

## TIMOTHY COLEMAN

Shelburne, Mass.
CR student, 1987–1989

From reading Krenov's books and working with former student William Walker, Coleman was already well-versed in the CR way when he came to the school. There are many Krenov influences in this imbuya, English sycamore, and yew cabinet. Coleman says, "One cannot build a cabinet on an open stand these days without referencing Jim in some way." Here, the attention to details, fine proportions, grace, and warmth are all apparent. Also, Coleman approached the design and construction with flexibility and spontaneity, which Krenov referred to as "composing." This, Coleman feels, was the most important lesson he got during his time with Krenov. Coleman works alone in his own shop, building furniture on speculation and commission.
PHOTO: CHARLEY FRIEBERG

# readers gallery continued

## JOHN CAMERON
Gloucester, Mass.
CR student, 1992–1994

Cameron found CR to be "an island of idealism, a place where the pursuit of the best was valued above all and in all." But he also remembers Krenov saying, "Perfectionism can lead to paralysis," which Cameron took to mean keep on working, but don't stop looking or questioning. The demilune is a traditional form. However, this one in Swiss pear, with its Rhulmannesque legs, shows Krenov's influence in the sense of proportion, the workmanship, and the details. Cameron, a member of the New Hampshire Furniture Masters, works alone in a small shop. He designs and builds custom furniture and bamboo fly rods, and does decorative metal and wood engraving.

## YEUNG CHAN
Millbrae, Calif.
CR student, 1996–1997

To Chan, using handmade tools is an important aspect of woodworking and something that he has done from childhood. It is no wonder he excelled in Krenov's program, where toolmaking (particularly planes) is stressed. Chan refers to his tools as "extensions of my hands, helping me work faster, safer, and with better results." He stores his tools in an exquisitely crafted case. Being able to learn from a master craftsman like Krenov taught Chan to look differently at wood. Now he focuses on the grain, color, and texture to develop a rhythm in each piece. Author of *Classic Joints with Power Tools* (Sterling Publishing Co., 2002), Chan builds custom cabinetry and furniture and teaches at various woodworking schools. PHOTO: ASA CHRISTIANA

## GREG ZALL
Sonoma, Calif.
CR student, 1990–1992

In this maple and pearwood cabinet, Zall was inspired by Krenov's perfect proportions and use of grain and color as part of the design. Zall also added a bit of his native northern California aesthetic. Zall makes custom furniture in his shop in Petaluma and teaches marquetry seminars, passing on the lessons he learned from Krenov.

# Q&A

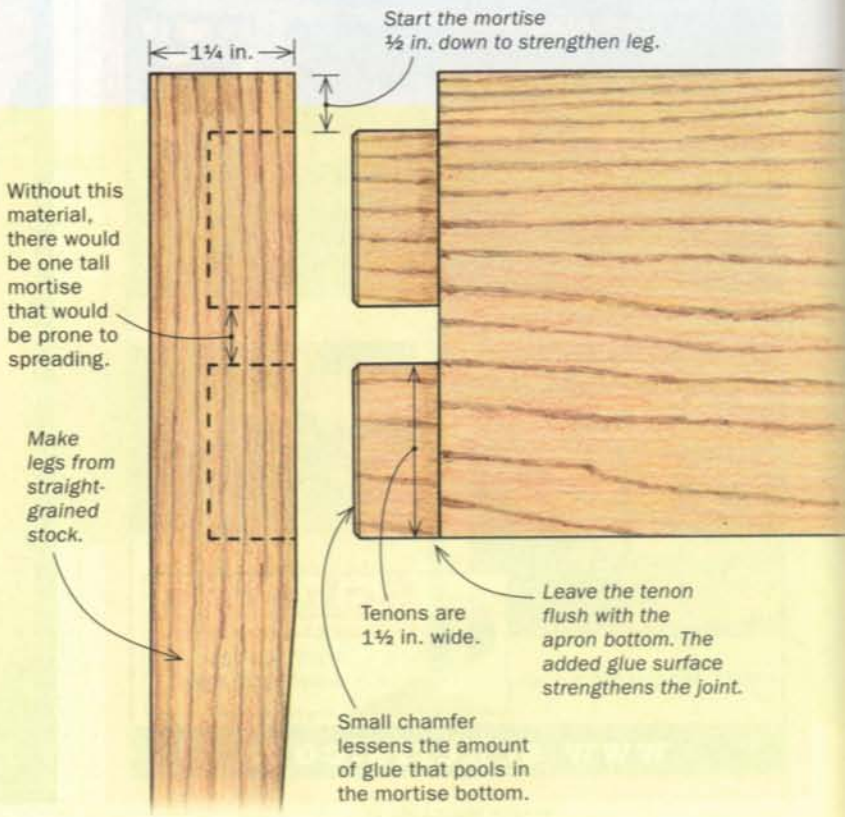
## Strong joints for thin legs

**Q: I'm planning to make a table with legs that are 1¼ in. square at the top, and aprons that are 4 in. tall. I'd like to use mortise-and-tenon joints for the leg-to-apron joinery; how can I make the mortises large enough to be strong but not weaken the legs?**

—DAVID DOMINICK, Austin, Texas

**A:** CUTTING A SINGLE 4-IN. MORTISE at the top of the leg would definitely weaken it. One alternative is to cut a ½-in. shoulder at the top of the apron so that the mortise on the leg begins ½ in. down. The tenon should end flush with the bottom of the apron. But the walls of one long mortise will have a tendency to spread over time. A better solution is to cut two mortises. Keep the ½-in. shoulder at the top, and leave the bottom flush. Make sure the tenons fit well and that you glue them properly, because this will add strength. Finally, pick the leg stock carefully. Straight grain in the mortised section makes for a stronger leg. Also, start with an extra 1 in. of wood at the top of the legs. This prevents splitting when you're mortising. You'll cut it away when the joinery is complete.

*—Steve Latta is a contributing editor.*




**BEST SOLUTION FOR THIN LEGS**

**Two mortises are stronger because less material is removed from the leg.**

## Which glues work in cold temperatures?

**Q: I need to glue up panels in an unheated shop. Are there glues that work on hardwood—in this case, cherry—in the 40° to 45°F range?**

—ART UTAY, South Windsor, Conn.


STANDARD YELLOW GLUE BONDS POORLY WHEN COLD

***Too cold to bond.*** *Most yellow glues should not be used below about 55°F. Below this temperature, instead of drying to their normal clear film, they quickly turn white and lose their strength.*

**A:** I CONTACTED FRANKLIN INTERNATIONAL and Gorilla Glue to see how cold you can go and still glue wood successfully. Joe Goodwin at Franklin had the minimum temperature for Titebond III memorized: "47°!" He also said Titebond II needs to be used above 55° F, and Titebond Original, Carpenters glue, liquid hide glue, and polyurethane must be above 50°. Below this, the glue dries white and powdery instead of transparent, and has virtually no bond strength.

Cyanoacrylate ("Super Glue") also is not suitable for applications in the 40° to 45° range. Some epoxies work, but take much longer than normal to cure. Gorilla Glue polyurethane can handle 40°, but the cure time also is slower.

The bottom line: Use Gorilla Glue down to 40°F and Titebond III down to 47°F, but the best solution is to heat your shop a bit. Everything will be easier then.

*—Mark Schofield is the managing editor.*


***Chilly champs.*** *If you need to use glues in cold temperatures, your choices among the common woodworking glues are limited to Titebond III, which performs down to 47°F, and Gorilla Glue, which needs a minimum of 40°F.*

Photos: staff

## Best finish for bathroom furniture

**Q: I am making a cabinet for my bathroom. What's the best finish to protect it against the rapid changes in heat and humidity that it will experience?**

—GILL MUSSLEMAN, Birmingham, Ala.


**A:** A GOOD OIL-BASED VARNISH will do the trick for the exterior. Apply at least three coats. Don't use varnish on the interior, as the smell of the oil will linger. Instead, use a couple of coats of shellac, such as Zinsser's SealCoat. It dries quickly, will have no offensive odor, and is far more moisture-proof than commonly thought.

*—Finishing expert Peter Gedrys is a frequent contributor.*

***Wood vs. water.*** *Bathroom cabinets need durable finishes to survive the hot, moist conditions they encounter. A few exterior coats of varnish and interior coats of shellac will keep them looking great.*

## When is veneer too thick?

**Q: I used 3/16-in.-thick resawn walnut, glued to plywood, to make a tabletop, but did not veneer the underside. I finished it with an oil/varnish mixture. The seams have opened up and the top warped. What went wrong?**

—MIKE BAUMGARDNER, Marietta, Ga.

**A:** YOUR RESAWN VENEER IS TOO THICK and is acting more like solid lumber than veneer, expanding and contracting in tune with seasonal changes in humidity. There are several things that you can do to minimize this movement.

Keep veneers thinner than 1/8 in. The thinner the veneer, the less prone it is to seasonal movement. Second, allow veneer to rest in the shop for a few weeks before using it, so that its moisture content reaches equilibrium with the shop's humidity. Third, joint and glue the seams together before gluing the veneer to the substrate, and wait a day to allow the water in the glue to escape from the seam area.

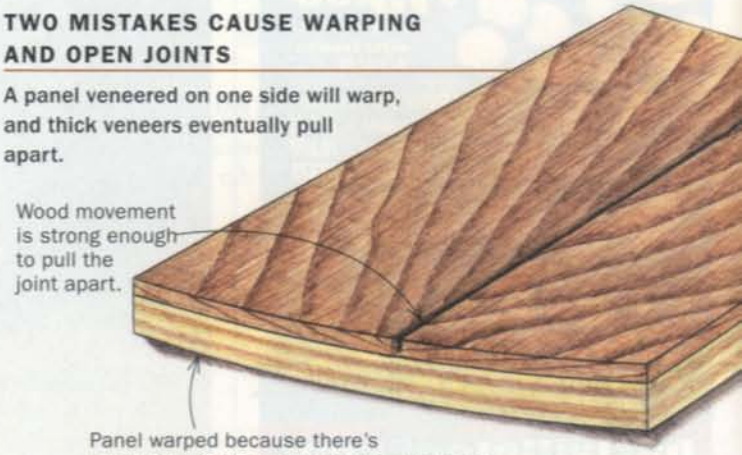
Finally, use an extra coat or two of varnish as a moisture barrier between the veneer and the atmosphere.

*—Thomas Schrunk works with exotic veneers in Minneapolis, Minn.*

***Glue edge joints before laminating.*** *This should keep them from opening up, if the veneers are thin enough. Use blue tape as a clamp.*

### TWO MISTAKES CAUSE WARPING AND OPEN JOINTS

**A panel veneered on one side will warp, and thick veneers eventually pull apart.**




### SOLVE BOTH MISTAKES WITH THINNER VENEERS

**As well as using thinner veneer, pre-glue the seams and veneer both sides.**


Drawings: Kelly J. Dunton

# How to sharpen a molding plane

**Q: What's the best way to sharpen a molding plane blade?**

—BOB O'LEARY, Lincoln, Mont.

**A:** ASSUMING THAT YOUR BLADES have no nicks and they match the profile on the sole of the plane, the best way to sharpen them is with slip stones. You might need several stones of various shapes and radii. You also can use sandpaper wrapped around dowels. With slip stones, start with 2,000 grit and finish with 4,000 grit. With sandpaper, start with 400 grit and polish with 2,000 grit. Hold the blade in one hand, and use the other to pass the slip stone over the bevel. Sharpen the entire cutting edge, then work on the flat side of the blade.

*—Alfred Sharp lives and works in Woodbury, Tenn.*

***Keys to success.*** *Just like a square plane blade, a molding plane blade needs a polished bevel and back to cut well.*

***Rounded blades need rounded stones.*** *Hold the blade firmly, bracing your hand against a benchtop, and carefully hone the bevel with a slipstone.*

***Polish the back.*** *Use a flat sharpening stone to polish the flat side of the blade to a mirror finish.*

master class

# Carve a shell on a cabriole leg

BY LONNIE BIRD

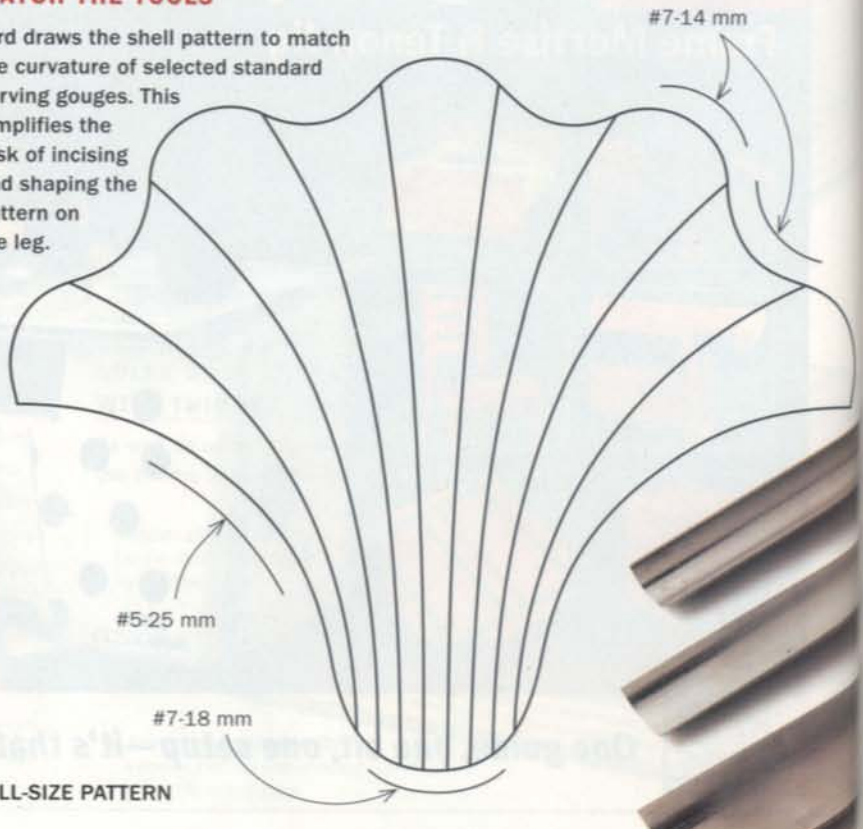
One of the surest ways to embellish a piece of furniture is to add a carved element or two. Although the thought of carving your furniture can be intimidating, some carvings are easier to create than you might think. This shell on a cabriole knee is a good example. Based on the ones found in Pennsylvania, the shell carving was used on chairs, tables, and case pieces like dressing tables, often in several places on the same piece of furniture. Pennsylvania chairs, for example, can have one shell on the crest rail, one on the seat rail, and one on each of the knees. Together, they unify the chair parts, adding considerably to the overall look of a piece.

### Careful layout is critical

Begin the layout by photocopying the pattern of the carving below, magnifying it as needed. To cut out the pattern, place the paper on a

**THE PATTERN'S CURVES MATCH THE TOOLS**

**Bird draws the shell pattern to match the curvature of selected standard carving gouges. This simplifies the task of incising and shaping the pattern on the leg.**




FULL-SIZE PATTERN

Photo, this page (left): Lonnie Bird

## Layout


flat piece of scrap wood and use carving gouges to create a series of overlapping cuts that match the outside shape.

You'll need three gouges for this: a #7-14 mm to incise the concave and convex lobes, a #7-18 mm for the semicircular bottom, and a #5-25 mm to incise the long curve between the lobes and the bottom. Later, you'll use these same gouges to incise the pattern's outline on the leg.

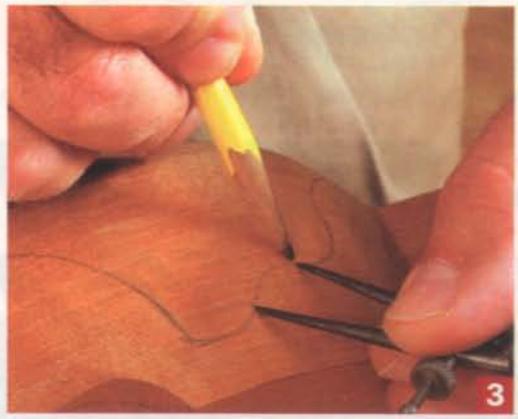
To draw the shell on the knee, place the pattern on the leg and trace around the perimeter. Because the leg is curved, it may be difficult to keep the pattern tight against the wood. After tracing, expect to do a fair amount of freehand sketching and blending of curves to get the perimeter to look right.

To ensure equally spaced lines for the lobes, use dividers to transfer measurements from the pattern to the leg at the top and bottom points of each lobe. Connect each pair of points with a smooth, flowing arc. Each arc has a mirror-image mate; draw the arcs in matching pairs. Use the arc at the edge of the shell as a guide for the first line. Afterward, each line guides the layout of the next.

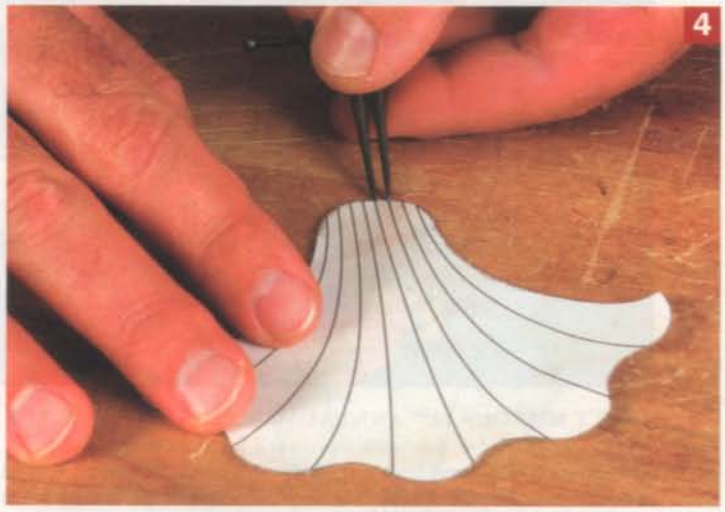
### Begin carving with the perimeter

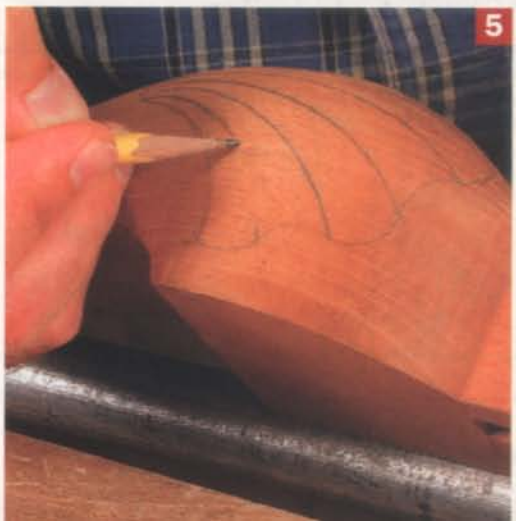
The next step is to incise the perimeter of the shell. This is done using the same gouges you used to cut out the pattern. Beginning with the central convex lobe at the top of the shell, gently rotate the first gouge along the curve of the layout to create a light incision. Then, work your way around the perimeter. As you outline each convex and concave lobe, carefully flow each curve into the previous curve to create one continuous, undulating line. Avoid using a mallet or incising too deeply. Forcing the chisel deep into the leg at this stage can crush the edges of the shell and cause irreparable damage.

The next step is to carve away the surrounding wood so the shell ends up slightly proud of the knee. I use a long ½-in.-wide paring chisel here for better leverage and control. Watch the grain and always cut "downhill" to avoid digging in and spoiling the surface. Make only light cuts, no more than 1/32 in. or so. Then, blend the relieved surfaces into the curves

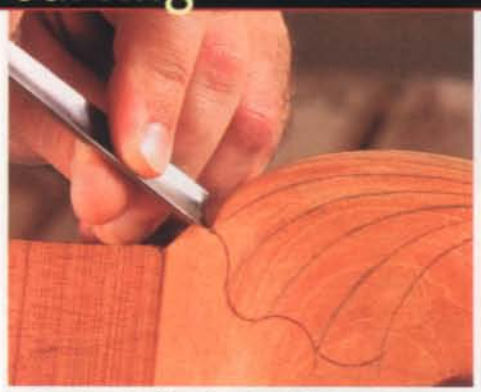

***Transfer the pattern to the leg.*** *After cutting out the paper pattern of the shell, use a pencil to trace the pattern's outline onto the leg (1). Next, establish the spacing of the lobes. Use a pair of dividers to capture the width of each lobe at its top (2), then transfer the dimension to the layout (3). Do the same at the bottom end-points (4).*




***Connect the layout points freehand.*** *To get smooth, evenly spaced curves, you may need to erase and redraw all or part of each line.*

## Carving



***Incise the shell perimeter.*** *Use gouges to incise the entire perimeter of the shell.*

***Carve the area around the shell.*** *Bird uses a paring chisel to remove material around the shell until it sits about 1/16 in. above the leg.*

***Outline the lobes.*** *Establish each of the lobes by using a V-parting tool to cut along the lines drawn earlier.*

of the leg. Examine the shell outline carefully; if necessary, trim the edges lightly to improve the balance and flow. Repeat the process until the shell stands about 1/16 in. proud of the leg.

### Outline and shape the lobes

Use a V-parting tool to outline the lobes, taking care not to carve too deeply at first. To shape the lobes, begin by rounding the center convex lobe using a #5-12 mm gouge, with the bevel up. Start each lobe by cutting away the sharp corners until the two cuts meet in the center of the lobe. You may need to deepen the V to create a smooth contour.

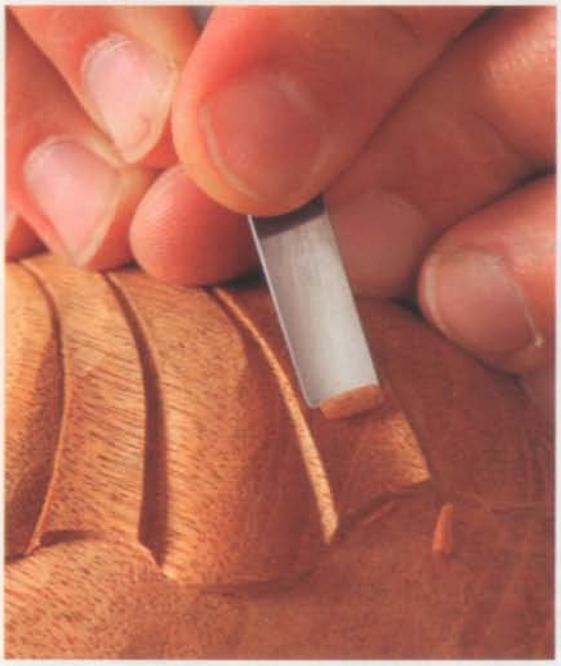
As the Vs converge and the lobes get narrower, switch to progressively smaller gouges like the #8-8 mm and #8-5 mm. Continue rounding each lobe past the apex of the knee toward the base of the shell. Eventually the rounding will disappear. A close look will show that the V-shaped lines at the base of the shell are not rounded.

The two sharply curved outer lobes are typically the most difficult to carve, running across the grain in a spot where the leg's shape also makes carving a challenge. I like a back-bent gouge for this task.

Use the same series of gouges, bevel down, to carve the concave lobes. Again, start at the top of the carving and work back toward the shell's base. A sharp ridge forms as you hollow each lobe. Like the lobes themselves, each ridge should flow smoothly with no interruptions to the curve.

Once the shell carving is complete, use a card scraper to smooth the facets from the surrounding surfaces. □

***Shape the convex lobes.*** *Use a gouge with the bevel edge faceup to round the sharp edges of each lobe. Begin by rounding at the edges of each lobe (left) and work toward the middle. Use narrower gouges as you work your way down the shell (right).*



***Shape the concave lobes.*** *Use your gouges bevel-edge down to create the hollowed shapes. Make sure that the ridges at the top of the V-grooves remain smoothly curved.*

*Lonnie Bird builds furniture and operates Lonnie Bird's School of Fine Woodworking (www.lonniebird.com) in Dandridge, Tenn.*



Photos, except where noted: Tom Begnal

## WOODWORKERS MART

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# Bleach mahogany for a unique look

BY SEAN CLARKE

Rich red tones are the colors most associated with mahogany, but you can also achieve a light golden-amber color by bleaching and then dying the wood. Honduras, Philippine, and African (khaya) mahogany all respond well to bleaching, but Cuban mahogany will darken if bleached and is therefore not a good choice (in any case, you are unlikely to want to bleach this rare and pricey wood).

While bleaching flatsawn boards produces a unique-looking wood, bleaching quartersawn boards with ribbon-stripe figure is a great way to imitate satinwood. Cut into thin, narrow strips, it can be used as a border or inlay and is a great deal cheaper and more easily available than genuine satinwood. □

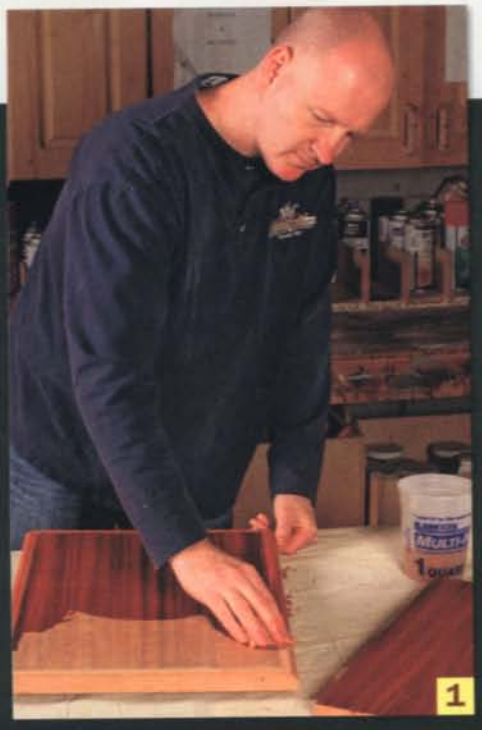

**EYE-CATCHING CONTRAST**
You can make an entire project from bleached mahogany or use it for part of a piece of furniture. The bleached wood stands out beautifully against ebonized wood.

**FAUX SATINWOOD**
This picture frame is made entirely from mahogany, but the strip of inlay is ribbon-stripe mahogany bleached and then dyed to imitate satinwood.

Photos: Mark Schofield

### RAISE THE GRAIN

*Bleach will raise the grain. Excessive sanding after bleaching may sand through to unbleached wood and result in uneven color. To avoid this, pre-raise the grain. After sanding the surface up to P220 grit, wipe the entire surface with lukewarm water (shown) and allow it to air dry. Re-sand the surface lightly with the P220-grit paper.*



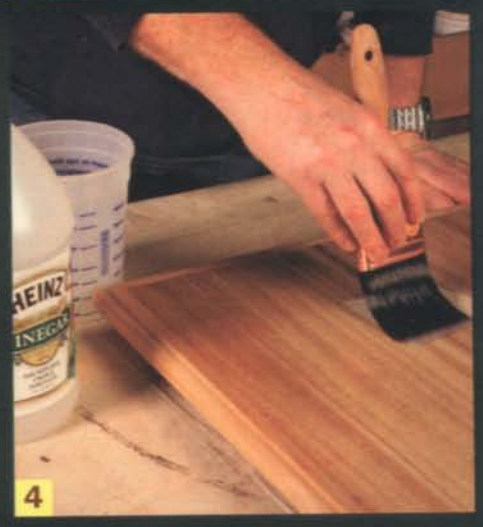


### USE THE RIGHT BLEACH

*Use a two-part bleach designed for wood, such as Klean-Strip (www.woodworker.com). Mix equal parts A and B in a plastic container. Wearing gloves, apply the bleach with a brush or a clean white cloth. The brush should have synthetic bristles, which will not react with the bleach. Apply it evenly, soaking the surface. Then remove any excess with a white cotton cloth and let it dry for eight hours.*

### EVALUATE THE COLOR

*With a white cotton cloth, wet the surface with lukewarm water to evaluate the color and neutralize any active bleach. If you like the color, let the surface dry, lightly sand with P220-grit paper, and move to finishing. However, one coat of bleach usually leaves areas with a pinkish tone. If so, re-bleach the whole piece, wait eight hours, and re-test the color.*


### NEUTRALIZE IT

*While water will neutralize a single coat of bleach, for two or more coats you need to apply diluted white vinegar (two parts water, one part vinegar). This prevents blistering in the topcoat. Apply the vinegar solution with the same brush used for the bleach and wipe off any excess. Let the piece dry for at least eight hours and then lightly sand again with P220-grit paper.*



### WARM UP THE WOOD

*You could finish the mahogany in its bone-white state, but Clarke prefers to warm it up slightly with a water-based golden amber dye (Lockwood #144; www.wdlockwood.com). Mix 1 teaspoon of dye with 8 oz. hot water, and apply evenly with a cloth or brush. Let it cool, wipe off any excess with a clean cotton cloth, and allow the piece to dry overnight.*

### SEAL THE SURFACE

*Brush on a 1- to 2-lb. cut of super blond shellac, such as SealCoat, or if you'd prefer a deeper amber tone, use button or garnet shellac. Once the shellac has dried for two to four hours, lightly sand with P320-grit paper and apply a topcoat of your choice.*

# Carvings cap an impressive chest

BY JONATHAN BINZEN

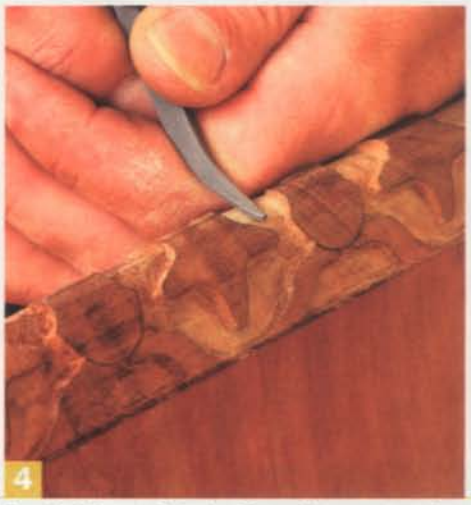
An outstanding piece of furniture should be as inspiring in its details as in its overall form. The details that elevate Doug Mooberry's mahogany chest of drawers (see the back cover) are the starfish, shells, and ribbons that grace the perimeter of the top. They were carved by Steven Swann of Coatesville, Pa., who specializes in carving for furniture.

Swann takes us through the major steps of the carving process here. But he cautions that one of the most critical steps comes before you pick up a gouge—carefully developing and laying out your design on the workpiece. For efficiency and for crisp carvings, he says, the curves of your design should match the sweep of your gouges. □

**Punching the pattern.** *After transferring the design from paper to the workpiece, Swann uses gouges to "punch" the outlines of the starfish, shells, and ribbons. For greater control, he pushes the gouges rather than using a mallet.*

**Custom base for a curved molding.** *He relieves the background of the carving with a ⅛-in.-dia., flat-bottomed, high-speed-steel bit in a laminate trimmer. A concave base keeps two points of contact on the bullnosed edge.*

**Flattening the background.** *To clean up the background, Swann skims the surface with a double-beveled chisel, which won't dig in. He begins with a wide chisel (shown) and follows with a narrower one for tight spots.*



**Taming the end grain.** *To avoid tearout on the ridge of the bullnose, Swann carves from the top down, flips the workpiece, and then carves from the bottom down. He uses a riffler file to remove the small ridge that's left in the center.*

**Simple strokes for the starfish.** *With the background relieved, Swann shapes the starfish by scooping the edges with a very shallow gouge. The center of the starfish remains uncarved.*

**Each shell gets rays.** *Swann shapes the surface of a shell, and then draws in its curving rays with a mechanical pencil. He punches in the lines with larger gouges and deepens those incisions with a tiny gouge, as shown.*

**Texture adds depth.** *To simulate a bed of sand, Swann stipples the background with an engraver's punch and a mallet. It's hard to avoid creating patterns, Swann says, but it looks best if you keep the spacing random.*



Top photo: David Gentry; all others: Jonathan Binzen

# Sea Chest

Doug Mooberry has loved American period furniture since he was a small boy. He remembers following his mother into antiques stores, opening drawers and exploring secret compartments. Today his six-man shop, Kinloch Woodworking in Unionville, Pa., produces furniture richly informed by tradition. But, he says, "I hate to blatantly copy. I always try to make a piece my own."

For this piece, Mooberry adopted the overall proportions, cock-beaded drawers, and reeded quarter-columns of a classic Chippendale chest of drawers. Then he "kicked it up a notch" with the wood he chose—solid crotch mahogany for the top, figured mahogany for the case, and shop-sawn crotch mahogany veneer for the drawer fronts. The personal twist came in the carving. Mooberry and his family are avid scuba divers and often spend their vacations exploring the sea. No surprise, then, that underwater imagery surfaced on the carved edge of the chest's top, where tiny scallop shells alternate with starfish against a stippled bed of sand. The chest was built at his shop by Jeff Dixon, with the carving done by Steven Swann.

*—Jonathan Binzen*

Photos: David Gentry

**How They Did It** Turn to p. 98 to see how Steven Swann carved the starfish-and-seashell molding for this chest.

**Pro Portfolio** Go to FineWoodworking.com/extras to see more of Doug Mooberry's designs and hear him talk about his work.