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from any chopsaw, p. 48



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original designs

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in narrow legs

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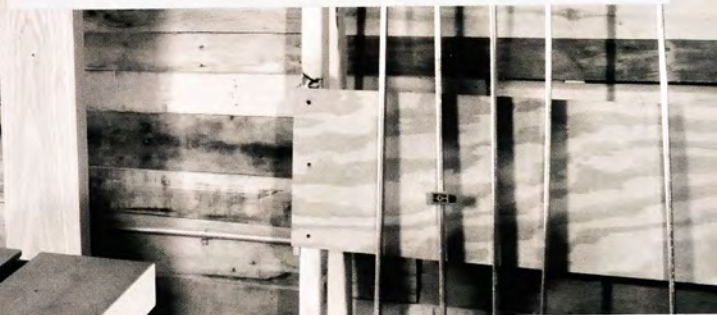


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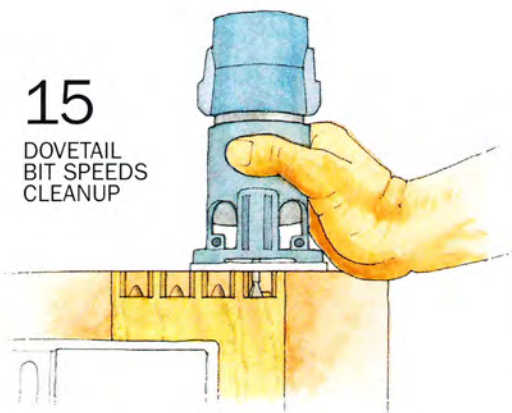
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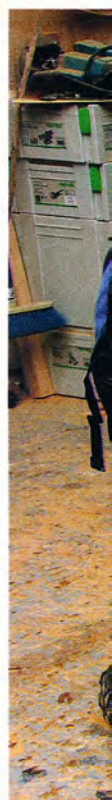
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Inspired by a local flower, the natural curves of this table make it a California original

BY JENNIFER ANDERSON



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Cover photo: Jonathan Binzen



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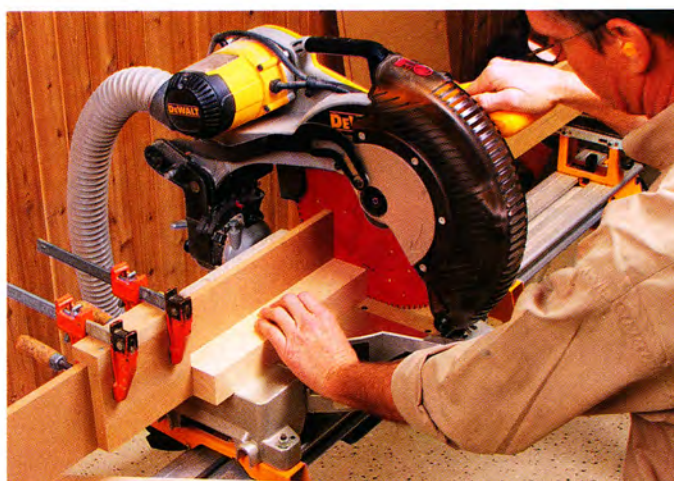
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BETTER CUTS
ON ANY CHOPSAW



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Secrets of a Happy Handplane

Garrett Hack demonstrates his techniques for turning a flea-market find into a top performer.



VIDEO:

Forge Your Own Hinges

Learn how easy it is to forge period-perfect snipe hinges, like those used in Andrew Hunter's blanket chest (p. 28).

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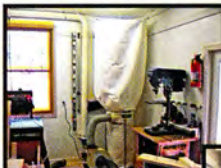
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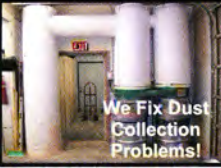


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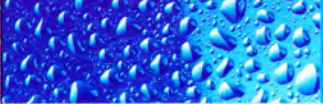
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contributors

On a sturdy ring, furniture maker **Jennifer Anderson** ("Hall Table with Flair") carries keys to half the college woodshops in southern California. Anderson, who studied with James Krenov at College of the Redwoods and Wendy Maruyama at San Diego State University, is a dedicated teacher. She leads classes across the region in art, design, and woodworking. Anderson builds furniture in a small shop near SDSU, where she is also the artist in residence. This fall, after 15 years of strictly one-of-a-kind work, she was designing and prototyping several pieces for production. Working either way, she says, the payoff is the same: the gratifying moment when an idea takes shape as a tangible object. This January, Anderson will teach a three-week intensive woodworking course at Anderson Ranch Arts Center in Snowmass, Colo.

Favorite recent project? "Made a camera obscura with laser-cut joinery in a limited production run for a San Diego children's museum."



Andrew Hunter ("Blanket Chest by Hand") is a former college quarterback who gets his exercise these days working wood with hand tools, playing volleyball, and doing tai chi. He's largely self-taught in furniture making, but spent time with millwright Jim Kricker reproducing period waterwheels and timber-frame buildings.

Best way to unwind? "I put a lot of pressure on myself in the shop; I like to decompress by mowing our lawn, which is the size of a football field."



Michael Fortune ("Develop Your Own Designs") studied furniture design and construction in the early 1970s under Donald McKinley at Sheridan College, just outside his home town of Toronto. From the start, Fortune wanted to build fine furniture as efficiently as possible. Frequently building in multiples, he relies heavily on machines and on any number of brilliant jigs, which enable him to reproduce complex shapes quickly and simply.

Why is this man laughing? "Because I've been caught using a handplane!"

Peter Gedrys ("Brushes for Woodworkers") has made a career out of his love for color, but his passion for it extends beyond his Connecticut finishing shop. When he's not working, you're likely to find him in the garden, nurturing one of his favorite flowers, dahlias. Says Gedrys, "My wife Kathy calls our gardens her 'Living Monet.'" Gedrys opened Architectural Finishes in 1987, offering finishing services to furniture makers, restorers, and installers of architectural millwork.

How many brushes do you have? "About 30 to 50, I'd say."



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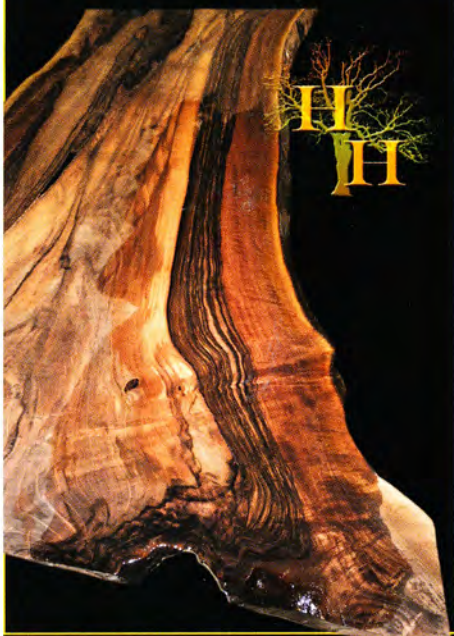
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Spotlight

FINE WOODWORKING LIVE
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CLOSE UP AND HANDS ON AT FWW LIVE

I can't tell you how much I enjoyed my four days at Fine Woodworking Live in New Haven (Conn.). Everything went off without a hitch. My only problem? Deciding which shooting plane to buy, Lie-Nielsen or Lee Valley! I never met such a huge crowd of nice people, all the presenters and everyone I roomed with, ate with, and walked between buildings with. Not a stranger in the bunch. I ended up going to three of Michael Fortune's sessions—what a hoot! Loved the 2x4 Build-Off, too. I had planned to get on a team but they filled up fast. I think I had even more fun just wandering among the teams and watching. The banquet was perfect and keynote speaker Brian Boggs couldn't have been better. Thanks for everything you did to make this happen. See you next year.

—Gordon Swenson, Potomac Falls, Va.

Editor replies: I agree. This FWW Live was even better than the last! All the thanks goes to the wonderful FWW authors and editors who were on hand to teach, the rest of the FWW staff, and our event coordinator, Jo-Ann Maude. For more information on FWW Live 2013, go to FineWoodworking.com/extras for a link to our blogs.



Pine woodworking. Eight teams had 1½ hours to design and build some type of seating, using nothing more than a pile of studs (probably fir, actually), a box of screws, a jigsaw, and a cordless drill. The results were surprising, a bizarre assortment of prizes was awarded, and we all had a blast.



Beyond the cutting board project

I was disappointed with the criticism of the article on cutting boards ("A Unique Cutting Board," *FWW* #233; letter to the editor in *FWW* #235). As a person who designs his own furniture, I look at the inlay as a new technique in my arsenal. I think of it not as a cutting board but as a tabletop or a drawer front or any surface that would look better with a contrasting band of wood in it.

—CHUCK MATTSON, Detroit, Mich.

Missed a feature in biscuit joiner test

As an owner of one of the biscuit joiners tested in *FWW* #235, I suspect that the author did not look through all of the materials that came with his machine. His primary criticism of the Porter-Cable joiner is its wide fence opening, which makes it difficult to use on the end of narrow stock.

However, the unit is supplied with a clear plate that is easily attached (no tools) to the fence, which allows the joiner to be used on narrow stock. And it's convenient to use all of the time.

—MARTY BACKE,
Downey, Calif.



Tony O'Malley

replies: You are right that I missed that point. I did notice the clear plate supplied with the Porter-Cable biscuit joiner, but assumed it was meant to create an offset joint, as other joiners in the review included such an accessory plate. Indeed, the clear plate clips on easily to the adjustable part of the fence, allowing it to handle narrow stock when the fence is pivoted down and used as the reference surface. But its attachment clips won't let the fence pivot all the way back into its original position, upright and square to the machine, when you want to use the base

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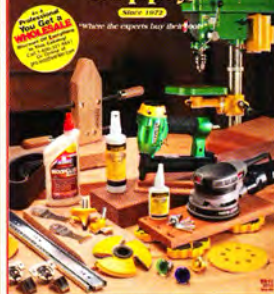
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as the reference. So the plate still needs to come off frequently, an inconvenience not shared by the DeWalt, for example. The clear plate also throws off the scale on the adjustable fence by $\frac{5}{32}$ in., an odd amount to deal with.



Handy hardware for expanding tables

Several years ago, I made a card table similar to the one in *FWW* #233 ("Expanding Table Looks Great Open or Closed"). But instead of using a sliding panel to lock the hinged aprons in the open position, I found a simple fixture at Ball and Ball Reproduction

Hardware that serves the same purpose. It is item J40-568, \$18 at ballandball-us.com. You'll need two, one for each folding apron.

—DONALD HOLLAND, Easton, Md.

Slick cauls are a good call

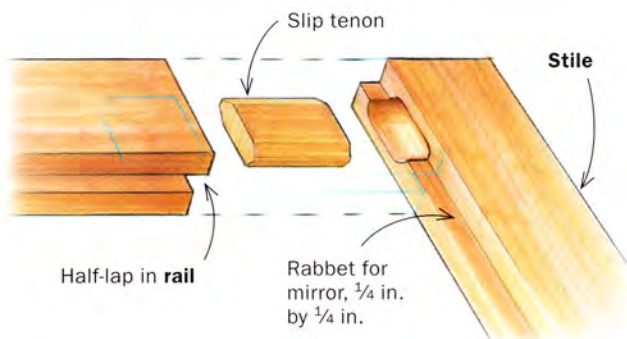
Right before I read Michael Fortune's articles in *FWW* #234 ("Great Glue-Ups, Guaranteed," and Fundamentals: "Gear Up for Glue-Ups"), I did a glue-up without using cauls across it. The result

was not good. Taking Fortune's advice, I decided it was time to make some good cauls to have on hand. I did not have the thick hardwood stock he recommends, so instead I glued together two layers of $\frac{3}{4}$ -in. cabinet-grade plywood. Then I epoxied countertop laminate onto one edge. I have since used these cauls and they work great. Cleaning up the squeeze-out is very easy, and most importantly, my work is now flat.

—JON CASH, Port Angeles, Wash.

Correction

In the article "Build a Vanity Cabinet" (*FWW* #235), the door parts in the drawing on p. 40 were mislabeled. The corrected labels are shown here.



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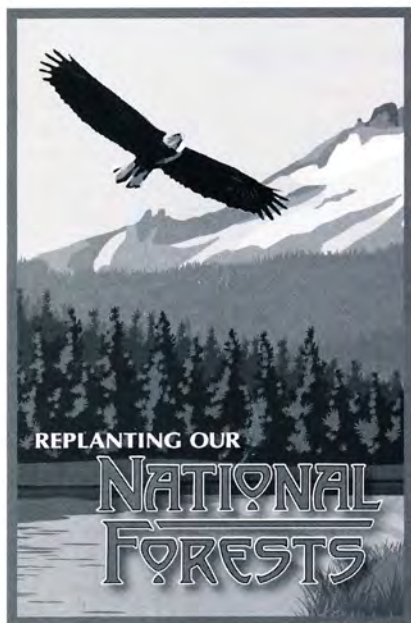
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Best Tip



Roger and Judy Sanwald have been building furniture in Raleigh, N.C., for more than 40 years—everything from Colonial period desks built without the aid of power tools, to modern, stackable bookshelves. You can see their work at sanwaldwoodwork.com.

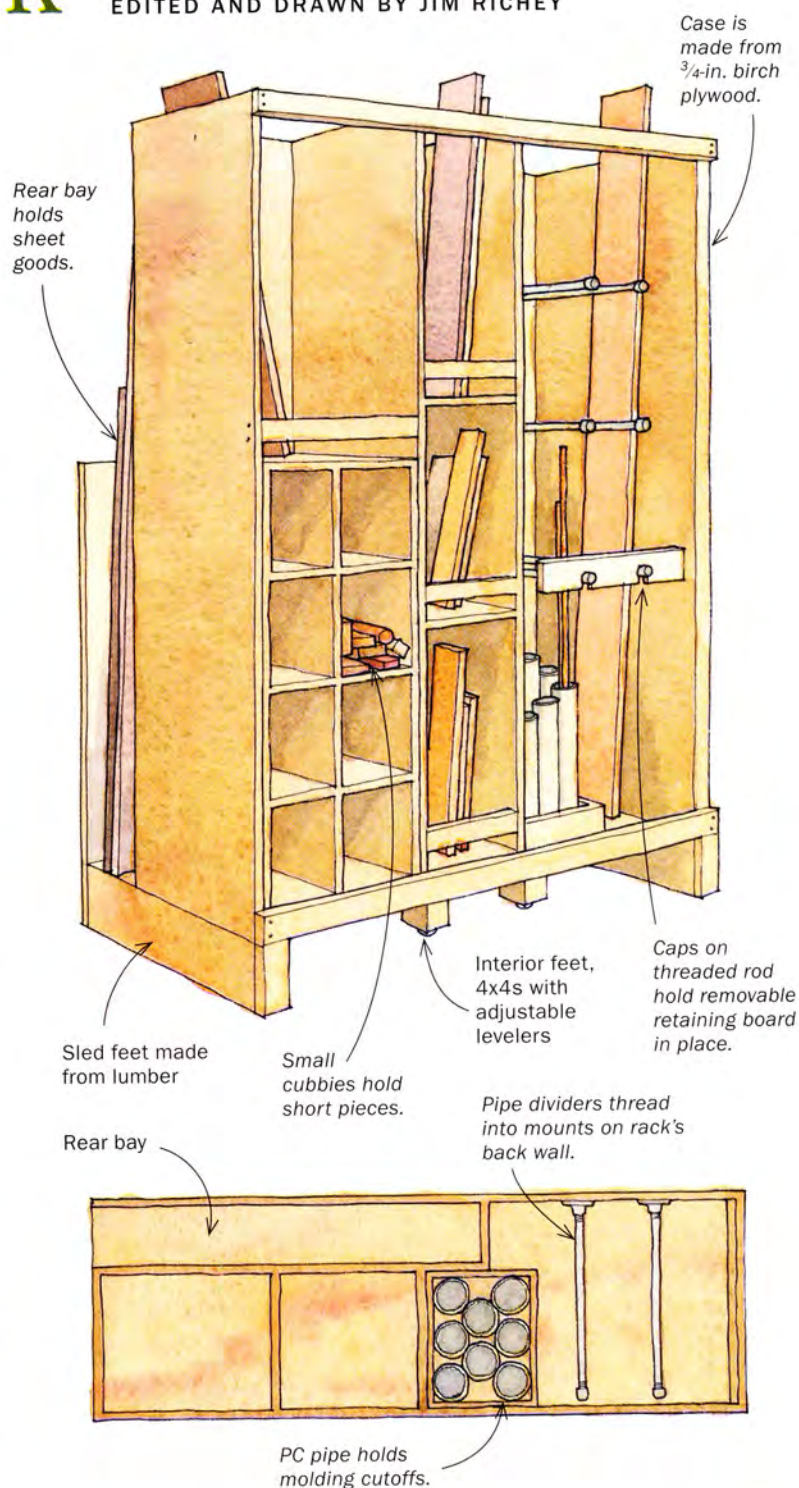
Smarter lumber rack

Our old lumber rack was a typical design that stored wood in horizontal stacks, and it had the typical problems—mainly that the board we wanted always seemed to be at the bottom of the stack. When we remodeled our shop not too long ago, it gave us the chance to design a new rack.

First, we wanted to be able to hold short lengths, long boards, and sheet goods all in a single rack. To keep things neat, we wanted the rack to hold all the stock off the floor, with an easily cleaned space underneath. Last, and most important, the design had to make each piece of lumber easy to see and remove.

One unique feature of this rack is that the short pieces are stacked in cubbies so they can be viewed from the end. This makes it easy to find the piece you want and, because the small cubbies limit the amount of wood, even the bottom pieces are easy to remove. Longer pieces are stacked vertically in several bins. This makes it easy to find and remove the wood without having to unstack and then restack it. A separate bay on the back side of the rack allows vertical storage of sheet goods up to 4x8 in size. The bottom of the rack is made from two thicknesses of $\frac{3}{4}$ -in. plywood for strength. Finally, the entire unit is built on sled feet and legs to keep the stored lumber off the shop floor so that it stays clean and dry, and to allow cleaning underneath.

—ROGER AND JUDY SANWALD,
Raleigh, N.C.



A Reward for the Best Tip

Send your original tips to fwmow@taunton.com or to Methods of Work, Fine Woodworking, PO Box 5506, Newtown, CT 06470. We pay \$100 for a published tip with illustrations; \$50 for one without. The prize for this issue's best tip was a Veritas DX60 block plane.



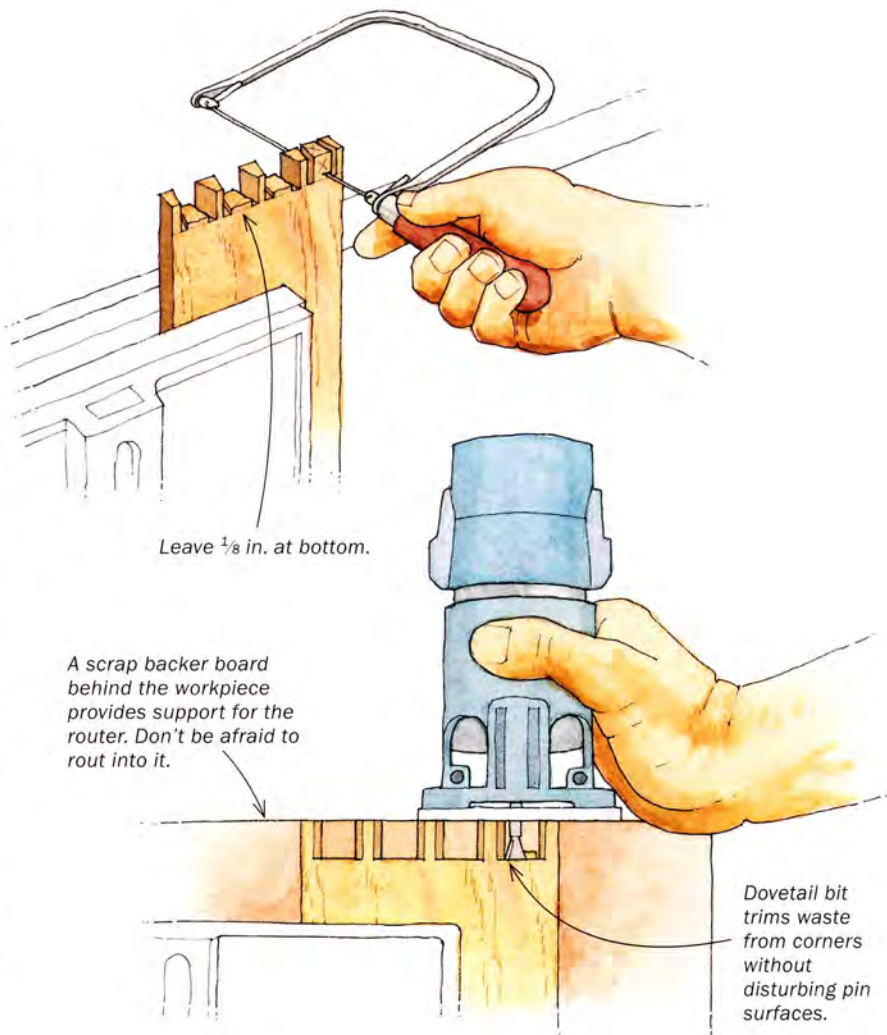
Dovetail bit speeds cleanup between pins

Having cut many dovetails, I've found a great way to remove the waste between pins using a router and a dovetail bit.

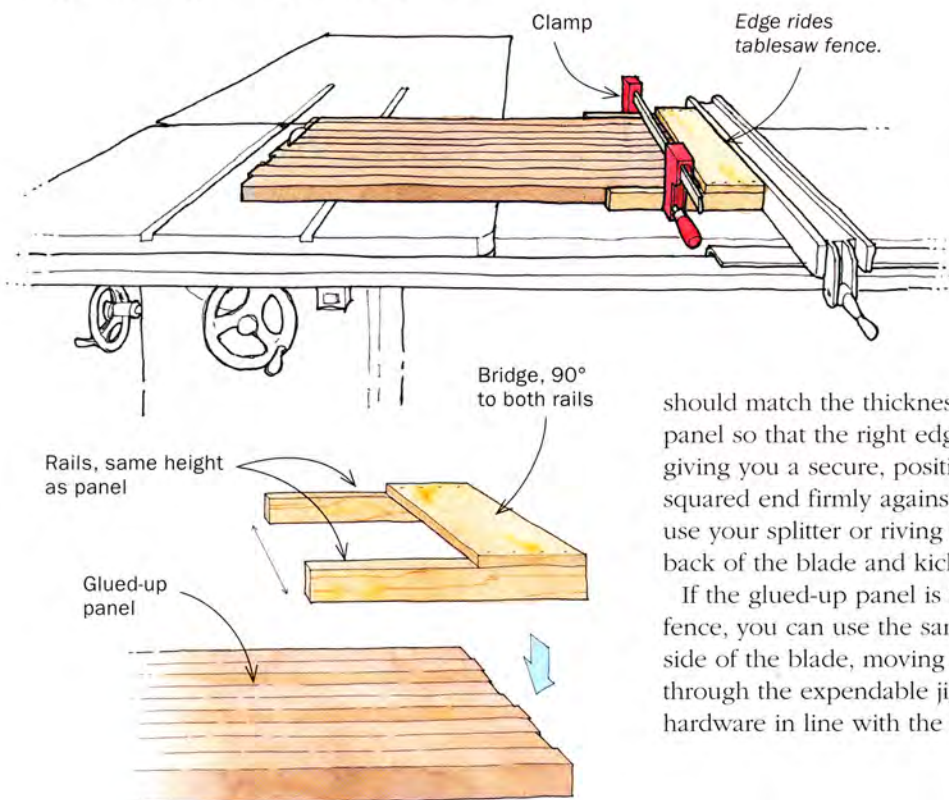
I saw my pins using a sliding crosscut jig at the tablesaw. To remove the waste between the pins, I start with a coping saw, taking care to leave about $\frac{1}{8}$ in. of wood at the bottom of the waste area. Then I go to my router and use it freehand to clean up the remaining waste between the pins. For this operation, I use a regular dovetail bit in the router instead of a straight bit.

I clamp the workpiece in a vise with a scrap board behind it at the same height as the workpiece to provide support for the router so it doesn't tip. Using a dovetail bit to clean up the waste makes this step easier to control and reduces errors. Unlike a straight bit, which takes only one slip or tip of the router to cut into the pin, a dovetail bit allows you to work only at the bottom of the waste area and eliminates this danger. This lets you work all the way to the corners without fear. Even if you inadvertently cut slightly into the bottom of a pin, it will not show when the joint is assembled.

—GENE DINERALTER, New London, Conn.



Jig helps square up large panels



I recently glued up a panel that was too wide to fit in my crosscut sled or guide easily with my miter gauge. So, to square the panel's ends, I came up with this simple jig.

The jig is a birch-plywood bridge that provides a straight edge to register against the rip fence. To make the jig, use a brad nailer to attach a straight-edged piece of stock at 90° to two rails. The distance between the rails must be exactly the same as the width of the workpiece that you want to square up, and the height of the rails

should match the thickness of your panel. Clamp the jig to the glued-up panel so that the right edge of the bridge can ride against the rip fence, giving you a secure, positive reference for a square cut. Run the newly squared end firmly against the fence to trim the opposite end. Be sure to use your splitter or riving knife to prevent the panel from pivoting onto the back of the blade and kicking back.

If the glued-up panel is too long to fit between the blade and the rip fence, you can use the same technique by moving the rip fence to the left side of the blade, moving the jig to the left end of the panel, and cutting through the expendable jig. Be sure that you don't have any brads or other hardware in line with the blade.

—MAXIME TANGUAY, Mirabel, Que., Canada

■ MACHINES

Brawny bandsaw is a joy to use

15-in. bandsaw
from Powermatic

Model PM1500
\$2,900
Woodcraft.com

WHEN EVALUATING A BANDSAW, I use specific criteria to determine how good the machine is. In a perfect world, I want a very rigid upper guide post so the blade won't flex and drift, and blade guides that are easy to set and remain set in use. I also want heavy wheels, a sizable cast-iron table, a fence

that moves easily and locks securely square, and of course, lots of resaw capacity and power. Powermatic has put together the total package with its category-busting 15-in. bandsaw.

The saw has 14 in. of resaw capacity, and its 3-hp motor has enough power to bully its way through any material. Heavy cast-iron wheels add inertia and create a very smooth-running machine. To test its mettle, I ripped a bunch of 12/4 hard maple practically as fast as I could push it past the blade, and encountered almost no resistance. I also resawed white-oak veneers from a wide block with perfect results.

Upper guide-post rigidity is impressive and the post can be adjusted to maintain parallel travel with the blade. Blade guides are easily adjusted via large thumbscrews and hold their settings securely.

The factory-supplied AccuFence glides easily and locks securely, and the cast-iron table is big (16 in. by 21½ in.) and solidly supported by cast-iron trunnions.

There are some great safety features, too. You can't power up the saw when the blade tension is

released. The foot brake stops the wheels and turns off power with one step—helpful when you don't want to take your hands off an unwieldy workpiece that's dangling off the table.

Finally, dust control is great, with two ports—one close to the lower guides and one at the wheelhouse. Overall, this machine is a pleasure to use. It's big, brawny, sturdy, and best of all, very accurate.

—Roland Johnson is the author of Taunton's Complete Illustrated Guide to Bandsaws (*The Taunton Press, 2010*).



Big mouth. With 14 in. of resaw capacity and a 14½-in. throat, the PM1500 can handle big boards.



Tool-free. Guide adjustments are made without the need for tools, and they hold their settings.



■ ON THE HORIZON

Highlights from the Vegas tool show

The woodworking industry's two big trade shows alternate years in Atlanta (IWF) and Las Vegas (AWFS). This year the big show was back in Sin City, and judging by the surging attendance numbers, the woodworking industry is in a state of recovery—and that means innovation. Here are a few of our favorite discoveries at AWFS. For more, go to FineWoodworking.com/extras.

—Asa Christiana and Ed Pirnik

LAGUNA MACHINES HIT THE VALUE SWEET SPOT

Most serious hobbyists are looking for a combination of value and performance, and Laguna is aiming squarely at that target with its new bandsaw and upgraded tablesaw.

At \$1,100, the “14 Twelve” 14-in. bandsaw has a boatload of great features for the money: durable, easy-to-set ceramic guides, 12 in. of resaw capacity, and, according to Laguna, the ability to tension a 3/4-in. blade for that job. Also, its 1 3/4-hp motor runs on 110-volt power.

Laguna's updated Fusion 10-in. tablesaw also promises plenty of power and features for fine woodworking at a great price: \$1,300 for the 36-in. version. It features a 1 3/4-hp motor that should have plenty of power to handle hardwoods and two types of riving knives that change out quickly.

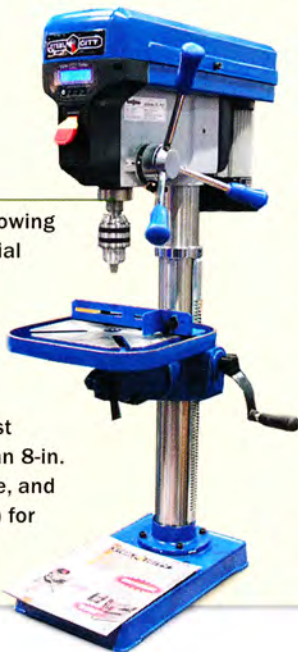
SUPER GLUE FOR WOODWORKING

By slowing down the drying times, chemists at Bioformix have been able to develop a new cyanoacrylate glue, called Nexabond 2500, that could find a permanent home in woodshops. Right now, three formulations are available: slow (S), medium (M), and long (L), with the latter being best for woodworking applications. But look for an extended version, according to the company, that will give you close to 20 minutes of open time. A little bit of this stuff goes a long way: a 4-oz bottle of Nexabond (\$16.50 at retail) is equal to 16 oz. of yellow glue.



STEEL CITY GOES BENCHTOP

Steel City's new Blue Line features a growing number of benchtop versions of essential woodworking machines. These machines cost much less than full-size models, take only a few feet of countertop or bench space, and are portable if need be. Notable are a 10-in. bandsaw (model 50110) for just \$260 that has 6 in. of resaw capacity, an 8-in. benchtop jointer-planer combo machine, and a heavy-duty benchtop drill press (right) for \$360.



SHOOTING PLANE FROM LEE VALLEY

At 7 3/4 lb. and \$330 for the model with an O1-steel blade, the latest Veritas handplane is a tool for serious shooters. It puts your hand in a comfortable position and features a Norris-style adjuster, an adjustable throat, and a pivoting handle (tote) that lets you use the plane facedown for other trimming jobs.

AFFORDABLE SPRAY SYSTEM

Hobbyist woodworkers interested in stepping up to HVLP finishing now have a more affordable entryway, with little to no compromises, according to the maker. The three-stage model of Apollo's ECO-Series sprayer, at \$650, should easily handle solvent finishes as well as most waterborne finishes. Despite its small size, Apollo claims the ECO-Series offers 12% to 22% more atomizing pressure thanks to a new fan design for the turbine, meaning their rigs can spray a wider array of finishes than similarly sized HVLP systems.



■ HAND TOOLS

Fast-cutting backsaw does it all



Hybrid dovetail/small tenon saw by Bad Axe Tool Works

\$245 (standard model)
badaxetoolworks.com

I **USE BACKSAWS FREQUENTLY** in my work, and I'm always curious about what's new on the market. Lie-Nielsen, Lee Valley, Gramercy, Wenzloff, and Adria make high-quality saws. But after using the new Bad Axe hybrid backsaw recently, I think these high-end sawmakers have some serious competition. Bad Axe Tool Works has been around for a while, but not many people know about them. They offer a lot of saw choices, and each type can be customized to your liking, from the handle material and size to the blade back and hardware.

The hybrid saw I tested was very comfortable to hold. The custom-sized handle fit my hand well, and the saw was well-

balanced. The folded blade back holds the thin plate in tension, which helps keep it firm and rigid.

What's most impressive is the hybrid tooth pattern (14 tpi), which is a cross between a rip and a crosscut. The saw starts easily, tracks a line effortlessly, and cuts fast and smooth, both with and across the grain. I also like the 12-in. length. I gang up parts for dovetailing—when I'm making a bunch of drawers, for instance—and the long stroke easily handles the thicker mass of these paired-up boards. All Bad Axe saws come with a one-year warranty and offer a sharpening service for a nominal fee.

—Chris Gochnour wrote *"Saw Like an Old Pro"* (FWW #235).

■ TURNING

Quick-change chuck is a game-changer

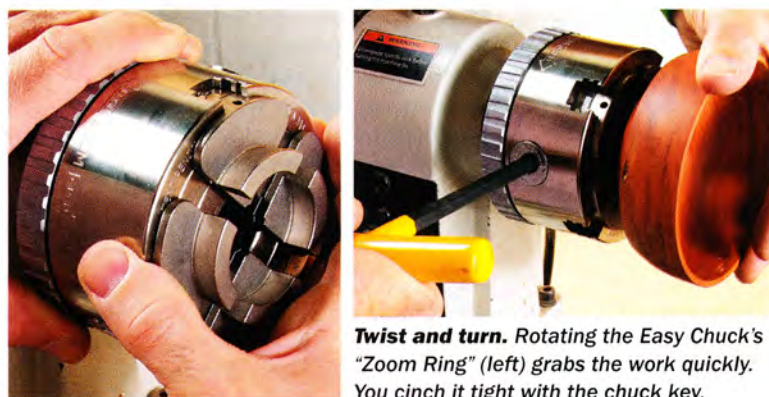
SINCE ITS INTRODUCTION IN THE 1980s, the four-jaw chuck has improved all realms of turning—not just hollow vessels—giving turners multiple options for mounting work and eliminating the fussiness of a faceplate.

Inevitably, if you become interested in wood turning, you will own one of these chucks. But soon you will find out that you need different jaws to perform different functions. Then you will find out how time-consuming it is to replace jaws. Sure, you could buy another chuck with different jaws, but that's a costly endeavor.

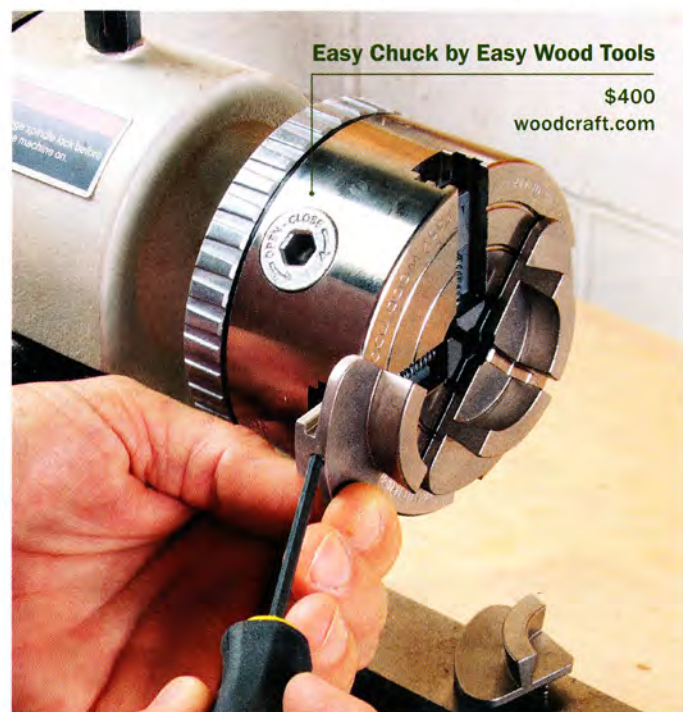
Easy Wood Tools has a better solution with its Easy Chuck, which makes jaw changes lightning-fast. With the Snap-Lock mechanism, you simply press the individual jaws into the base until they grab and lock. To release them, you use the supplied jaw key. The jaws are case-hardened and nickel-plated and are held in place by the chuck's body and not screws, which are more susceptible to shear. The edges of the jaws are rounded over to reduce knuckle injuries. Mounting work is fast. You simply twist a ring on the base to snug the jaws around the workpiece and then cinch them tightly with just a turn or two with a chuck key.

The Easy Chuck fits 1-in. by 8-tpi spindles and comes with jaws that grip 1½-in. tenons. You can buy other jaw sizes as accessories (\$70) and an adapter for 1¼-in. spindles (\$38). It's pricey, but whether you're a beginner or an experienced turner, you'll love this chuck.

—Mike Mahoney is a professional turner (bowlmakerinc.com).



Twist and turn. Rotating the Easy Chuck's "Zoom Ring" (left) grabs the work quickly. You cinch it tight with the chuck key.



Easy Chuck by Easy Wood Tools

\$400
woodcraft.com

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■ POWER TOOLS

Powerful vac is clean and quiet

MAKITA'S NEW SHOP VACUUM is a powerful yet quiet machine, with state-of-the-art filters available. To test it, I repeated the procedures used for a shop-vac review we did in *FWW* #223, using both the standard filters and optional HEPA filters. After removing the included bags and seasoning the filters, the working airflow at the end of the 16-ft., 1½-in.-dia. hose measured 70 cfm (with the HEPA filters), second only to the Bosch Airsweep in that review and just ahead of the more recently reviewed DeWalt DWV012 (*Tools & Materials*, *FWW* #232). With the standard filters, the flow was 5% higher.

The 10-gal. usable volume is about average. But some great features make this vacuum stand out. The automatic filter cleaning system kept the flow up as the container filled, and restored the original performance after emptying the container, with both the HEPA and standard filters. The vac has a variable-speed feature that lets you dial in the suction power, a tool-actuated outlet, a 24-ft. cord, and easy-rolling casters. Plus, at 72 db., this was one of the quietest units we have tested.

The Makita ranks close in performance to the Bosch Airsweep and DeWalt DWV012. But because HEPA filters are not standard, it's hard for the Makita to move ahead of the DeWalt as a Best Value candidate.

—Bill Peck is *FWW*'s shop manager.

12-gal. shop vacuum by Makita

Model VC4710

\$560

homedepot.com



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Every woodworker needs a tape measure

HOW TO GET THE MOST FROM THIS TRUSTY TOOL

BY ASA CHRISTIANA

The tape measure is largely a contractor's tool, but every woodworker needs at least one. Mine travels with me to the lumberyard and stays in my pocket for a host of tasks around the shop, from rough layout to setting up machines for milling lumber. It has endless possible uses—and there are a few tips and tricks that will help you make the most of it.

I can't count all the ways I use my tape, but the first is at the lumberyard when checking stock against my cutlist. At home, I use it to lay out parts, marking rough lengths and widths with a lumber crayon. I use it at the chopsaw, when I cut those boards to rough length, and at the bandsaw when ripping them to rough width.

Later, as a piece develops (and I need to build doors and drawers to fit, for example), I use my tape to grab measurements and lay out rough stock. But rough work isn't the only reason I



Roughing out parts

Fast layout. When using a tape to lay out parts for a project, you can quickly see which parts can come from which board.



And fast machine setup. When you rough those parts out of a large board, a tape is great for setting your bandsaw fence, for example.



TIP CHOP QUICKER



No mark needed on the miter saw. With the tape hooked on the end of the workpiece, just align the blade with your desired measurement. (without turning the saw on). Hold the workpiece tight against the fence.



Hold and cut. Keep the workpiece firmly in place as you retract the tape, and then bring down the blade to make the cut.

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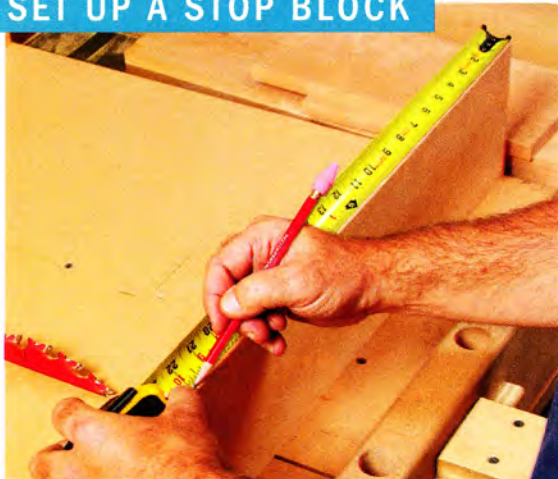
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SET UP A STOP BLOCK



Precise, matching parts. A tape measure can do more than rough work. To cut two case sides the same length, for example, square one end of the workpiece, then hook your tape on that end and make a tick mark (left). Then use that tick mark to set up a stop (above)—in this case, a hook-shaped stop—and cut both parts precisely with one setup.

reach for my spring-loaded buddy. Since I know my tape is accurate (see p. 27), I use it to lay out joinery on big pieces, like dados in bookcase sides. I trust it for machine setups, too—especially for measurements that are too big for a combo square, like when I'm working with plywood, or setting up a stop block in my crosscut sled. Even an accurate tape can't replace stop blocks or a story stick when they're called for, but you want a tape you trust, so you can use it to set up those stop blocks in the first place.

Tricks of the trade

I'm not the first to use these, but I have a few favorite tape tricks. They may not be amazing, but they're handy.

Here's a no-brainer: When you need to be precise, pivot the tape so that one side is lying down flat on the work. There are times you need to measure from one mark to another and the hook becomes a liability; it's much more accurate to measure from a line somewhere along the tape. I used to start at the 1-in. mark, but after forgetting to add that inch back in a couple of times—with disastrous results—I now start from the 10-in. mark. It's an adjustment that's too big to forget.

Then there is the trick at the chopsaw (or miter saw), where I bring the blade down onto the tape and board at the same time to line up a measurement. Then I just slide the tape away and keep the board in place for an accurate cut—without stopping to make a mark. Finally, there are all the ways you can use your tape during assembly to measure diagonals to check for square. The tape is perfect for this task—you can slip it under clamps, hook it over outside corners, and nestle it into inside corners.

Asa Christiana is FWW's editor.

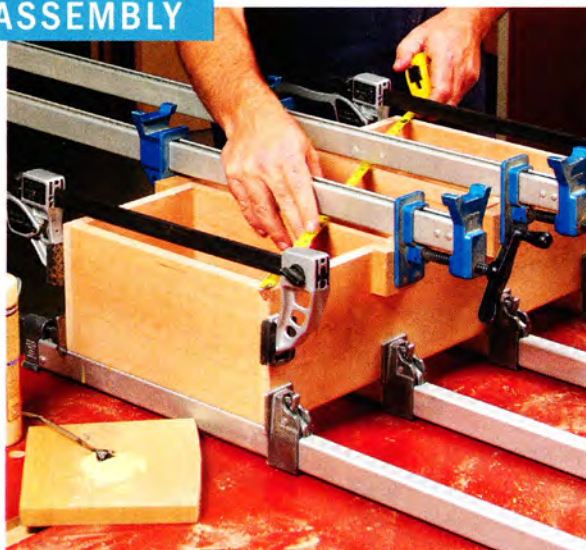
TIP

10-IN. TRICK



Measuring from mark to mark. If you start at the 1- or 2-in. mark when measuring from one pencil mark to another, you might forget to subtract that amount from your measurement. Start at 10 in. instead. That amount is hard to forget.

ASSEMBLY



Best tool for checking diagonals. When you assemble and glue up a case piece, it's important to measure the diagonals to check that it's square. A tape threads around clamps and cauls so you can make those measurements quickly and easily.

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Choosing a tape: My favorites are small and accurate

With all the bells and whistles that are available on measuring tapes these days, the most important feature for woodworkers is still accuracy. Good news: After testing every tape measure I could get my hands on, I found that the most accurate, most convenient tapes tend to be among the least expensive.

Manufacturers are always looking to build a better mousetrap. But most of the innovations that have come along—winged hooks, and extrawide tapes that can span long distances without drooping, for example—benefit contractors more than woodworkers. Likewise, the big, fat 24-ft. tapes and beyond are overkill for the woodshop. For me, the perfect tape is 16 ft., longer than the longest boards I find at the lumberyard but small enough to carry easily. You might get away with a 12-footer, but I avoid pulling my tape measure out to its limit, since it puts stress on the reel inside and can shorten a tape's life.

A great woodworking tape does just a few things very well. For one, it's accurate on the inside and outside of the hook, especially when tipped on its side to get the markings close to the work. (The big, winged hooks on contractor tapes often prevent the tape from lying on edge.) The hook should be easy to snag on the

end of a board, the lock should move smoothly and hold fast, and the marks and numbers should be easy to read. Tapes that read from right to left are much easier for righties than the traditional left-to-right tapes, as the easiest marking position is with the tape in your left hand, hooked on the right end of the work. I tried every tape I could find, and my favorites are among the least expensive. That means you can afford to keep a few lying around the shop.

I like a standard locking mechanism that locks only when you flick the switch, and stays locked until you flick it back. I avoid the ones that slide freely only when you actively hold the release button, because that lever gets in my way when I quickly hook and pull.

There are new tapes that lie flat and are made for woodworkers, but since I frequently use my tape to measure things that are out of reach, like the end of a 12-ft. board or the opposite corner of case piece, I prefer the traditional type that has the ability to support itself in midair.

All these features are useless, though, if the tape is not accurate. Fortunately, you can check its accuracy before you buy (see opposite page). —A.C.

STANLEY 16 FT.

No. 30-495; \$8.50, amazon.com

This tape was accurate, inside and outside, and the price is unbeatable. The first 12 in. of graduations are $\frac{1}{32}$ in., and $\frac{1}{16}$ in. after that. The angled hook makes it easy to turn on its side for inside measurements.

STANLEY POWERLOCK 16 FT.

No. 33-116; \$9, amazon.com

This metal-cased Stanley has a smoother lock than its yellow plastic cousin, and it has a protective coating added to the tape itself, but otherwise, they're the same. I own two, and they're both dead-on accurate.

STANLEY FATMAX 16 FT.

No. 33-716; \$20, homedepot.com

This extrawide tape is my favorite among the Stanleys. It's chunky, but the $\frac{1}{16}$ -in. markings are easy to read, even upside down. The hook is solid, offering more support when you angle the tape sideways.

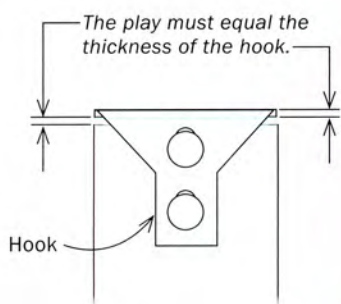


Does your tape measure up?

A tape measure should give accurate readings for both inside and outside measurements. Since quality can vary from one tape to the next, use a steel rule to check it for accuracy before you buy it.

PRECISION SLOP

The hook on the end of a tape measure wiggles for a reason, allowing precise measurements whether the hook is pushed or pulled.



Check the outside reading. When you're in the store, grab a good steel ruler off the shelf, hook the tape on the end, and verify that the lines match.



And the inside. Push the ruler and the tape against a stationary object to check whether the inch lines match when taking an inside measurement.

LEE VALLEY 12 FT.

Blindman's Tape; \$8, leevalley.com

This is the only right-to-left reading tape on my list—a great feature (L-R is available too). The giant numbers are easy to read, and each mark comes to a sharp point, so accuracy is not sacrificed for readability.



STARRETT EXACT 16-FT.

No. TX34-16; \$9, mansontool.com

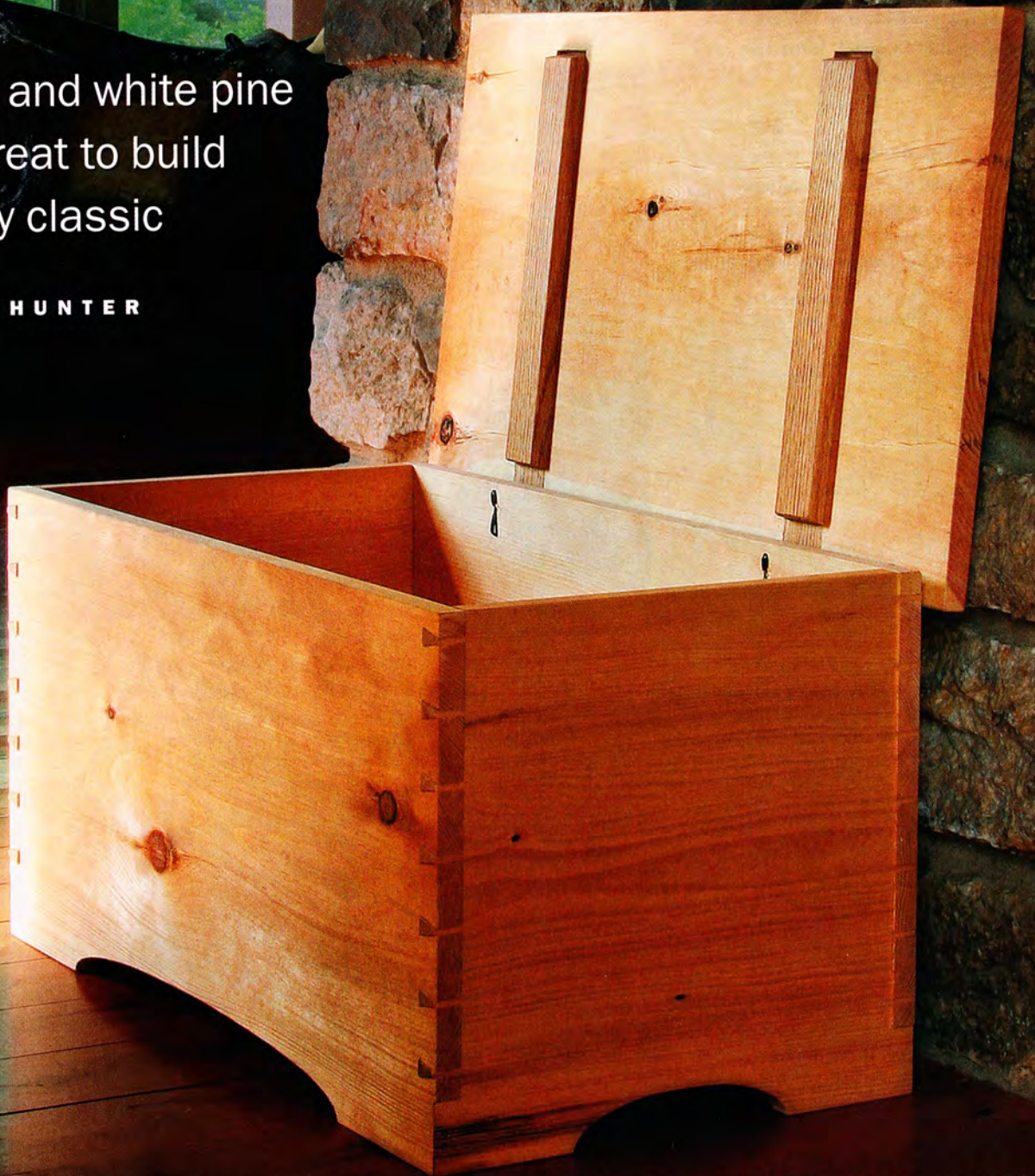
This is a great tape for woodworking, with dead-on accurate readings in any position, a matte finish that reads well in any light, and $\frac{1}{16}$ -in. marks all the way to the hook. The first foot has $\frac{1}{32}$ -in. marks, too.



Blanket Chest by Hand

Hand tools and white pine make it a treat to build this country classic

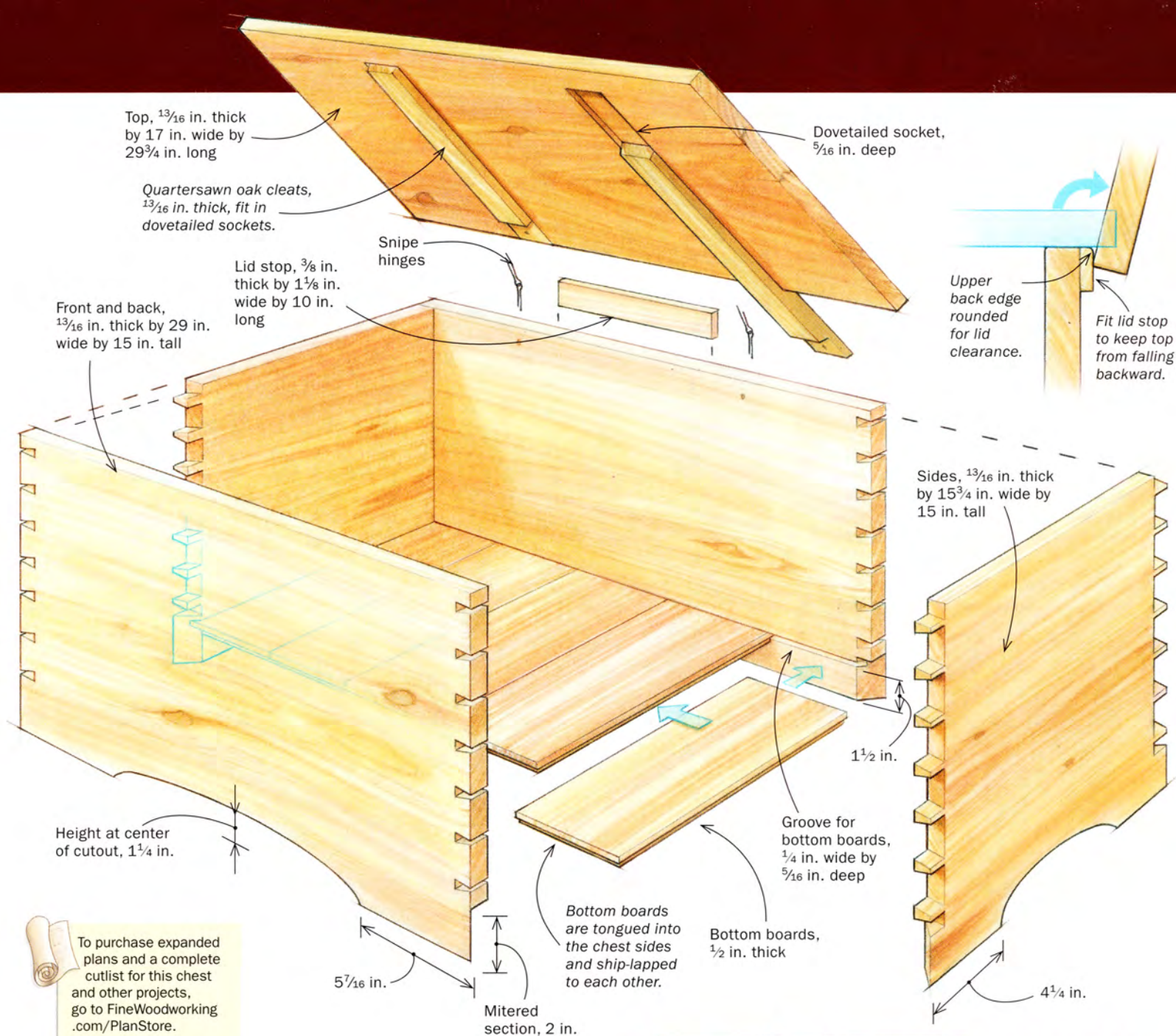
BY ANDREW HUNTER



Trends in furniture come and go, but Early American country furniture endures. Country pieces, with their simplicity and practicality, can find a home in any setting, from an 18th-century farmhouse to a New York City loft. The clean, unpretentious designs, born of necessity, have an honesty that gives them lasting beauty. But for a woodworker, the real beauty of country furniture is in the making. Everything from fine dovetails to clinched nails is appropriate as joinery, and eastern white

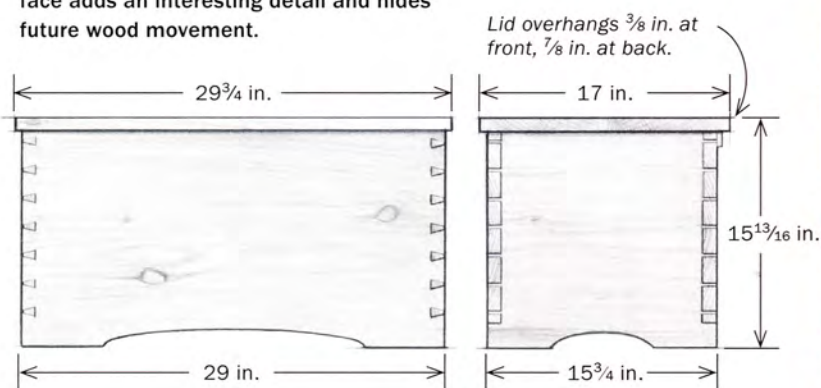
pine—the wood of choice for so much Colonial furniture, and my choice for this chest—is a dream to work.

Country designs are ideal for building solely with hand tools, and the classic six-board chest is a great project for developing your skills. It is small enough not to overwhelm yet chock-full of enjoyable joinery. One can work without the pressure to be perfect. Imperfections and stray tool marks in a country piece only add to the feeling of authenticity. Although I'll demonstrate



DOVETAILED PINE BLANKET CHEST

Leaving the dovetails $\frac{1}{16}$ in. proud of the face adds an interesting detail and hides future wood movement.



Drawings: Bob La Pointe

START WITH THE GROOVE



After milling and cutting the boards to size, begin the chest by cutting the groove for the bottom boards. A grooving plane makes short work of the task. Then create the cutouts at the bottom of the chest, sawing close to your layout lines with a bowsaw or coping saw and smoothing the surfaces with spokeshaves and chisels or files.



Dovetails by hand

These protruding dovetails also have a short miter at the bottom, giving the chest a clean base section.

1. LAYOUT



Mark and score. Hunter lays out the dovetail pins with a mechanical pencil and a sliding bevel, then scores along the baseline, in the waste areas only, with a marking gauge (right).



Mark the miters. When you lay out the 45° miters on all four boards, begin at the baseline. The miter's tip should end $\frac{1}{16}$ in. shy of the end of the board. The dovetails need the extra length, since they're proud.

2. PINS COME FIRST



Rip the pins. Hunter saws just shy of his layout line, then pares right to it, leaving the line for reference.



Chop and pare. Chop away the waste between the pins with heavy blows, leaving $\frac{1}{16}$ in. or so along the baseline. Follow with paring cuts, starting with the tip of the chisel in the score line. Work from each face of the workpiece toward the middle to avoid blowout.

using only hand tools, you can choose your battles depending on the skills you have or wish to develop.

Preparing the boards

My father and I sawed up a large white pine tree 10 years ago, and I've made a number of country pieces with those beautiful planks. But even though pine is my preference, any locally abundant, easily worked wood fits the bill for this project. And while I had the luxury of using full-width boards for my chest, you can always glue up narrower boards if wide boards are not available, matching two boards to look like one or simply using random boards for an uncalculated country look.

I milled all the stock for my chest with hand tools. Of course, you could mill your wood with a jointer and planer instead, and begin the hand-tool work after that. Once you have straight, flat boards, rip and crosscut the four main boards and the lid to their

final dimensions. But leave the bottom boards and the lid cleats wide and long for now.

Construction work begins at the bottom

Start the joinery by laying out and cutting the grooves for the bottom boards and the cutouts that form the feet. Locate the grooves in the mitered section of the corner joints, so they can be through-grooves, which are much easier to cut. Plow these grooves before you make the cutouts so you still have the bottom edge of the sides to use as a reference surface. I used a grooving plane with a fence for this job. Alternately, you could use a panel saw with a guide block and a chisel.

Next come the arched openings. To lay them out, I made templates cut from cereal-box cardboard. I first drew a number of curves freehand, and when I had one I liked, I made a template from it. To be sure the two ends of the cutout were mirror images,



3. TAILS FOLLOW

Two-step layout. With the pin board simply standing along the baseline on the tail board, Hunter makes a short pencil mark inside each pin cheek. Then he removes the pin board and extends the marks with a sliding bevel.



I made the template for just half the opening and used it to lay out both sides. I cut out the curves with a bowsaw and followed it up with spokeshaves and chisels to smooth the cut and fair the curves. You could use a coping saw, or even make multiple relief cuts with a handsaw and chisel away the waste. The best tool is the one you have—making do goes along with the country theme.

Story pole simplifies joinery layout

Accurate layout is the most important part of the project, and I try to focus all my attention while I'm doing it. After that I can relax a little and just enjoy working wood—all I have to worry about is not going over the lines.

Start by laying out the baselines for the dovetails on all four boards in pencil with a sliding square. Because the dovetails will be proud, set the square to the thickness of the stock plus $\frac{1}{16}$ in. Leaving the dovetails proud is not just an aesthetic choice. Over time, as the wood moves, joints that are cut flush don't stay exactly that way, and protruding joinery will accommodate any such changes. With the baselines marked, locate the pins and the mitered foot with a story pole. Using a story pole will ensure that all four corners of the chest are laid out identically.

I drew the pin cheeks using a bevel gauge set to about 14° . Then I used a marking gauge to score the baseline of the pins. The tail layout waits, since you'll trace the tails from the pins. Take care when laying out the mitered foot—because the dovetails are proud, they'll extend $\frac{1}{16}$ in. past the point of the miter.

Create the dovetail pins

I used a Japanese rip saw to cut the cheeks of the dovetail pins, but of course a Western saw will get the job done, too. I cut the dovetails while sitting on a stool with the board lying on my bench. This puts the workpiece at eye level for great control of the cut.

With the cheeks sawn, begin chopping away the waste between the pins, chiseling about $\frac{1}{16}$ in. from the scored base-



Saw, chop, and pare. Saw close to your lines, and then chop out the waste, staying away from the baseline. Last, pare to all of your layout lines.



4. MITER THE FEET

Cut all of the miters now.

Cut the mitered faces first with a rip saw. Then saw in from the side to cut the waste free. Use paring cuts with a chisel to clean up the miters, and fit one to the next.

Assemble the case

After a few final steps and a dry-fit, you can glue up the whole case in one shot.

PREP THE PARTS



Final touches before assembly. With all the joinery cut, Hunter creates a glassy finished surface with light passes of a Japanese smoothing plane (left) and chamfers all exposed edges.



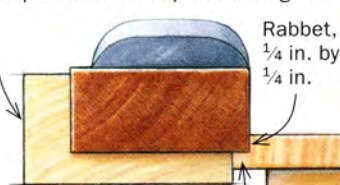
Tiny chamfers are a big help. Chamfered edges give the proud dovetails a distinctive look and also make assembly go more smoothly.

RABBET THE BOTTOM BOARDS



SHOPMADE RABBET FENCE

Scrap of solid wood notched to fit rabbet plane is held in place during cut.



Rabbet, $\frac{1}{4}$ in. by $\frac{1}{4}$ in.

Rabbet plane overhangs notch in fence by $\frac{1}{4}$ in.

Quick rabbets. To cut the tongues and shiplaps on the bottom boards, Hunter fits his rabbet plane with a simple shopmade fence. To prevent tearout on cross-grain cuts, he scores the workpiece with a marking gauge.

line. Be sure the workpiece is well supported beneath, since any give will steal force from the chisel blow. Working in soft wood, such as pine, there's a greater tendency for end-grain tearout. To minimize it, use low blade angles on sharp chisels and give firm blows, working from both sides toward the middle. To protect my bench, I support the board at both ends on scraps of $\frac{1}{4}$ -in. plywood.

After chopping close to the baseline, pare away the rest of the waste, inserting the chisel point into the scored line. Then pare the cheeks, working up to the pencil line but leaving it as a reference.

Pins generate the tails

To trace the pins, lay the tail board on the bench with its outside face down. Then stand the pin board along the tail board's shoulder line. If the pin board has any cup, use a caul and clamps to keep it straight while you are tracing. The joinery will keep the boards flat after assembly.

With the pin board in place, make a short pencil mark to register the location of each pin. Then remove the pin board and use the bevel gauge to complete the lines. Use a square and the bevel gauge again to transfer the layout to the second face. When you've finished the layout on all four joints, saw the tail cheeks. Then use a narrow chisel to chop close to the baselines. Because the space between the tails is so narrow, I used a narrow chisel, tapped into the end grain, to split the waste so I could remove it as I chopped. After paring to the baselines, pare the cheeks as well.

The last part of the joint to be cut is the mitered section at the foot. First, with the workpiece clamped so the feet are pointing

GLUE UP THE CASE



Knock home the ends. After applying hide glue to the cheeks of the pins, Hunter hammers home the joint. Then he installs the bottom boards. Scraps of $\frac{1}{4}$ -in. plywood under the case accommodate the through-dovetails.



up, make the angled crosscut. Then clear the waste with an angled ripcut. Clean up the sawcuts by paring with a chisel.

Getting ready for glue-up

Before test-fitting the corner joints, put a slight chamfer on the ends of the pins. Go slow with the test-fitting, using light blows and a scrap block to protect the project. If the going is tough, separate the parts by hammering down on the tail board, check for excessive denting, and pare where necessary. When you've made the bottom boards, dry-fit the case to see that they are a good fit.

Once all the parts are fitted, disassemble the chest and use a smoothing plane set very fine to put a finished surface on all the parts. Then plane a small chamfer on the exposed edges. Handplaning the surfaces was my final finish—I didn't apply any coating. The sheen of the wood is from the keenness of the plane blade, and the lustrous surface will attain a rich patina over time. Dents, scratches, and stains will attest to its years of usefulness.

Bringing the box together

Assemble the chest with a bit of glue on the pins only, and try to keep any squeeze-out to the inside where it can be cleaned with a chisel after it dries. I used hide glue, which gives me more time for assembly and also means that in the future parts can be reglued, since new hide glue will bond with old.

I did the glue-up with the back of the chest lying facedown on the bench. I fit the two ends to it, and then fit the bottom boards. I didn't use any glue on the bottom boards, although you could put a dab at the center of each one, as long as you ensure there's a gap between them to allow for seasonal movement.

Put a lid on it and add appropriate hinges

Two quartersawn hardwood cleats in dovetailed sockets keep the chest's lid flat yet allow for seasonal movement. To excavate the



Proud and square. Seat the joints with a scrap block placed just inside the pins. Then measure the diagonals to check for square (below). If necessary, pull the chest into square by lightly clamping from corner to corner.

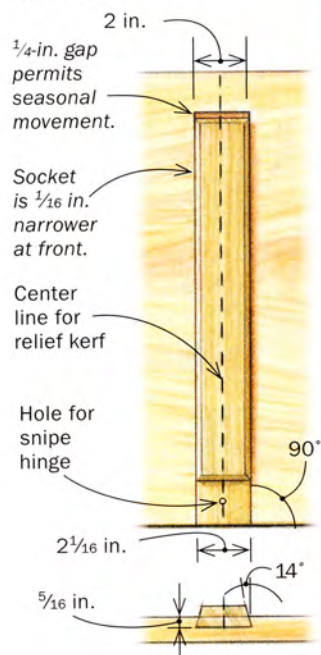


Top it off

Tapered dovetailed cleats are the backbone of the lid. Simple snipe hinges are its elbow joints.

CLEATS KEEP THE LID FLAT

CLEAT SOCKET LAYOUT



Cleats fit in a dovetailed socket. The socket, tapered slightly along its length, is 1/16 in. wider at the back of the lid than the front.

sockets, I started with a saw and finished with chisels. I used a Japanese panel saw, which has a convex head, enabling me to start a cut in the middle of the board.

After sawing, clean out the waste with a long chisel or a router plane. Then plane the cleat to its layout lines and test the fit in the socket. The cleat should stop 1/4 in. before the closed end of the socket to allow the lid to move with the seasons. Hammer the cleat home and mark it to length. Also mark where the back edge of the cleat will need to be relieved to allow the lid to sit flat. Remove the cleat one last time and make the two cuts. The cleat, which gets no glue, is fixed at the back end by the snipe hinge.

Cotter-pin or "snipe" hinges, common in Colonial furniture, are a simple way to attach the lid, and they function quite nicely, with the added benefit of securing the cleats. You can make them from 1/8-in. steel rod or simply use cotter pins from the hardware store. To install the hinges, drill holes where the back and top meet, centered on the cleats. Loop the cotter pins together and slide them through their holes. With pliers, fold the tips outward 90°. Then hammer each leg over, supporting the blows from below. □

Andrew Hunter builds furniture in Accord, N.Y.



Automatic angle. A block of scrap cut to a 14° angle guides the saw to cut the dovetail socket. Hunter draws a line on the sawblade with an erasable marker to gauge the depth of cut.



Rough removal. Working toward himself with the bevel down, Hunter chisels out all the waste, first on one side of the central relief cut, then on the other.



Out comes the long chisel. Hunter flattens the bottom of the cleat socket with a long, wide paring chisel. He checks his progress with a straightedge.

CREATE THE CLEAT

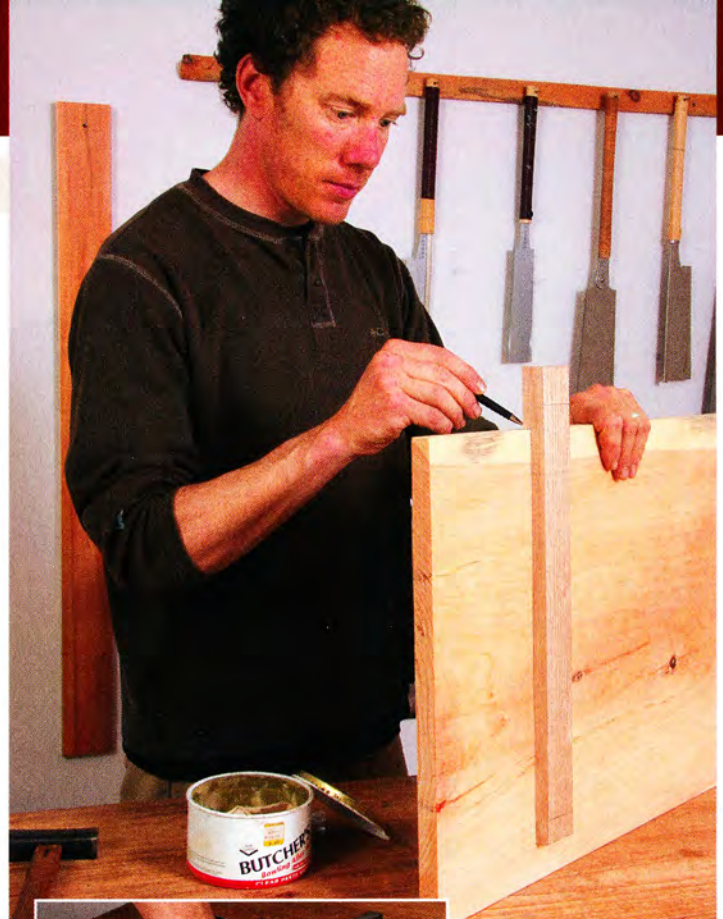
Angled guide block produces the cleat angle.

Hunter bevels a scrap block at 14° and uses it like a shooting board to angle the sides of the cleat. He makes the cleats from quartersawn red oak for maximum strength and stability.



Drive it home.

Adjust the fit of the cleat until you can drive it in with moderate hammer blows. Wax helps. Leave a 1/4-in. gap at the front end of the socket to allow for seasonal movement of the lid.



Trim the cleat. When you are satisfied with the cleat's fit, mark it at the back edge of the lid and cut it to length. Then remove it and cut a notch (inset) so the last section lies flush with the lid.

INSTALL THE HINGES

DRILL AT ANGLES

Rabbit in cleat, 1 3/4 in. long, allows lid to lie flat.

Both ends of cleat are cut at 70° to help seat lid on chest.

Chest back

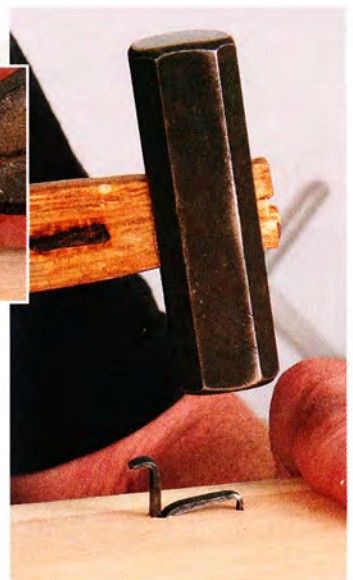
One leg of hinge passes through the cleat, keeping it in place.



Drill for the hinges. Snipe hinges—two linked cotter pins—suit this chest. With the lid weighted, drill an angled hole up through the cleat and lid. Then remove the lid and drill the other hole through the back of the chest.



Clinch the deal. With the pins linked, push one through the back, the other through the lid. With the lid closed, use pliers to crimp the ends of the lid pin and clinch it with a hammer. Then open the lid and crimp and clinch the mating pin.



Online Extra

To watch Hunter make a snipe hinge, go to FineWoodworking.com/extras.

Get Smooth Surfaces,



Over the years, I've worked with everything from buttery mahogany to the most challenging figured maple, and in that time I've developed a straightforward system for getting a beautifully tearout-free surface—no matter how twisted the grain or wild the figure.

Getting silky-smooth results quickly, regardless of the species of wood, isn't magic. Part of the game is to keep tearout from showing up in the first place. But when it does rear its head, you need to know what to do.

Smart machine work minimizes tearout as you mill flat, square, and straight surfaces on rough lumber. Handplaning smooths those jointed, planed, and sawn surfaces quickly, while keeping them flat. A scraper is the perfect weapon for attacking any isolated spots of remaining tearout. And finally, sanding polishes everything, leaving a stunning surface that's ready for finish. That's the process, and you can rely on it with almost any wood, provided you approach it systematically.

Milling matters

Good surface prep starts long before you break out a handplane. If you introduce a

Rough to smooth, in three key steps

1

Mill smart

Smart machine work keeps tearout to a minimum, which means you'll spend less time on handwork.



2

Remove machine marks

A sharp, well-tuned smoothing plane makes quick work of defects like mill marks and tearout, while preserving that flatness you worked so hard to create at the milling stage.



Even on the Wildest Woods

ton of tearout in the milling process, you'll be chasing it the rest of the way.

The most important tip is to keep your machines well-tuned and, above all, sharp. Also, as you're selecting and roughing out your stock, build in extra cushion for every part, in every dimension. This will come in handy later, when you need an extra pass on the jointer, planer, or tablesaw to get rid of unexpected tearout.

After the workpiece is cut to rough length, look at the edges to determine the way the grain is running through the board. Draw an exaggerated line on both edges indicating the overall grain direction.

Test your read of the grain by running one face over the jointer. If there's excessive tearout, flip the board and run it the other way. If tearout persists, make sure you're not feeding the board too fast. Faster feed rates result in fewer cuts per inch; when you push a piece of stock quickly over the knives, you're asking them to remove more material per swipe, which creates wide mill marks and increases the chances of tearout.

After flattening one face on the jointer, mill the opposite face using the thickness planer. If your planer offers variable feed rates, set it to the slowest speed.

How one pro heads off tearout at every pass

BY MATT WAJDA

Because I tend to get better results with the planer than with the jointer, I try to leave myself enough extra thickness so I can run both sides of my stock on the planer, leaving less tearout to deal with by hand.

After milling the faces, the usual next steps are to joint one edge, then trim the opposite edge to final width at the tablesaw. But if you are getting tearout no matter which way you run an edge on the jointer, just plan on trimming both edges on the tablesaw. Sawn edges don't tear out because the blade is cutting parallel to the long fibers, not perpendicular to them like the jointer and planer. This is where that extra width comes in handy.

Be sure to replace your grain direction marks on the edges.

Cut joinery now—In most cases, before working surfaces with hand tools, you should lay out and cut all the joinery first. Handwork can be inconsistent, changing overall thicknesses, and even tapering boards a bit. One exception to this rule is dovetails. If you handplane the inside faces after the dovetails are cut, you will create gaps between the pins and tails.

Handplanes are faster than sandpaper

Some woodworkers are content to move from the machine to a random-orbit sander to remove tearout and milling marks. I start with my smoothing plane for two important reasons. It's much faster than using a sander, and it maintains those flat surfaces you worked so hard to get on the machines. Flat surfaces simply look better under a finish.

Any smoothing plane will do (no. 4, 4½, bevel-up, whatever), but it needs to be sharp. One pass with a dull or poorly tuned plane can cause much more tearout than it removes.

Plane the faces first, following your grain-direction marks on the edge. Don't look for a full shaving on the first pass. Instead, advance the blade little by little until it barely engages the work, just



3

Troubleshoot and polish

Light sanding is all you'll need to get rid of any handplane tracks. If there is any tearout left, judicious scraper work is the fastest way to eliminate it.



1

Milling: Get flat and square with

Work in the right direction and make sure your blades are sharp. Also, build in some extra cushion in each dimension during rough layout. That way you'll have room to re-mill a face or rip off a torn-out edge if you misread the grain.

clipping the tops of the ridges left by the machines and hitting some other high points. The goal is a continuous, very thin shaving that's wispy and almost translucent.

Overlap consecutive passes by about $\frac{1}{2}$ in. Once you have removed all the mill marks and are getting continuous shavings everywhere, stop, even if some isolated tearout remains. The light tracks left by the handplane are OK. They'll be removed in the next steps.

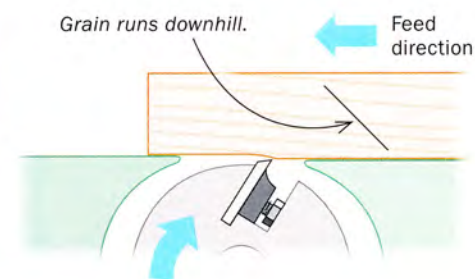
Scrape away any lingering tearout

If I've successfully removed all the tearout and milling marks with my smoothing plane, I go straight to light sanding. But if isolated spots of tearout remain, I pick up my card scraper. A scraper has a higher cutting angle, which means it's virtually impossible for it to create more tearout. But it must be wielded carefully, since it can quickly create hollows in the surface that will be apparent under a finish.

For a scraper to work correctly, it needs a fine burr on its edges, and to get that burr those edges need to start out flat, square, and polished. My other tip is to roll the burr at not more than 5° . This keeps the scraper nearly perpendicular to the work, and lets you push it with forward pressure, rather than downward pressure. This helps control the depth of cut. If the scraper is producing dust, not fluffy shavings, re-sharpen it. (For more great tips, see Handwork:

JOINTING WITH THE GRAIN

The jointer cuts from below, so where possible you want the grain to run from high to low as you cut. A pass in the other direction here would create major tearout.



JOINT ONE FACE FLAT

Mark the grain direction. Before you start milling stock, read the grain's direction and mark the edge with an exaggerated slash, so you can refer to it at a glance.



The right depth of cut. Just a hair more than $\frac{1}{32}$ in. (inset) is about right. A heavier cut encourages tearout, and a lighter one can cause the jointer's blades to burnish the surface instead of cutting, which dulls the blades. Grain can be deceiving, so if you get excessive tearout, flip the board and run it the other way. Don't forget to change your reference mark on the edge of the board.

less tearout

PLANE TO THICKNESS



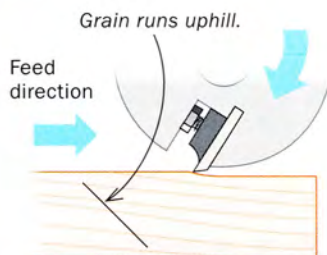
Take it slow. If your planer has speed controls, turn the speed down as low as it will go. Slowing the feed rate increases the cuts per inch, reducing the appearance of machine marks and discouraging tearout.



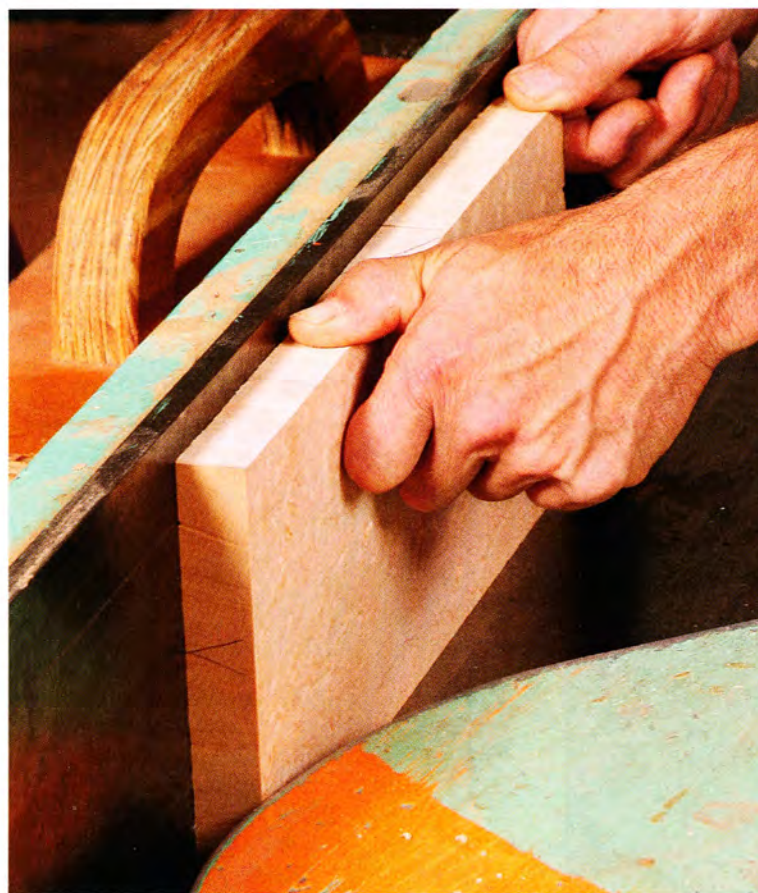
Plane both sides. Wajda finds that his planer produces less tearout than his jointer, so he factors in enough extra thickness to plane both sides of the board.

PLANING WITH THE GRAIN

A planer's knives are oriented above the board, not below it like on the jointer. So for the cleanest results, the grain should run from low to high as it passes through the machine.



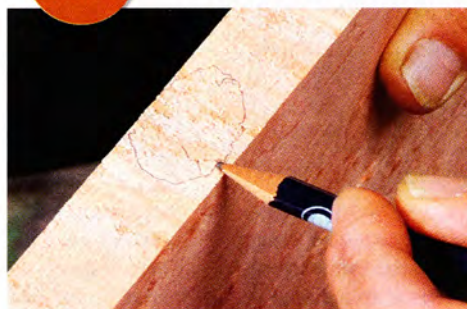
JOINT AND RIP TO WIDTH



Establish an edge. With the faces complete, establish your first square edge at the jointer. If you've left some extra width, you don't have to worry about tearout, because you can remove it at the tablesaw (right).

TIP

TABLESAW TAMES TORN-OUT EDGES



Still got tearout? If the edge grain tears out no matter which direction you run the board, don't worry.



Trim the opposite edge. Even with tearout, the jointed edge is flat and can be used as the reference at the tablesaw. Trim the opposite edge while removing as little material as possible.



Trim the jointed edge too. Now flip the board and rip it to final width. The tablesaw will not create tearout, even on the wildest woods.

2

Plane away machine marks

Coming off the machines, your stock is flat and square, but it's not smooth. It has scallops on the faces from the planer's knives, saw marks on the edges from the tablesaw blade, and, with tricky woods, it probably has significant tearout. A sharp, well-tuned handplane is the best tool for removing all these surface defects.

"The Right Way to Sharpen Your Scraper," *FWW* #227.) If you can't get the hang of burnishing a scraper, no worries—you can always move right to sanding at this point.

Go after the worst spots first, working with the grain. Start directly over the tearout, then blend the surrounding area as you go. A card scraper will make the workpiece less flat, and it's easy to become fixated on one spot. So remember that the surface must be feathered out from where the most material has been removed, to avoid leaving an obvious hollow. When treating a spot that's $\frac{1}{32}$ in. deep, for example, I'll feather it out over at least 6 to 8 in. I don't recommend using a

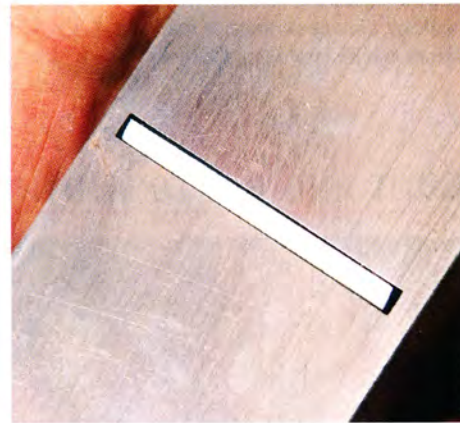
SOUP UP YOUR SMOOTHER



Fine-tune the chipbreaker. The chipbreaker stops the blade from chattering during the cut. To do its job well, it must mate seamlessly with the blade, about $\frac{1}{32}$ in. back from the edge.



Advance the frog. To minimize tearout, the plane's mouth must be closed down to about $\frac{1}{64}$ in. You can do this by advancing the frog or installing a thicker aftermarket blade.



Tighten the mouth. The tighter the mouth opening, the better the shaving is held down right ahead of the cut, preventing tearout.



The sound of success. Take a very light cut, advancing the blade until it just engages the work. On your first pass, you should hear a distinct "zip" sound, indicating that the blade is just clipping the tops off the ridges left by the planer.

TIP

TRY GOING CROSS-GRAIN



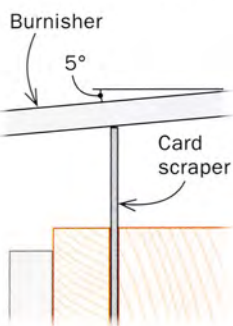
If the grain is tearing out no matter what you do, re-hone the blade and try planing across the grain. This leaves a rougher surface than going with the grain, but it won't create tearout.

3 Fine-tune for a flawless surface

With handplaning complete, the milling marks and most of the tearout should be gone. Isolated tearout likely remains, along with fine track marks left by the smoothing plane. If there's tearout, turn to a scraper first. If not, go straight to sanding, which leaves a uniform surface that's ready for finish.

SCRAPE AWAY TEAROUT

Turn a fine burr. A burr that's 5° or less lets you scrape in a more vertical position, which is easier to control.



Fluffy shavings, not dust. Concentrate pressure forward instead of downward. The card will flex less and create a wider, shallower footprint, making it harder to create noticeable hollows. Start on the worst tearout and feather out from there. Then make passes over the whole surface.

THEN SAND



Sand by hand. For small surfaces like this drawer front, Wajda sands by hand, starting with P150 (120 if the surface is rough from planing cross-grain), working up to 220. For larger surfaces, he uses a random-orbit sander.



Missed some tearout? Sanding dust will fill tearout you overlooked earlier (inset), making it stand out. Depending on how deep it is, Wajda might go back to the scraper (right) or even the handplane (be sure to brush away the dust and loose abrasive first), and then work back through the process.



scraper on narrow edges. It will be too hard to control.

Sanding creates a uniform surface

For relatively small surfaces, I always sand by hand, starting with P150 grit and moving up to at least P220. On large flat surfaces, I do save time by using a random-orbit sander, but there are keys to success. Let the sander's weight provide all the downward

pressure, and always attach a shop vacuum to remove dust efficiently. The abrasive will work better and won't leave the telltale sander swirls created when excess dust accumulates under the disk.

For hand-sanding, don't use your hand alone. Instead, wrap the paper around a piece of 3/4-in. plywood with cork glued to one face. Sand in the direction of the grain and work in systematic, overlapping

strokes. When the grit isn't changing the surface anymore, move up to the next grit.

Take the time to learn these skills, use a systematic approach, and you'll get flawless surfaces on the wildest woods—and take your furniture to a new level. □

Matt Wajda owns River City Furnituremaking in Rollinsford, N.H., and teaches at North Bennet Street School in Boston.

Develop Your Own Designs

A step-by-step process unlocks your creativity

BY MICHAEL FORTUNE





For many furniture makers—even those with advanced technical skills—design is the most daunting aspect of the craft. Learning to design can seem intimidating, even mysterious. But there's no magic involved. Anyone with the desire and a little perseverance can be creative. In fact, the overall concept for a piece of furniture can be discovered and its details beautifully resolved by walking through a series of simple steps. When strung together, these steps form a dependable design process. The more you use it, the more intuitive it becomes.

Whether I'm designing a chest, a chair, a bed, or a bench, I follow the same steps. I always generate multiple options to choose from—the more the better. To keep the ideas flowing fast, I focus only on the visual aspect of the pieces at this point and figure out how to build them later. This approach has the great benefit of forcing me to explore new woodworking techniques, which makes the work more fun and adds arrows to my quiver for future designs. Along the way, I discard nothing, so with each project I add to my idea bank, building up a repository of sketches, models, photos, and techniques that I'll draw from for the rest of my life.

Here are the seven basic steps:

1. Identify and analyze—I start my design process by identifying what I want to make—a chair, a cabinet, a built-in bench—and analyzing the hard constraints on the piece: what functions it will serve, what space is available, and the requirements of weight, stability, and traffic around it.

2. Set the goal—I clarify what I want from the piece aesthetically and technically. Do I want a completely new design, or something to match an existing style? Do I want to learn new techniques? Work with specific materials? Is the priority function or appearance? Or are the two equal?

3. Generate ideas—This is the fun part—and it's the heart of the matter. The key is to generate as many ideas as possible, either on paper or in model form. The tools can include transparent paper and a soft pencil for doodling and drawing, and whatever else works for making quick models: wire, foam, MDF, softwood, Popsicle sticks, and straws.

4. Select—Withhold judgment on your ideas for a couple of days. Then give them a careful review and pick one. The trick here is to make a decision and proceed. Remember that you can make any of the other ideas at a later date. If you procrastinate, you don't learn anything.

5. Build—Make a full-size mock-up if you need one, but make it quickly and cheaply. You're looking to refine the proportions of the piece, not work out all the details. Then make a full-size drawing to determine the details of joinery. Proceed to construction of the real piece.

6. Document—While you're building the piece, take photos and make sketches and notes to document the process. Add them to a file with all your design sketches for the piece, along with photographs of the models and mock-ups.

7. Evaluate—When you've built the piece, always review the steps you took and look for ways to make the process more enjoyable and productive. Next time you design, revisit the files for successful pieces to see how their designs developed.

Read on to see how several of my own pieces evolved using this simple step-by-step process.

Michael Fortune has been designing and building furniture since 1974.

Sideboard sprang from scale models

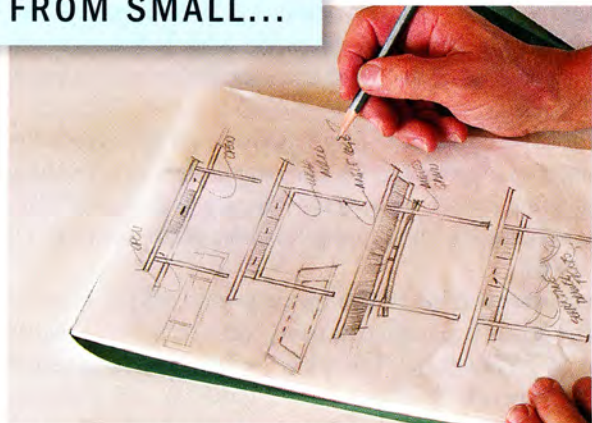
I designed this sideboard for a house from the 1920s with an Arts and Crafts feel to it. I began making sketches with elements that characterized that style: parallel lines, flat planes, right angles. I quickly ended up with boxy forms, so I deconstructed the boxes into Ls and began playing with them on paper.

I always sketch on semi-transparent paper so I can lay one doodle over another and quickly generate variations. I purposely use a thick, soft pencil so the sketches can't get too detailed.

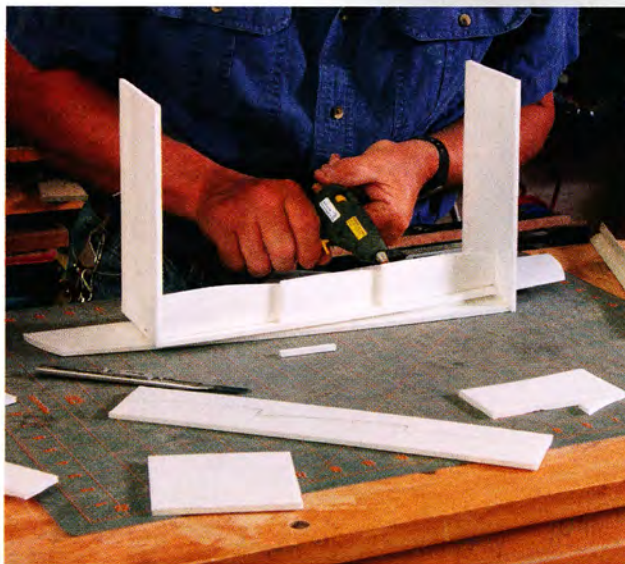
As it turned out, the doodles in my sketchbook didn't allow me to easily explore the flat planar shapes that I wanted, so I switched to models. I used Foamcore, which is inexpensive and simple to work with. Rather than just making interesting shapes that may or may not translate into a practical piece of furniture, I work with $\frac{1}{4}$ -scale models. Foamcore is perfect for this because at $\frac{1}{4}$ in. thick it approximates 1-in.-thick stock or multiples of an inch.



FROM SMALL...



Design journey begins on paper. Fortune starts a project by generating dozens of alternate ideas for the design, working quickly in broad strokes and avoiding details in favor of rough outlines. He uses a heavy pencil and light, transparent paper so he can easily trace an idea he likes and alter it.



Foamcore makes fast models. Fortune often brings drawings for case pieces and tables to life in Foamcore. With a mat knife and a hot-glue gun, a model goes together in minutes, enabling him to see a range of ideas in three dimensions.



The creator is also the critic. To open the channels of creativity, Fortune makes a flood of drawings and models for each project. He photographs each model, waits a few days to gain some objectivity, and then evaluates the models one by one. The cutout figure provides a sense of scale.



...TO FULL-SIZE

Does the idea hold up full-size? After selecting the design he likes best in model form, Fortune builds a full-scale mock-up. For this sideboard he made a mock-up in flakeboard. A solid-colored blanket allows him to see the shapes more clearly.

I avoid making decisions too quickly. Instead, I want to generate a volume of shapes to choose from. For that reason I never destroy one model to make another. I also don't worry about how I am going to make whatever is emerging in model form. Figuring out how to make a piece I'm excited about is part of the fun.

I always photograph the models. Then, after letting a few days pass, I review the pictures on my laptop. Two things typically happen with a bit of time passing. An idea that initially appeared strong will drop out of favor, and an idea that seemed so-so will propel me in an interesting direction.

Because I work quickly and loosely, ideas always come up that aren't appropriate for a particular piece. But I don't discard them—they can often be developed for a different project at a later date. I've used ideas 25 years later—all because I've kept a good record. The design session for this sideboard, in fact, also produced the idea for the piece on the back cover.

Eventually, as I look at the models, a preference for a particular design begins to emerge. That's when I'll move to building a full-size mock-up. It's at the mock-up stage that I refine the proportions. On this sideboard, I knew from the beginning that the maximum width was 14 in. and the height would be about 33 in. Length was the element that I could play with. So when I'd built a flakeboard mock-up, I began sliding the two parts of it together and apart, all the while keeping my eye on the space created between the legs. When the legs were close together, the table appeared heavy; as I slid them apart, the whole piece seemed lighter and the overlap, a main design feature, was emphasized.

To this point I'd avoided thinking about details so that I could focus on the overall shapes and proportions of the piece. But

CUT WITHOUT CUTTING



When he wants to explore alternate shapes on a mock-up, Fortune often uses black tape (or black felt-tipped marker, for small areas) to create the illusion of negative space. Here, he used tape to see how curved tapers on the legs and top would look.

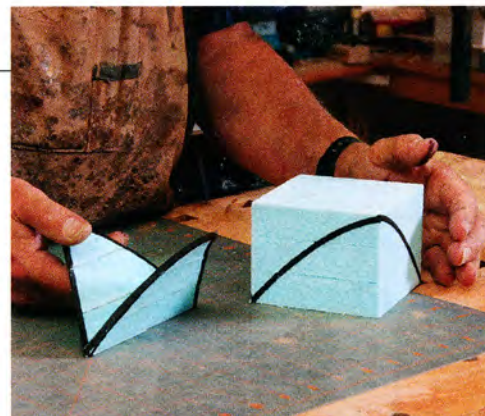


Fitting it out full size. After shifting the two halves of the mock-up in and out until he found the amount of overhang he liked, Fortune used a scrap of $\frac{1}{4}$ -in. MDF, quickly bandsawn to shape, to represent drawer fronts. He used a felt-tipped marker to draw reveals between the drawers.

now the details began to emerge on the mock-up. I noticed that it was easy to catch your foot on the straight-sided legs as you walked close by. The solution there was to taper the ends toward the floor. To try a few different tapers, I applied black tape on the parts that I imagined cutting away. This creates the illusion of negative space and allows you to "see" a shape before cutting it out. Then I mocked up the drawer fronts in $\frac{1}{4}$ -in. MDF.

When I was pleased with the mock-up, I resolved all the construction details on a full-size working drawing. As I made the drawing, I had to think through each aspect of the piece, resolving all the joinery and detailing. That done, I could size all the parts and cut the joinery with confidence.

Coffee table came from a cube



Drawing in 3-D. Fortune discovered an interesting shape by connecting the corners of a foam cube with curving lines. He carefully cut along the lines on the bandsaw and loved the butterfly form he found inside.

Another example of my design process, which resulted in one of my favorite pieces of furniture, began with a block of rigid foam and a felt-tipped marker, went through MDF models, and led to a mock-up in pine.

Having some parameters imposed by a client or a site often makes the designer's job easier. But in the case of this table it was all up to me. There were very few functional requirements, and I could use any materials or style I chose. I just needed to design an interesting base to hold up a glass top.

When I'm drawing a difficult shape, I sometimes start by defining the space the piece will fill by drawing a cube (or a rectangular solid). Then I make my sketch within the cube. In this case, I took that technique from the drawing board to the bandsaw. I cut some solid geometric shapes out of foam, then drew lines with a marker right on the shapes. I discovered that if I connected the opposing corners of a cube with a curved line I got an interesting wing shape. I carefully cut that out of the foam block.

Then, to see what the shape would look like as frames rather than planes, I made models in $\frac{1}{4}$ -in. MDF. I made a big batch of them and hot-glued them together in various configurations. When I had an arrangement I liked, I moved to a full-scale mock-up in pine. There I worked out a stepped detail that provided excellent shadows and highlights.

Over the years, I've made these tables many times in a variety of woods. Better still, I've used the stepped detail in completely different objects. So the time I spent in the design process has been rewarded many times over.



A little MDF goes a long way. Fortune cut short, curved pieces from a small scrap of $\frac{1}{4}$ -in. MDF and hot-glued them together to make these models. He made extras and tried various groupings until he found the linked pairing he settled on.



Full scale for detail. Rather than fussing with fine detail on a model, Fortune switched to a full-scale mock-up in pine to explore a stepped arrangement he had in mind for the table.

Some designs go straight to mock-up

Much of my furniture is time-consuming to make. But in designing this blanket chest, which was part of a suite of dorm-room furniture, I wanted to work with simple shapes that would be quick and easy to produce.

The big wall of books in my office is a reliable spur to my design process. For this chest, some quick browsing there revealed several furniture styles that I could draw inspiration from: Pennsylvania Dutch, Québécois, and Mission. With books around me and ideas beginning to percolate, I began sketching.

Rectilinear shapes are easy to make, but they aren't very interesting. So I played with angling the ends and sides of the chest, creating a slight hopper shape and avoiding the mass-produced feeling of a squared-off piece. Because the chest's shape was so straightforward, when I had a drawing I liked I skipped the model phase and went directly to making a full size mock-up. I built it in about half an hour using 1-in. insulation foam, which approximated the thickness I was after and was very easy to cut, shape, and join.

With the mock-up together, I decided to curve the bottom edges of the chest. Using black tape, I tried out various arcs. I also tested a variety of handles, making them out of pine and hot-gluing them to the mock-up. In the end, I chose a recessed handle, which seemed to fit best with the design. I used a crescent of black tape to see what it would look like.

The trickiest thing to work out was the treatment at the top of the end panels. I felt that some sort of bevel on the inside edge of the ends combined with a curve at the top could create a very interesting detail without complex

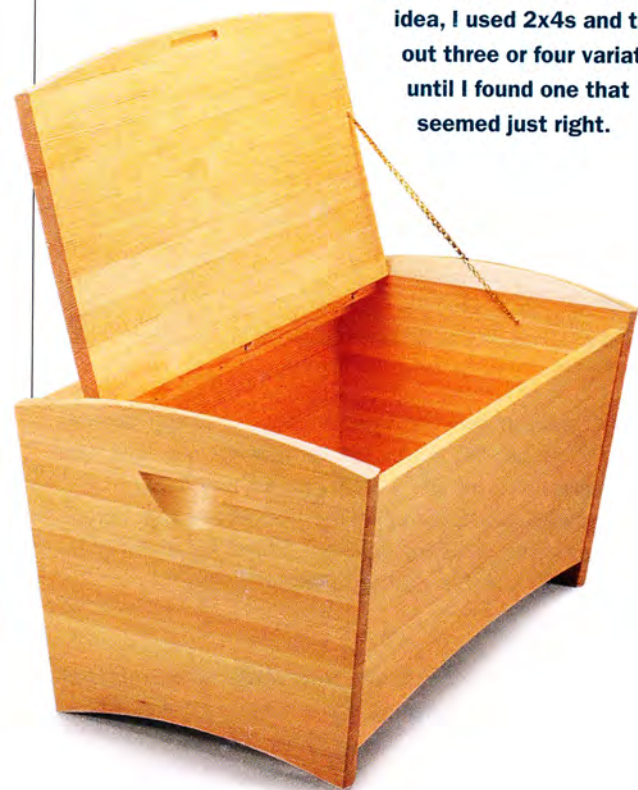
machining. To explore the idea, I used 2x4s and tried out three or four variations until I found one that seemed just right.



Skiping right to full scale. Confident in his concept for his blanket chest, Fortune went from a rough sketch directly to a mock-up. Sheets of 1-in. rigid insulation foam, easily cut with a snap-off utility knife, shaped with sandpaper, and joined with hot glue, provided the perfect building material for the mock-up.



Finding the right flare. To compare a few different versions of the detail at the top of the ends of the chest, Fortune mocked up his ideas in pine. He cut off the top of one end of the chest so he could see the new ideas in place.



Get More from Your Miter Saw

Use it to break down rough stock, but get furniture-quality cuts, too

BY MARC ADAMS



Because miter saws were not around when many of us took a high school shop class (remember the radial-arm saw?), the majority of us were never taught how to use them. The hosts of those television DIY shows are no help.

Although relatively lightweight and portable, the “chopsaw” deserves as much respect as any machine in the shop. It certainly carries as much potential danger. On the other hand, it is capable of more than you might know.

With a few tips and upgrades, you'll be able to do almost all of your crosscutting and mitering on the miter saw, like I do, getting

furniture-quality cuts in half the time it takes to drag out your crosscut sled. Of course, the miter saw is also the quickest way to rough-cut lumber to size, and I have tips for that, too.

My tips and techniques are based on the type of saw that I favor, the simple chopsaw (see “Basic chopsaw is better for woodworking”), but many will work for sliding miter saws, too.

A few key upgrades

The first step is to replace the blade that came with your saw. It will struggle through big hardwood lumber, and it won't have



enough teeth for the finest cuts. You don't have to buy the most expensive one, but do get a good blade designed for a miter saw.

With any crosscutting tool, you have to deal with tearout. One of the best ways to enhance your miter saw is to add a zero-clearance throat plate and a sacrificial fence. These simple upgrades do three great things: They eliminate chipout at the bottom and back edges of the cut; they show you exactly where the blade will cut, at any angle, making it easy to line up a mark accurately; and they make the saw safer, preventing small offcuts from getting trapped against the blade and kicking back at you.



Basic chopsaw is better for woodworking

Designed for carpenters and contractors of all stripes, miter saws come in a bewildering variety of configurations. One advantage of running a woodworking school is that I get to purchase lots of tools and learn which features are truly worthwhile. For woodworkers, I've found that the simple chopsaw is the best bet and the most accurate. You don't need to pay extra for a big sliding model if you have a tablesaw and crosscut sled for wider stock.

But the cost savings don't end there. You also can skip the double-bevel feature, since you'll get better cuts when pivoting the head rather than tilting it. And I'm not a fan of laser guides. They don't work in every blade position, and they need regular adjustment.

On the other hand, I would go for the full 12-in. blade over the 10-in. size, and I'd make sure the saw has an automatic brake (most do) that stops the blade when the trigger is released. You'll see why shortly. Another feature I find handy is a miter range of 50° or more.

Replace the stock blade. Get a high-quality blade designed for miter saws, with 100 or so teeth for finer crosscuts.



PRODUCES C
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Crosscut Wood
Chipboard
Plywood
Laminat
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Set up for success

ZERO CLEARANCE IS ESSENTIAL

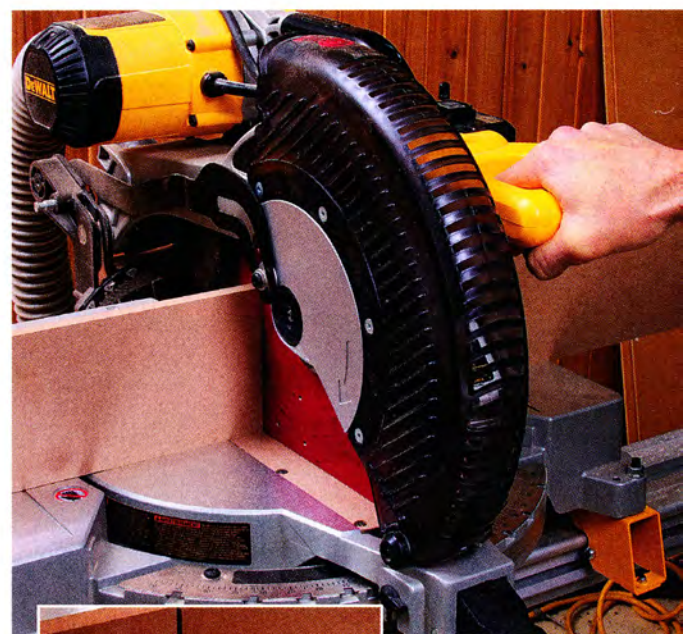
This is a crosscutting tool, so without sacrificial surfaces below and behind the cut, you'll get tearout.



Replace the plate. Remove the stock throat plate and trace around it (left) onto $\frac{1}{4}$ -in.-thick MDF. Saw and sand it to fit, and then screw it into place (above), or attach it with carpet tape. You might have to plane the MDF to make it flush with the base.



Add a fence. A 6-ft.-long piece of $\frac{1}{2}$ -in. MDF or plywood makes a good sacrificial fence. Attach it with carpet tape.

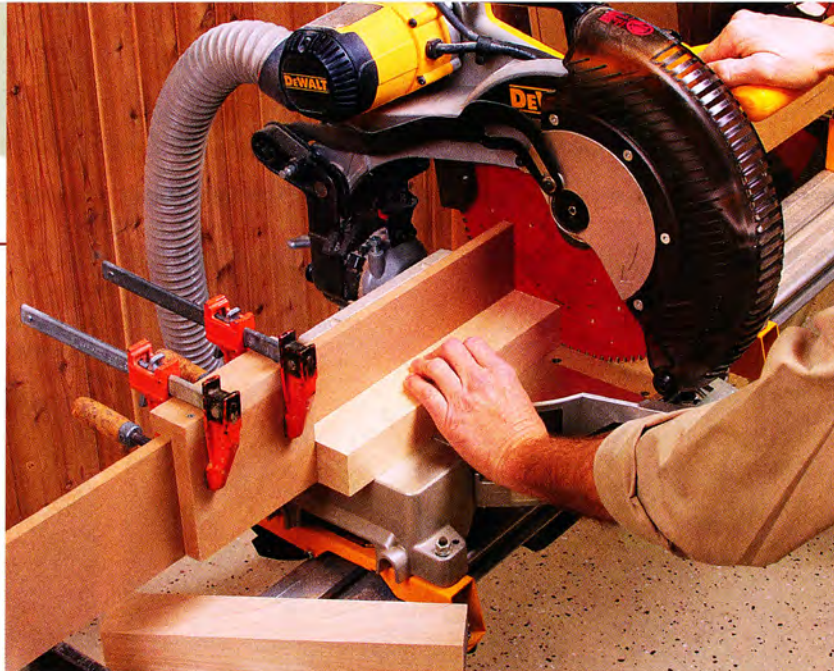
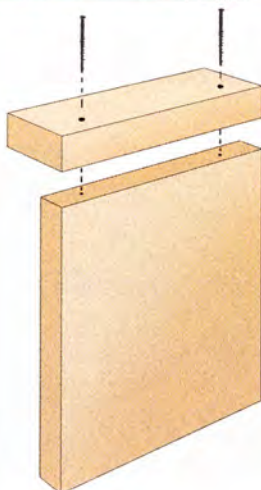


Cut the slot. Make a cut through the plate and fence, and say good-bye to tearout. The zero-clearance slots also show exactly where the blade will cut, making it easy to line up a mark precisely.

LONG FENCE HOLDS STOPS

SIMPLE BUT EFFECTIVE STOP

This basic stop block hangs on the fence. The cleat keeps it square to the blade, with a slight gap between it and the table so dust doesn't interfere.



Using a stop safely. Always hold the workpiece on the stop side. That part is trapped against the blade, and should be controlled at all times.

To tame tearout along the bottom edge, some woodworkers cover the base of the saw with a full layer of plywood, but I prefer to replace the throat plate. That way, you don't lose thickness capacity. Also, the saw always comes down in the same slot, even when pivoted for miter cuts, so you don't have to replace that shopmade plate unless you change blades or make a bevel cut with the head tilted.

I've made these inserts successfully for at least five different brands of saw. Just trace the standard plastic insert on a piece of 1/4-in.-thick MDF. Then bandsaw and sand the edges to fit. If neces-

sary, you can plane the insert to bring it flush with the surface. To install it, you can use thick (exterior grade) carpet tape, or redrill the screw holes and use those.

To prevent tearout along the back edge of the board, you can't easily make a sacrificial insert in the metal fence. So I use a full layer of plywood there, which does steal some width capacity. I recommend 1/2-in.-thick MDF or plywood cut roughly 6 ft. long and just wide (tall) enough to fit under the motor or handle in its lowest position. The extra length comes in handy for attaching stops. Again I use carpet tape to hold the fence in place, making

ADVANTAGES OF TABLE-MOUNTING

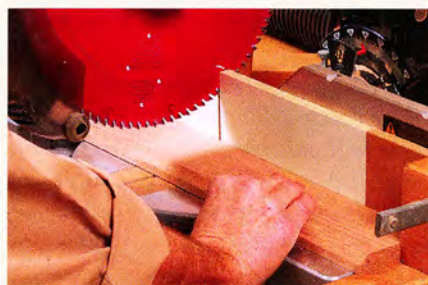
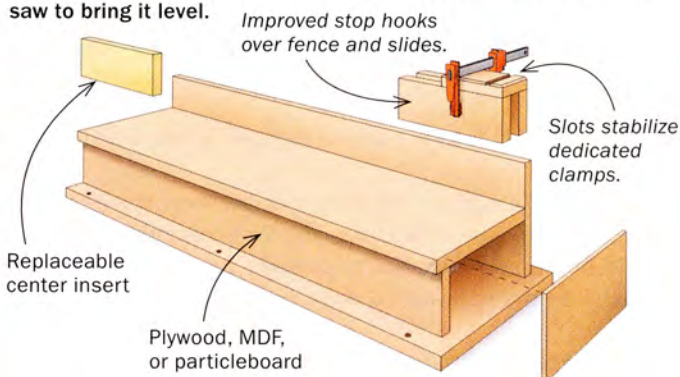
If you can dedicate some counter space to your saw, there are a number of advantages.



Better work support. Bolt down the saw and build long boxes to extend the fences and support long boards and stops.

SIMPLE SUPPORTS, SNAZZIER STOPS

Adams bolts his saw in place, and also screws down these work supports, so their fences line up with the center insert. Shim the saw to bring it level.



Replaceable insert. You don't have to replace the whole fence every time you make a miter cut and ruin the zero-clearance slot. You just replace the center insert, which is held in place with carpet tape.

Get furniture-quality cuts

You can get smooth, accurate cuts of all kinds with this lightweight machine. Proper technique is the key.



THREE STEPS TO CLEAN CUTS

1 Power up. Let the blade get to full speed before lowering it.



2 Let it cut. It takes time to get 100 teeth through a big piece of wood, so let the blade cut at its own pace.



3 Now wait. This is the most important part. Let the blade come to a full stop before lifting it or moving the stock. This is where an automatic brake speeds things up.

it easy to change. You'll need to replace it when you change cutting angles.

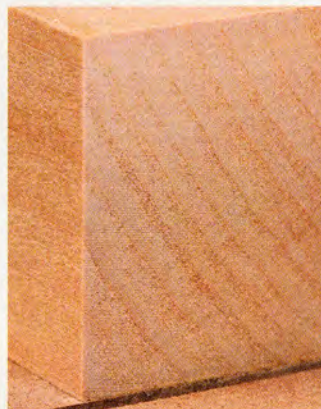
Using stops for repeat cuts is one of the best moves you can make on a miter saw. You can place them on either side of the saw, but for shorter cuts, the stop might need to go on the opposite side from the motor to avoid bumping it.

The right technique makes all the difference

All miter saws have a degree of slop in the arbor, which allows blade runout. That's why proper technique is so critical to getting accurate cuts.

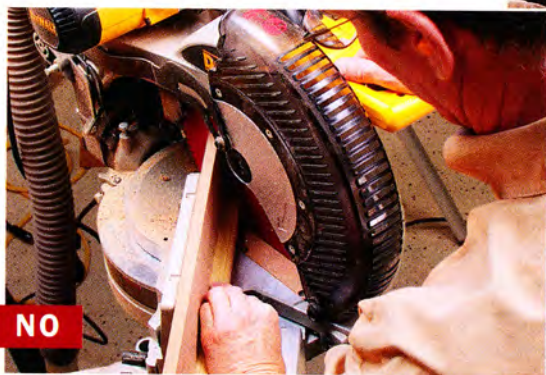
I don't actually like the term "chopsaw" because it reminds me of words like "hack" and "slash." Forcing the blade will make it deflect and wobble. Also, a blade with more teeth needs more time to get through the wood. On the other hand, if you go too slowly, you'll get a burnt or burnished cut. So let the blade cut at its own pace—not yours. Go by feel. The same blade will cut differently in soft and hard wood, through larger and smaller workpieces.

PATIENCE REWARDED



See for yourself. The left board was cut with good technique. On the right sample, Adams lifted the blade back up through the cut while the blade was still spinning.

PERFECT MITERS



Stay away from the blade. Pivoting the saw toward your body (above) is less safe and makes it hard to reach in and hold the stock steady. Change hands and stand on the other side (right) to give yourself more room.



Turn tricky bevels into happy miters. A miter-saw motor is less stable when tilted on its side (above), affecting the quality of the cut on this base molding. Also, too much of the blade is exposed. By standing the molding up (right), you turn a bevel cut into a safer, more accurate miter.



If yours is a sliding model, pull it all the way toward you before lowering it and pushing it through the cut. Again, go by feel.

The second important rule is to let the blade come to a stop before raising it back up through the cut. The cutting action tends to stabilize the blade, but it can wobble again when the cut is done. Also, you tend to raise the blade faster than you cut with it. That's why you will hear that "twangggg" sound when you bring a spinning blade back up through the cut, and will see deep sawmarks.

If the brake is working well, you'll only have to wait a couple of seconds for the blade to stop, but the quality of the cut will be considerably better. So force yourself to develop this habit.

Miters vs. bevels—Because of the way the guard works, I do not like using a miter saw's bevel function, in other words, tilting the head. There is just too much blade exposure, and it ruins the

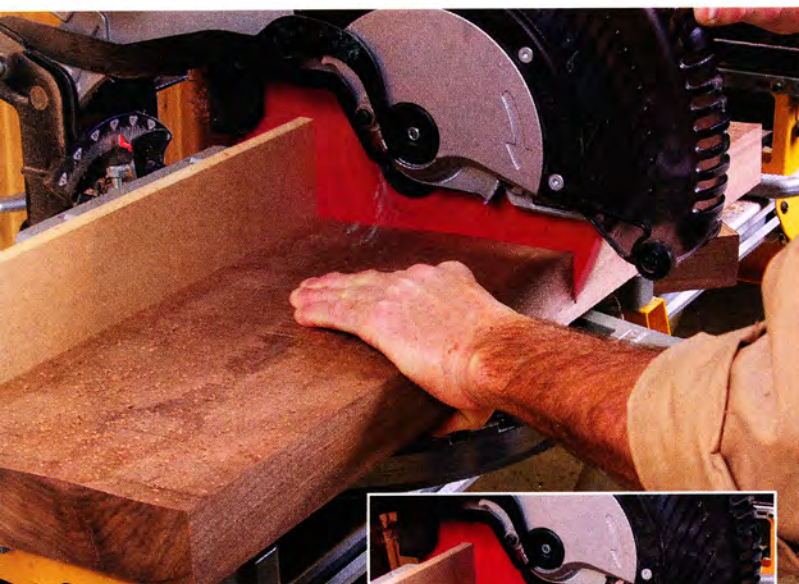


Convert compound angles, too. Laid flat on the saw, this crown molding would require a combination miter and bevel cut. Add a sacrificial base to the saw with a cleat that stands the molding up in its installed position. Then you can make a simple 45° miter cut for perfect joints.

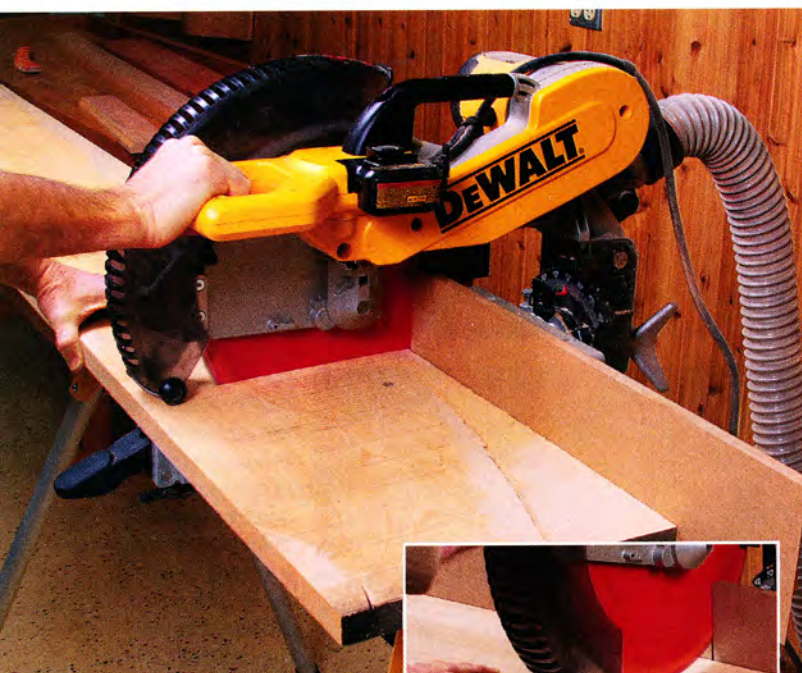
Going bigger and smaller

GET MORE WIDTH IN A PINCH

When chopping up boards into rough lengths, the saw's width capacity often falls short. These tricks add capacity.



Lift it. If you have only a sliver of wood left (above), you can safely lift the near edge into the spinning blade (right) to finish the cut.



Flip it. To almost double your cutting capacity, make a full cut on one side (above), and then flip the board to finish the job (right).



zero-clearance insert. It also puts the weight of the motor on the side of its pivot point, causing it to flex sideways as you pull it downward, compromising the cut.

The good news is that you can stand a narrow board up against the fence, turning a wobbly bevel cut into an accurate miter cut. There is also a great trick for avoiding compound-angled (bevel and miter) cuts on crown molding (see p. 53), turning those into simple miters, too.

Coax extra width out of your saw—There are a number of ways to get more width capacity from your saw. This is most often a problem when cutting rough lumber to approximate length, and usually on a chopsaw. Sliding miter saws are not my favorite, but they do have significantly more cutting capacity.

First let's cover an important safety tip. When cutting bowed, twisted, or cupped boards, always make sure the stock is touching the fence and base in the cutting area. Otherwise it will dive down or backward as you finish the cut, pinching and binding dangerously against the blade.

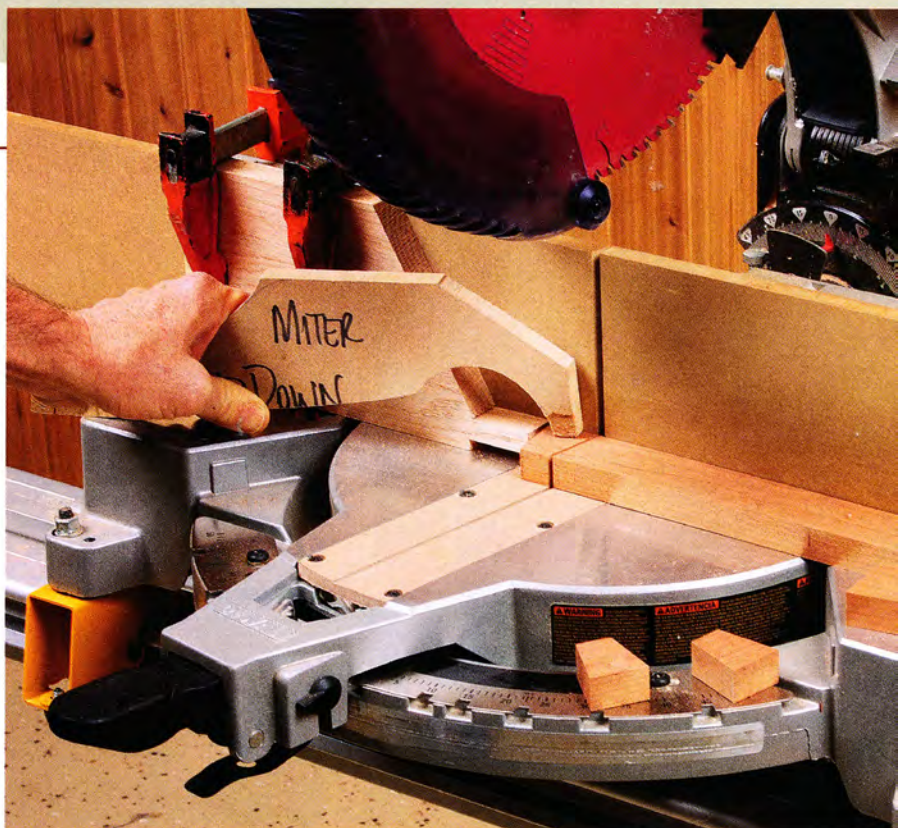
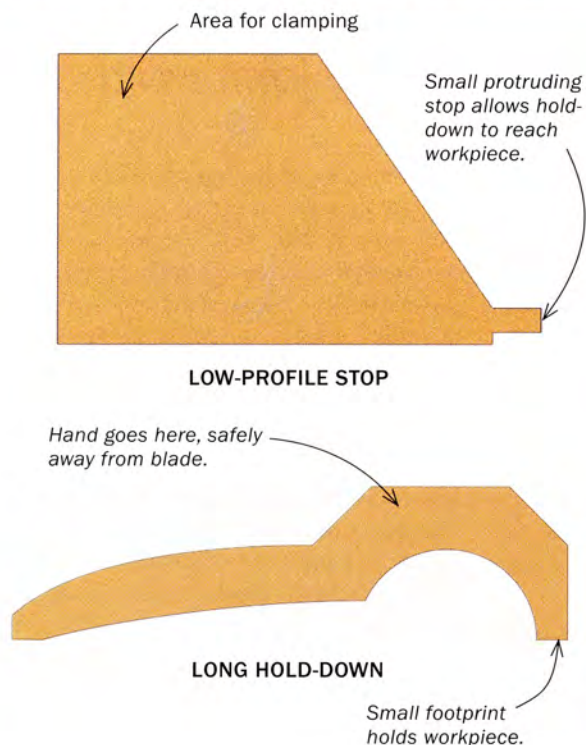
The first tip is that if your cut leaves $\frac{1}{2}$ in. or less to be nicked off at the end, you often can simply lift the front edge of the board a bit to finish the cut. The other trick for rough lumber is to make as wide a cut as possible and then let the blade stop, flip the board over, realign the blade with the kerf or mark, and finish the job.

For accurate, furniture-quality cuts, I have another handy tip. Just put some scrapwood underneath to raise up your stock to the bigger part of the blade. You can add an inch or more to the width of the cut this way on a 12-in.-dia. blade.



A trick for fine cuts, too. To add an inch or more to a cut without compromising the quality, raise the board on a sacrificial piece in order to use a wider portion of the blade.

HANDLE SMALL WORK SAFELY



Cut precise pieces. A low-profile stop and special hold-down let Adams safely control small, precise parts for segmented turnings, for example.

A few more safety tips

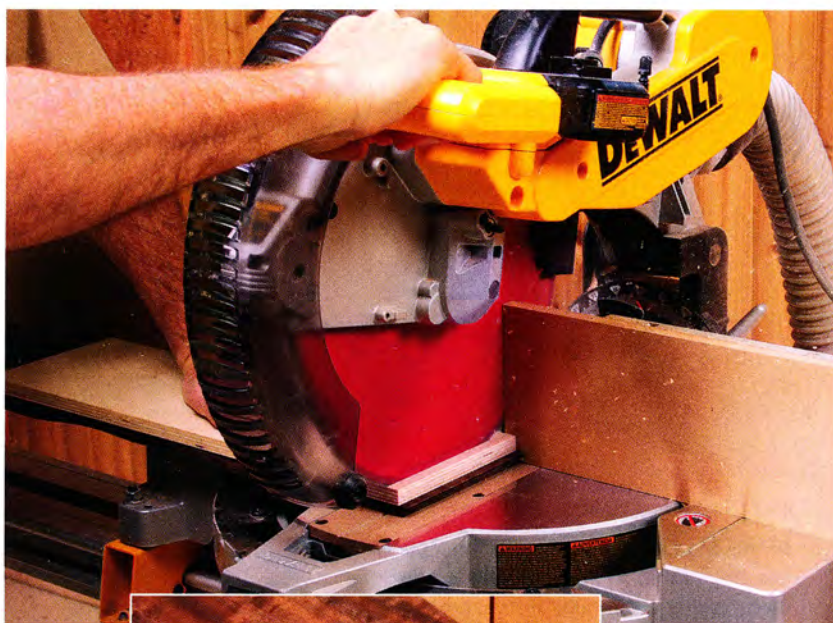
In 2010, the University of Cincinnati did a study at our school on woodshop noise levels. The miter saw produced more decibels than any other tool in the shop. So always wear ear muffs or plugs, and of course, protect your eyes at all times.

Never cross your arms. Most people do this when cutting miters, choosing to use their normal trigger hand no matter which way the miter is pointing. Miter-saw triggers will work with either hand, and for miter cuts you want to stand opposite where the saw is pointing. That might mean putting the board on the opposite side you are used to, and switching hands. This will give you better visibility and help you hold the stock more tightly so it isn't pulled sideways by the blade. Another time you might want to switch hands is to hold onto the piece that is trapped against a stop.

I have a 3-in. rule on all power tools, making sure my hands always stay out of this danger zone. So for smaller pieces, I use a special stop and hold-down to keep the stock safely in place against the fence and table. These are easy to make (see drawings, above).

So make a few upgrades to your saw, let it come to a stop after each cut, and follow a few simple rules. Then you'll really see what a miter saw can do. □

Marc Adams runs Marc Adams School of Woodworking in Franklin, Ind. For a full class list, go to MarcAdams.com.



Trim veneers cleanly. Veneers (and plastics) will shatter on the miter saw, but if you hold them down with a sacrificial board (above), you can get a perfect cut on a whole stack (left).

Strong Tenons in

Get sturdy joints without

For a table or cabinet-on-stand, my preferred joinery method is the mortise and tenon. The typical arrangement is to have two single tenons of the same thickness entering the leg at the same setback from its face. This simplifies the process for cutting both mortises and tenons because the machine setups are the same

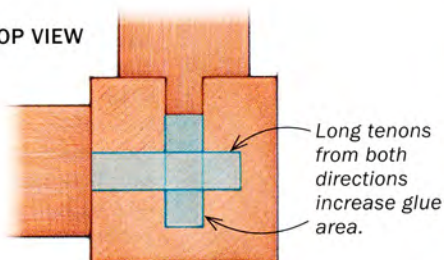
for both sides of the leg and both aprons. But my furniture designs often have slender, curving legs, and I frequently shape the top of the leg as it joins the apron. With these narrow or shaped legs, the room for adequate joinery quickly shrinks, and a one-size-fits-all approach doesn't work.

In these situations I need to be creative in the way I lay out the tenons, using different arrangements from each side of the leg, and varying the length, thickness, and number of tenons. This is the best way I've found to pack a lot of joinery into these small spaces without compromising the strength of the leg or having to beef up the dimensions of the parts and ruin the light

STACK THEM

For his Stencil Table, Coleman was able to use long tenons by stacking and interlocking them, taking advantage of the apron height.

TOP VIEW



Graceful table with strong bones. Coleman had to compress the joinery to preserve this table's delicate proportions.

Skinny Legs

BY TIM COLEMAN

compromising your design

appearance I'm after. By the way, these solutions work for narrow frame members of all kinds, not just legs and aprons.

My Stencil Table, Star Cabinet, and Fall Front Cabinet are examples of this joinery in action. Each piece is a different take on how you can maximize the space to create strong joints that will resist racking and twisting. Let's look at the table first.

With wide aprons, interlock the tenons

The Stencil Table (opposite page) has legs that are just 1¼ in. square at the top and aprons that are 3 in. wide. To get the most out of that narrow space, I created an interlocking joint, with two tenons from one direction passing above and below a tenon from the other direction. The key here is finding a balance between material

removed for the mortises and the size of the tenons. When a joint fails, it is often the mortised part that breaks, not the tenon. So the thickness and length of the tenon must be sufficient to hold the joint firmly while leaving enough material on the outside of the mortise and above to resist cracking. You need to leave at least ¼ in. of material on the outside of the mortise; less, and any



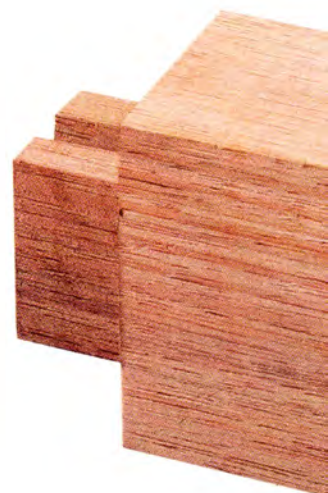
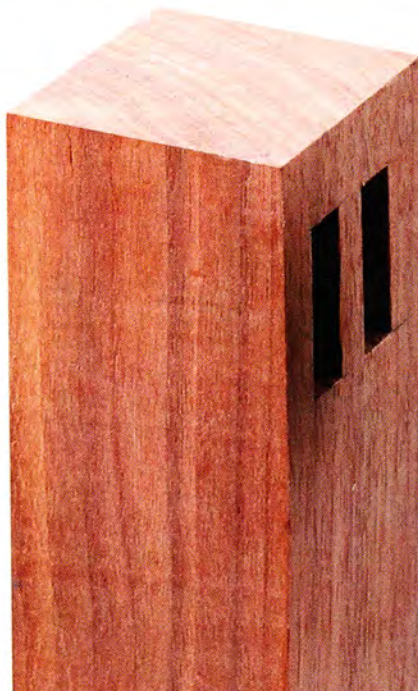
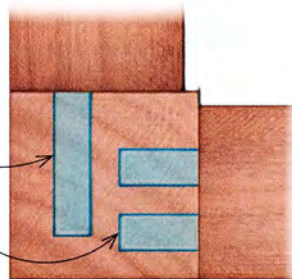
Slender strength. On his Star Cabinet, Coleman was looking for a slender base. So he doubled up the tenons and added stretchers.

OR DOUBLE THEM UP

With a narrow apron and leg, Coleman made the aprons thicker to allow him to double up the tenons in one direction and use a longer tenon in the opposite direction.

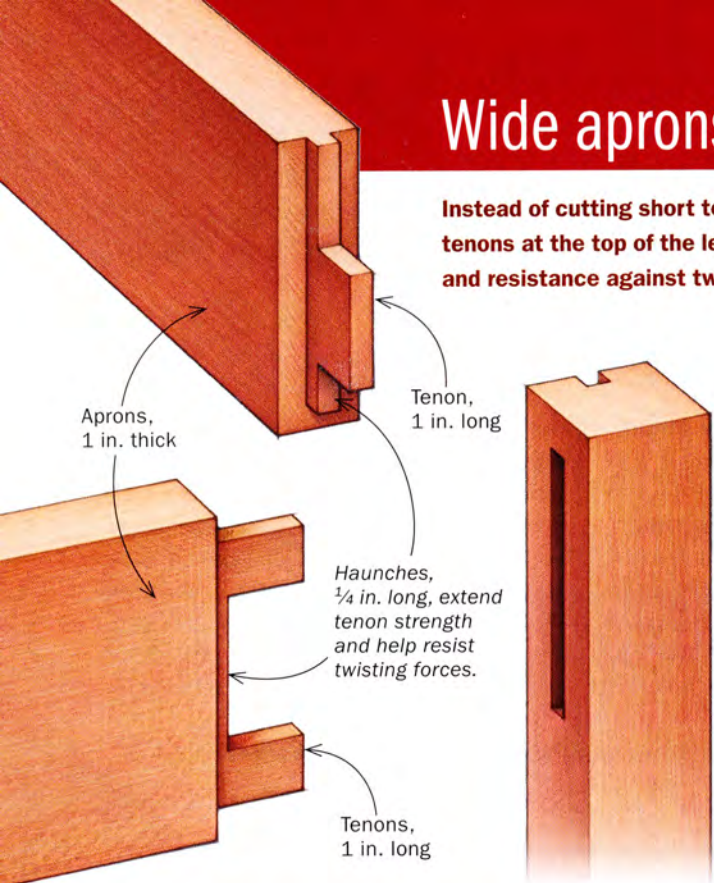
Long tenon is used on longest span.

Double tenons increase glue surface, compensating for their short length.

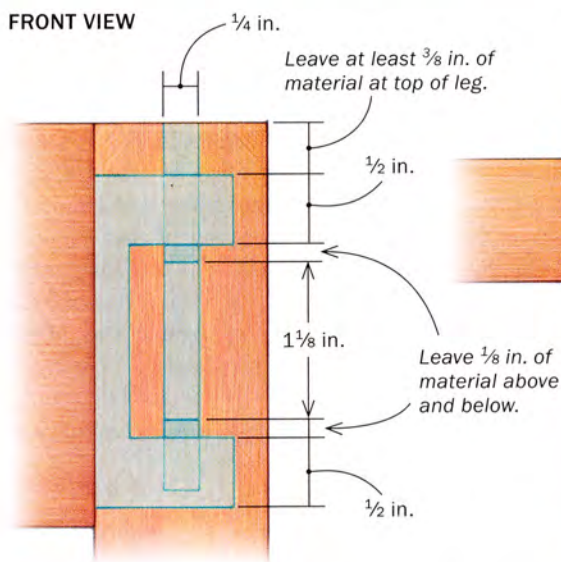


Wide aprons? Interlock the tenons

Instead of cutting short tenons, Coleman takes advantage of the apron height by interlocking the tenons at the top of the leg. This lets him use long tenons from each direction, increasing glue area and resistance against twist.

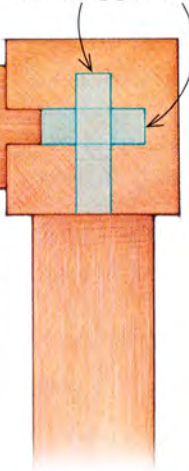


FRONT VIEW



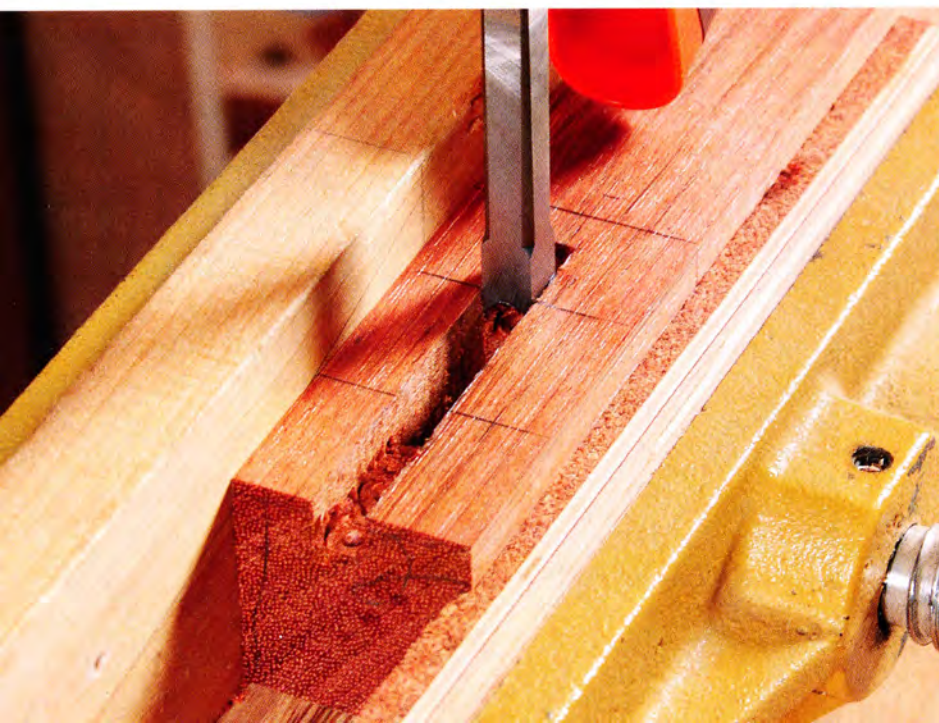
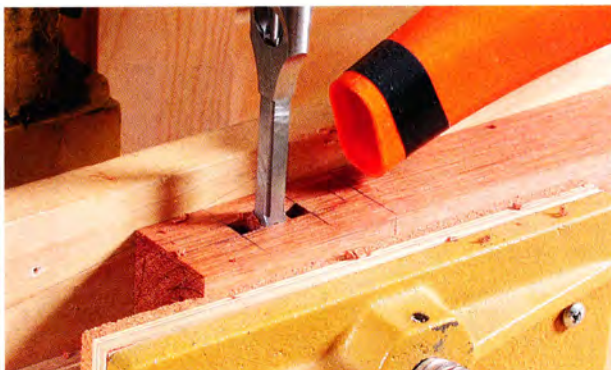
TOP VIEW

Tenons can be longer, increasing glue area.



DEEP MORTISES FIRST

Steps to a stepped mortise. Coleman does the deep part of the mortise (right), then resets the machine to cut the 1/4-in.-deep mortise for the haunch (below). He works one leg at a time, but to ensure alignment he references off corresponding faces.



racking force could cause the leg to split. Also, unless there's a haunch, set the tenons at least $\frac{3}{8}$ in. below the top of the leg. Any closer, and that weak end grain area would not have enough meat to resist leverage from the top of the tenon.

In this example I was able to use 1/4-in.-thick by 1-in.-long tenons, which leaves plenty of material on the outside. Both tenon designs have a haunch that supports the apron along more of its width, increasing resistance to twisting. (For an example of a similar joint, see "Hall Table with Flair," pp. 66-73.)

Double tenons for narrow aprons

Despite their slender components, the Fall Front (see photo, p. 61) and Star Cabinet (p. 57) stands must be strong enough to support the weight of the cabinet plus its contents. The shaping at the top of the leg is different in each piece, but the layout and execution of the joinery is the same.

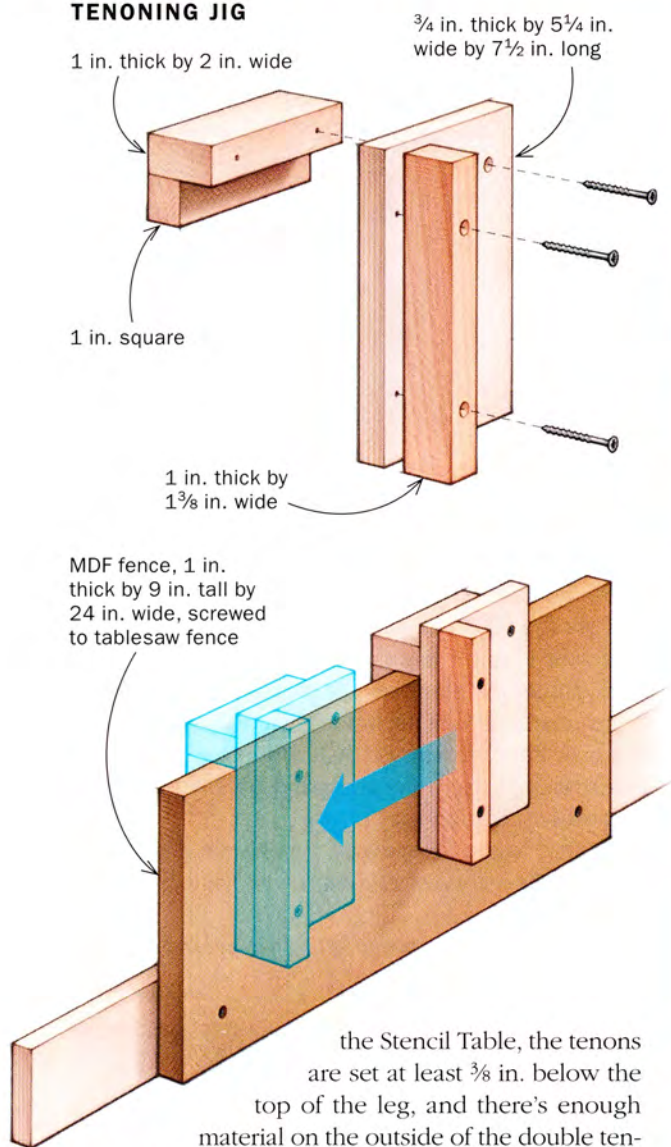
In both pieces, there is a single, long tenon from one direction, and a pair of side-by-side tenons from the other direction (the fall-front has one narrower tenon on the outside to accommodate the curve at the top of the leg—see detail on p. 61). All tenons are $\frac{5}{16}$ in. thick. The long tenon is $1\frac{1}{4}$ in. long, and the double tenons are $1\frac{1}{16}$ in. The double tenons have more overall glue surface than the single tenon, which partly compensates for their shorter length. As with

Online Extra

To see how Coleman uses stretchers to add further strength, go to FineWoodworking.com/extras.

MAKE TWO TENONS FROM ONE

TENONING JIG



the Stencil Table, the tenons are set at least $\frac{3}{8}$ in. below the top of the leg, and there's enough material on the outside of the double tenons to maintain structural integrity.

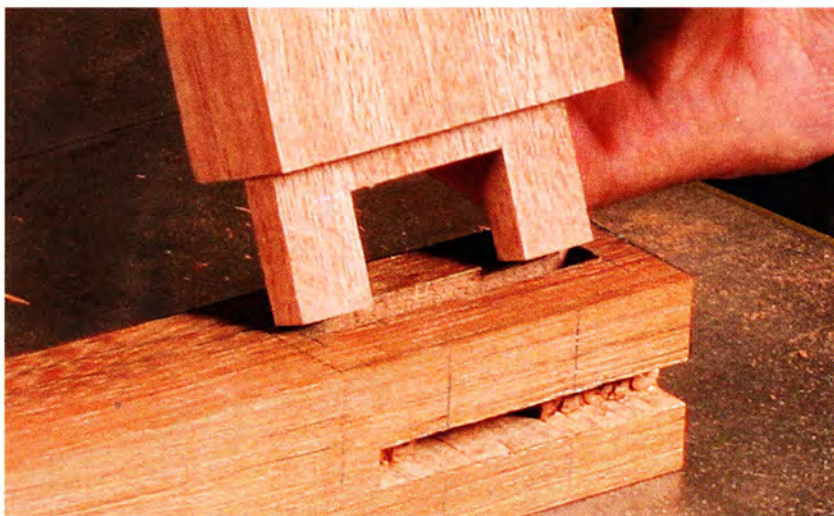
The single, long tenon is a bit stronger than the double tenons because its length helps it resist leverage. So I use a single tenon on the apron that runs side to side. The legs are farther apart here so there is more stress on these joints than those that run front to back. Before shaping the legs, I cut the mortises using a hollow-chisel mortiser. Then I cut the tenons. I make all the tenons the same length and trim the shorter ones later. This way the shoulders are all cut at the same setting, and the blade height to cut the tenon cheeks is the same. It helps to have extra stock the same size as the aprons to use as setup pieces.

The shoulders are cut first at the tablesaw. Then I use the bandsaw to cut the cheeks. The final cheek



Cut and flip.

After cutting the tenon cheeks and shoulders, Coleman uses a shopmade tenoning jig (see drawing, left) and a flat-top rip blade to excavate between the stacked tenons. Make a cut and then flip the apron end for end to make the same cut on the opposite end (left). Then adjust the fence and repeat. When you're close, check the fit (below) and trim where needed.



Narrow aprons? Double up the tenons

When faced with a narrow apron and leg, Coleman makes the apron thicker in order to use two short tenons from one direction and a long one from the other. The long tenon has better resistance to twisting, so he uses it on the longest aprons.

Double tenons on short span doubles the glue area, compensating for their short length.

Long tenon is used on longest span.

$\frac{3}{8}$ in.

Leave at least $\frac{3}{16}$ in. between tenons.

TOP VIEW

$\frac{5}{16}$ in. thick

$\frac{5}{16}$ in. thick

$\frac{1}{4}$ in.

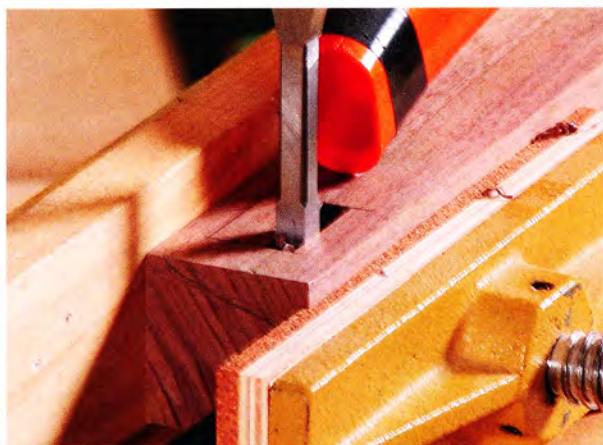
Cut the double mortises first.

Cutting the long mortise first would leave a weak area here that would be easy to break through.

DO THE DOUBLE MORTISES FIRST

Far one first. Set up the mortiser to cut the outside mortise. Do all the legs at the same time, referencing off the same faces.

Spacer saves time. To locate the second mortise, Coleman uses a spacer block placed between the workpiece and the fence of the mortiser. To determine the spacer thickness, simply add the width of the mortise to the space between. So a pair of $\frac{5}{16}$ -in.-wide mortises with $\frac{1}{4}$ -in. space gets a $\frac{9}{16}$ -in.-thick spacer.

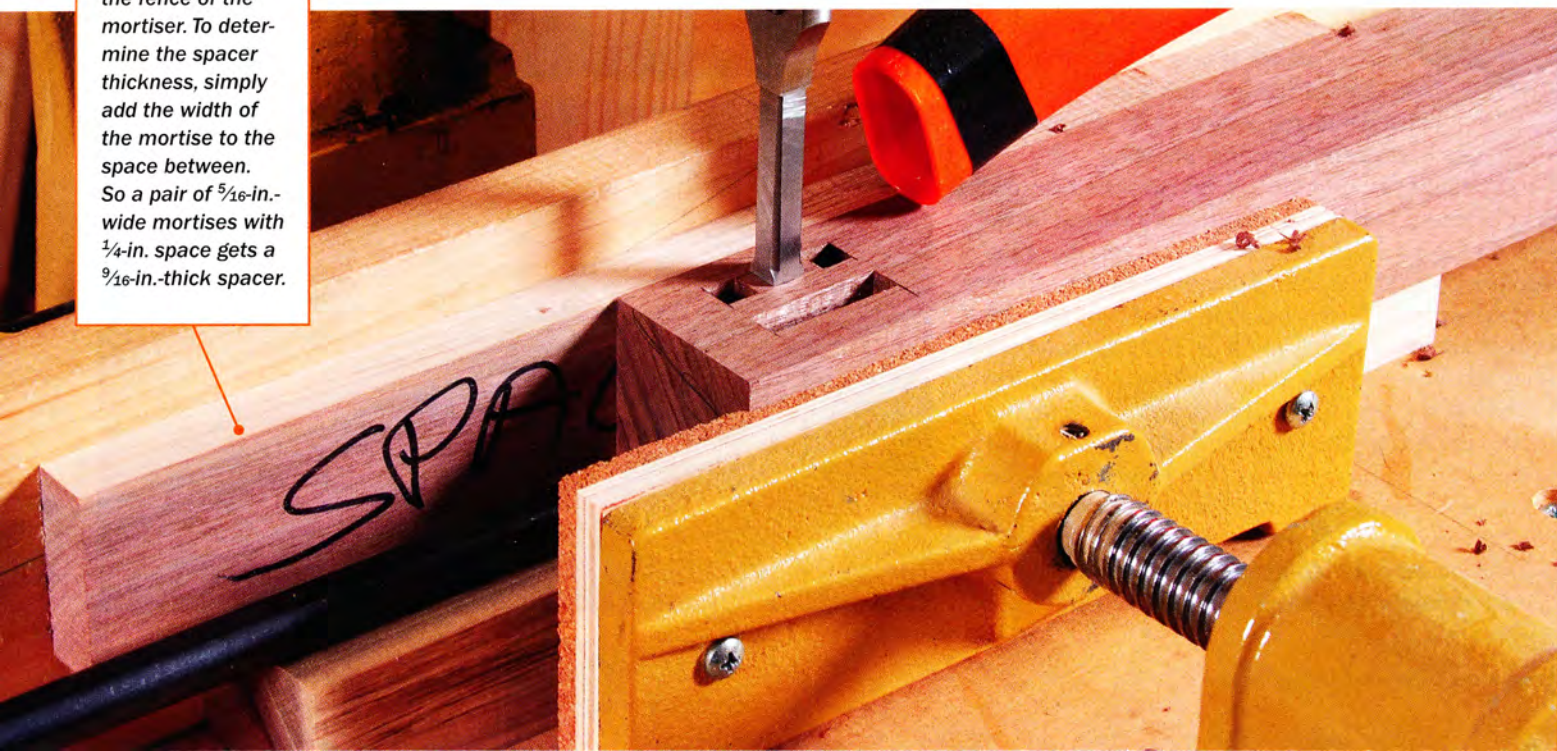


cuts on the tablesaw are just skimming cuts using my shopmade tenoning jig (see drawing, p. 59). This method removes any chance of a trapped cut, and makes it easier to dial in the setup. My ultimate aim is to get the tenon thickness right off the tablesaw.

I do the double tenons essentially the same way. After cutting the shoulders at the tablesaw, I remove the material between the tenons first because it's easier to adjust the thickness of each tenon on the outside cheek. Here I use a flat-top-grind rip blade and my shopmade tenoning jig.

After the inside is removed, I make the cheek cuts, first with the bandsaw and then with the tablesaw. □

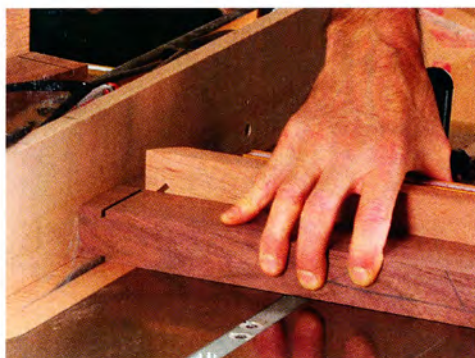
Timothy Coleman is a renowned furniture maker and designer (timothycoleman.com).



TACKLE THE TWO TENONS

Shoulders first.

Coleman makes all the tenons the same length, so all the shoulders can be cut with the same fence setting and blade height.



Use the mortises as a map. Lay the apron on the leg to mark the inside cheek cuts.



Inside cheeks first. To remove the waste between the tenons, Coleman uses a flat-top rip blade and a tenoning jig, cutting about $\frac{1}{64}$ in. proud of the shoulder. He pares to the line later with a narrow chisel.



Outside cheeks next. Coleman removes most of the waste on the outer cheeks with the bandsaw.



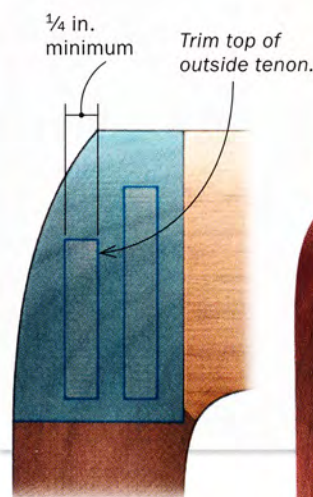
Eyeball the cuts. Place the tenons over their mortises to mark how much needs to be trimmed on the outside.



Final cuts. Use a tenoning jig and a flat-top rip blade to skim the outside cheeks. Check the fit as you go.

SHAPED LEG GETS NARROWER TENON

Coleman's Fall Front Cabinet has the same joinery as his Star Cabinet, except for one detail. The top of the leg is curved on the outside, so the outer double tenon is trimmed at the top to accommodate that curve.





Brushes for Woodworkers

Choose the right one for the job and get great results

BY PETER GEDRYS

Visit a pro finisher's shop and you are likely to be confronted with a bewildering array of brushes: round handles, flat handles, bristles long and short, ox hair, goat hair, squirrel hair, and nylon. Why do I have so many? The most important thing that a finisher knows about brushes is exactly what a woodworker knows about router bits: One size and shape does not fit all. That's because there's more to finishing than just brushing liquid onto flat, rectangular surfaces. The brush that works well for that isn't the best choice for narrow or curved surfaces.

To help you pick the right one, here's an overview of the brushes that I use most often. With a little guidance you can put together a custom brush kit that will help you handle any situation, from applying clear finishes on flat surfaces to detail work with dyes and glazes.

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

Clear winners for clear finishes

A good finish brush should hold a generous amount of liquid, releasing it only at the point of contact with the surface. There are some general rules to follow: synthetic filaments for waterborne finishes, natural filaments for solvent-based finishes.

Flat surfaces

For finishing large, flat surfaces like doors or tabletops with varnish or waterborne products, a foam brush is my first choice.

Why? The biggest reason is that a foam brush lays down an even coat of finish with no brush marks. Contrary to popular myth, a foam brush won't leave bubbles in your finish. Just be sure to steer clear of

the super-cheap ones with minimal interior support. Look for the ones that have a plastic support right up to the bevel.

Also, take care in loading the brush. First dampen it on the bevel and just above it with a few drops of the appropriate solvent, then dip it into the finish just past the bevel. Take the brush out of the finish and turn the bevel faceup to let the liquid soak in. Repeat this dip and turn once more for a useful charge of finish.

Foam brushes are terrific, but I avoid using them with shellac because the alcohol in the shellac will melt the foam. So, for applying shellac on large, flat surfaces, I use an extrawide brush (below) made with ordinary natural white china hog bristles. This brush is 4 in. wide with short ($1\frac{3}{4}$ -in.) bristles (Varnish and gesso brush No. 85062100, \$17; kremerpigments.com). The generous width lets me cover a lot of surface area quickly without frequent reloading.

FOAM IS SURPRISINGLY GOOD



Dip and tip. To avoid bubbles in the finish, don't press the sponge against the cup. Instead, angle it upward to let the liquid soak in (above). Foam leaves a smooth finish with no brush marks (right).



NATURAL CHINA HOG BRISTLES FOR SHELLAC

Go wide. Gedrys favors an extra-wide, short-bristle brush for applying shellac over large areas. The extra width minimizes the overlapping strokes that can create unsightly lines in your finish.



Clear finishes continued

OX HAIR

Details

For profiled surfaces and other details, I use a flat brush with short 1-in. filaments. This one (left) is made with soft black ox hair (Habico No. 660D; \$53, Sepp Leaf Products, 800-971-7377). The brush is small, measuring just 6 in. long. The handle is flat and extremely thin, making it comfortable to hold and easy to control. The filaments are beveled at the tip and lay down a very fine coat due to the softness of the hair.

This little brush can cover a lot of ground. Once the brush is fully charged with varnish, I can easily do the narrow facets of the raised panels of a large door and I only have to dip it in the finish once or twice.



GOAT HAIR DOME MOP

For applying clear finish to irregular surfaces, my first choice is a round brush shaped like a mop and made with very soft goat hair (Winsor & Newton 140 series wash, $\frac{3}{4}$ in. or $\frac{7}{8}$ in.; \$7.50, dickblick.com).

The brush holds a lot of finish. Fully loaded, it can lay a thin, even coat on a table leg without reloading. The soft hairs are also long and flexible enough that they can lay flat and conform to any surface you're finishing—a huge help on parts like turned table legs, especially those that are tapered or reeded.

Despite its softness, the brush holds a great “point,” coming to a well-defined narrow tip that is ideal for finishing carved details such as ball-and-claw feet.



For small, flat surfaces. This brush is great for narrow, flat surfaces. Gedrys puts the brush inside a disposable glove (inset) to keep it from drying out between coats.



Curved surfaces. For curved areas, the shape and softness of this mop brush allow it to apply finish evenly.

Stay synthetic for waterborne

To apply waterborne finishes on flat surfaces, Gedrys uses foam brushes again. But for irregular surfaces and details, he chooses mops and flat brushes with nylon bristles.



FOAM

NYLON BRISTLE
FILBERT

Best brushes for color

Gedrys uses a different set of small artist's brushes for tasks like isolating veneers, cutting in dyes, blending glazes, and touch-ups.



SMALL ROUND ARTIST

Small brushes for small details

For detail work that calls for fine lines of color, I use small, round artist's brushes in several sizes (Winsor & Newton series 101, sizes 1 to 3, \$4.50-\$5.50; dickblick.com). A good round brush is made with a mix of natural sable and synthetic filaments. The brush holds a sharp point—ideal for tasks like applying narrow lines of shellac over holly stringing, to keep it lighter than the surrounding surface after stain is applied. I also use rounds to hide filler for nail or screw holes, adding fine lines of color to mimic the grain. I also have several flat artist's brushes in sizes ranging from 10mm to 19mm (Winsor & Newton Series 606, \$9-\$19; dickblick.com). These lay down a very straight line; I use them when blending sapwood to heartwood or adding dye adjacent to stringing that I've already isolated.

Two specialists for glazing

When working with glazes, I keep two brushes handy: one for applying glaze to detail areas and another for blending glaze across a larger surface. These two brushes are as different as night and day. One has a limited row of stiff hair shaped like a fan and the other has long, soft, squared-off bristles.

A fan brush, used with a pushing or pouncing motion, is great for applying small amounts of glaze to detail areas like cock beading or reeded legs (Cambridge fan, size 4, \$8; dickblick.com). Fans can be purchased with hairs of different tensile strengths—stiffer for pushing glaze into recesses and softer for blending.

To blend out and feather glaze on a larger scale, I use a softener (Cadet hog softener, 100mm, \$54; finepaintsofeurope.com). Whisk the brush lightly and consistently across a surface to eliminate any application lines.



A brush for blending. The softener removes excess color and blends what remains. Wipe the excess glaze onto a paper towel dampened with solvent.



Master the fine points. Small round artist brushes are ideal for touching up damaged finishes and other fine detail work.



Flat and straight. The rectangular shape of this brush helps it follow a line—even a curved one—very accurately.



FLAT ARTIST



Every finisher needs a fan. The broom-like bristles of this brush are used to pounce and daub glaze into hard-to-reach areas.



FAN



NON-FERRULE SOFTENER

Hall Table with Flair

Inspired by a local flower, the natural curves of this table make it a California original

BY JENNIFER ANDERSON

I designed this entryway table when I was a student in the Fine Woodworking program at College of the Redwoods. Many of my classmates were designing furniture with legs that tapered from thick at the bottom to thin at the top, a style we called "Gumby" legs. Inspired by the calla lilies that grow wild near the school on California's north coast, I took a different approach.

To echo the flower's shape, I gave each leg a pronounced taper, topped with a gentle curve, on both outside faces. I cut away the table's top at each corner to put these graceful shapes on full display, and I shaped the apron faces to harmonize with the profile of the legs. I built the table from shedua, with maple for the drawer sides and bottom.

The piece is a treat to build. The design is not as complex as a carcass piece but goes beyond a simple table with drawer, adding a few wrinkles that will help you grow as a woodworker.

There's a variety of joinery, from traditional mortise-and-tenon joints to dovetails to dowels, and real pleasure in shaping the legs and aprons. For this, I blend machine work and hand tools.

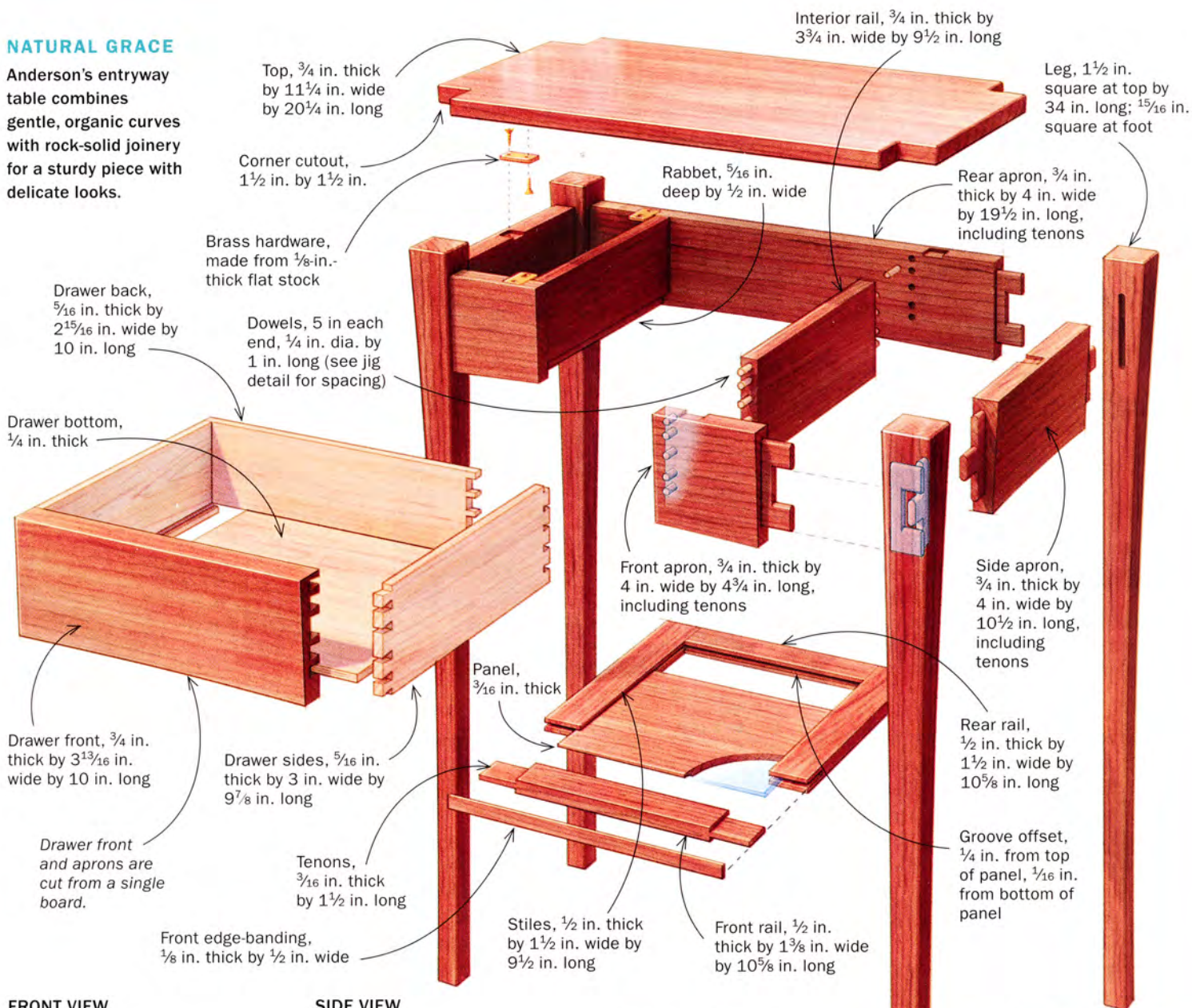
CALLA LILIES

Start with the joinery

Cut all of the joinery while the stock is still square, but first

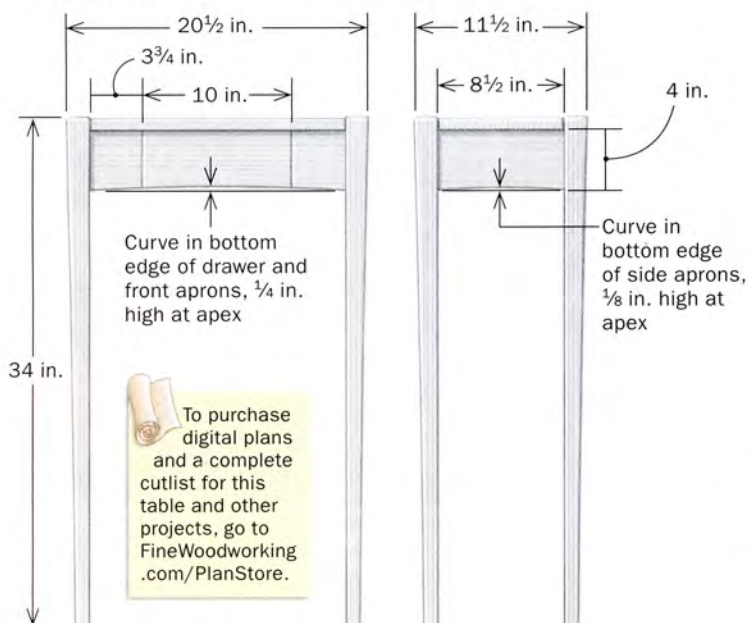
NATURAL GRACE

Anderson's entryway table combines gentle, organic curves with rock-solid joinery for a sturdy piece with delicate looks.



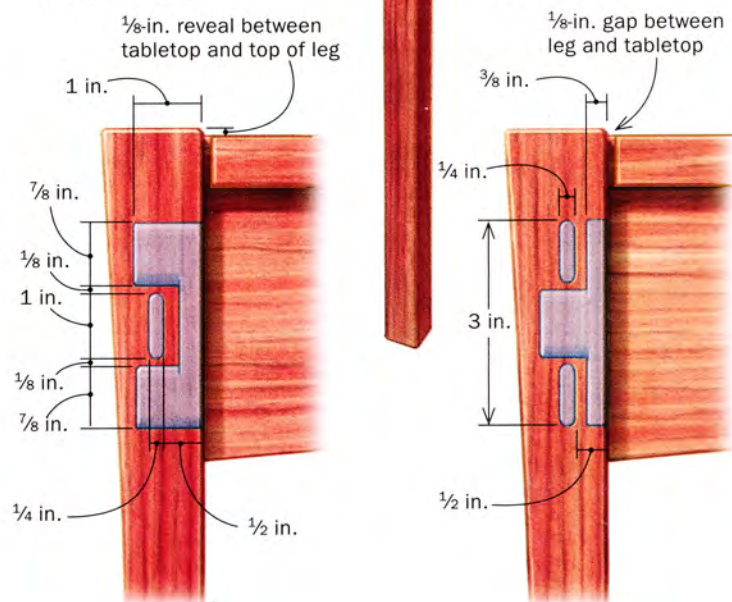
FRONT VIEW

SIDE VIEW



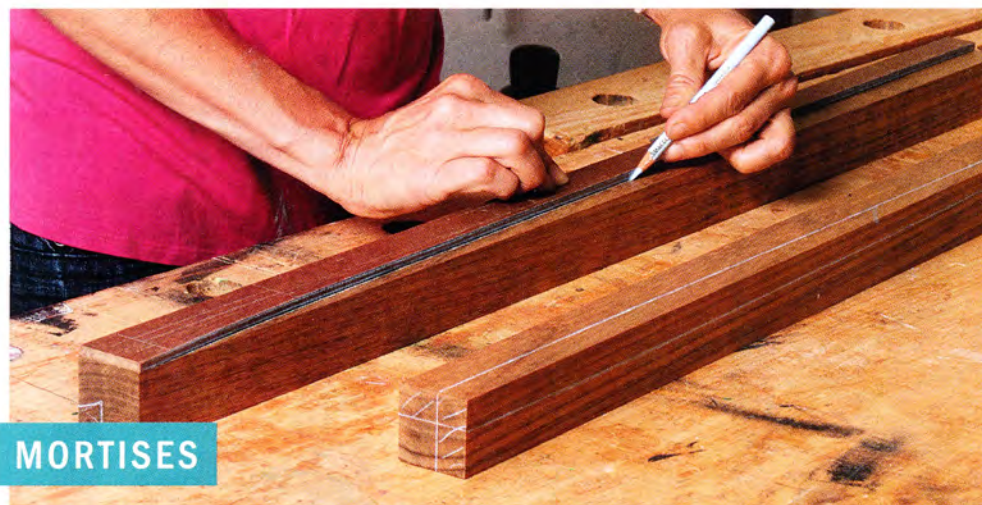
FRONT APRON

SIDE APRON



Join the base

Anderson uses two types of joinery to bring together the table's base. Interlocking mortise-and-tenon joints provide a sturdy connection between the aprons and the slender legs. Dowels fortify and align the butt joints between the aprons and interior rails.



MORTISES

Lay out the curves first. Anderson uses a template to trace layout lines (above) that serve as a visual reminder to avoid mortising into the portion of the leg that will be cut away. Rout in progressively deeper passes (right) to create the stepped mortises for the tenons.

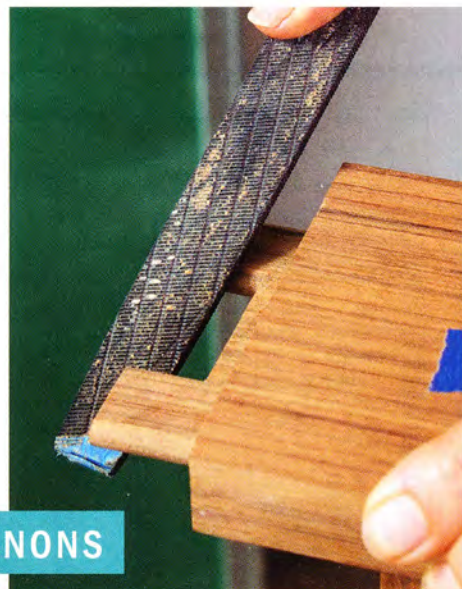


take a few moments to make a template for your leg shape, and use it and a bevel gauge to mark the legs and aprons for the curves and tapers you'll cut later. To join the narrow legs and aprons, I interlocked the mortise-and-tenon joints (for a similar technique, see "Strong Tenons in Skinny Legs," p. 56). I routed the mortises and cut the tenons at the tablesaw.

When cutting the tenons, test each setup on sample material until the machines and

jigs are dialed in. Use a marking gauge to lay out the shoulders and cheeks on each piece. Clamp a stop to a crosscut sled for cutting the shoulders. Cut all the wide surfaces first, then adjust the blade to the proper height for cutting the shoulders on the apron edges. Before making this cut, put a piece of blue tape on the stop to offset the shoulder slightly. This leaves a small strip of extra material on the shoulder that can easily be pared flush.

I used a tenoning jig to cut the cheeks, then a bandsaw to remove the remaining waste at the ends and between the tenons. Clean up and fit the joints with chisels and files. I round my tenons instead of chopping the mortises square. When all the joinery is cut, saw the drawer front from

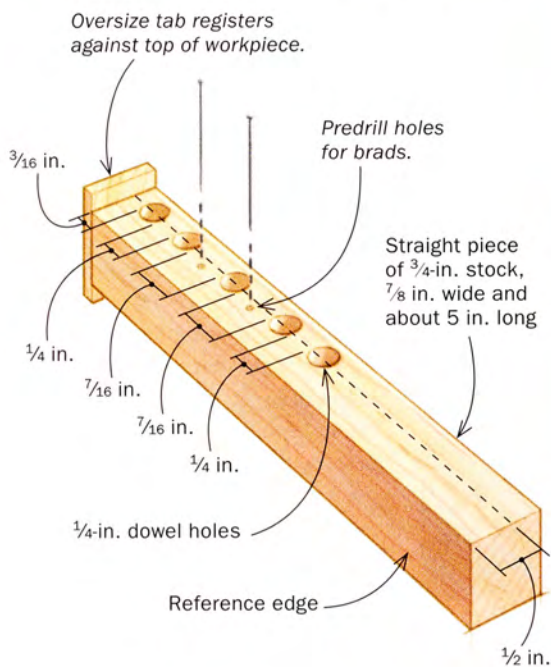


TENONS

Rounded tenons for routed mortises. After cutting the cheeks and shoulders at the table-saw, remove the waste with a bandsaw and chisel, then round the tenons with a file.

DOWELS

A shopmade jig ensures accurate dowel holes.



the front apron. Next, dry-fit the end assemblies and measure the inside distance between the front and rear aprons to determine the length of the interior rails. For greatest accuracy, take this measurement as close to the legs as possible.

Create the drawer pocket

The drawer enclosure is formed by a pair of interior rails—each slightly narrower than the aprons—that run front to back



Mark the back apron for each drawer rail. Align the ends of the front and back aprons. Scribe a line along the front apron's inner edge, marking the rear apron to locate the doweling jig.



Secure the doweling jig. Drive brads just far enough to hold it. Drill the jig and the first set of dowel holes at the same time.



Mind the reference face. To ensure proper alignment of the dowel holes, keep the jig aligned with the workpiece edge.



Drilling goes quickly. For the holes in the rear apron, keep the jig's reference face oriented toward the interior of the piece. Align the edge with the layout line you scribed on the apron's inner face. A large hand screw secures the rail (right) for drilling into the end grain.



Shape the parts

Anderson's table is distinctive because of the organic curves that require shaping on every major component. Aside from a few bandsaw cuts, much of the work is done by hand with spokeshaves, planes, scrapers, and sandpaper.

LEGS

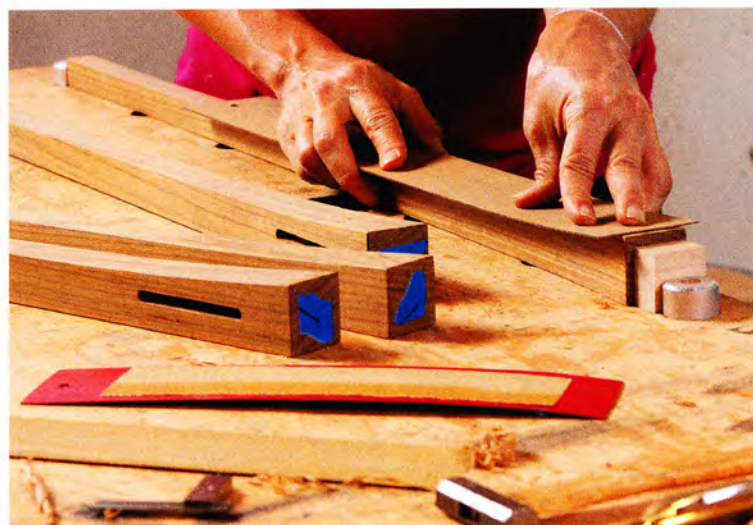
Start at the bandsaw. Cut close to the lines to create the long, gentle curves on the outside faces.

Smooth the shape with hand tools.

The curve is gentle enough to accommodate the sole of a skewed smoother or a block plane. Anderson follows up with a scraper.



Flexible sanding pad. Anderson attaches adhesive-backed sandpaper to strips of plastic laminate for a flat backer that is rigid but gives enough to easily follow the curve.



and guide the drawer sides. Each rail is joined by dowels to the front and rear aprons and rabbeted along the bottom to accommodate a framed panel. This panel closes the compartment, adds rigidity, and supports the drawer from underneath.

For smooth drawer movement, the interior rails must be parallel to one another, with dowel joints that are precisely aligned, front to back. To accurately lay out the joints on the face of the rear apron, I used the front aprons as a reference (see photo, p. 69).

A jig aids doweling—I drilled my dowel holes using a shopmade jig created especially for this project (see drawing, p. 69).

To drill a front apron, set the jig in place so its reference face is flush with the apron's interior edge. Clamp the jig temporarily while you fasten it with a couple of brads. At the drill press, take a moment to set the bit depth, using the layout for your shaping as a guide. Drill through your layout marks, simultaneously completing the jig and drilling your first set of dowel holes.

After drilling the apron, carefully align the jig on the end of the corresponding rail and drill the mating holes.

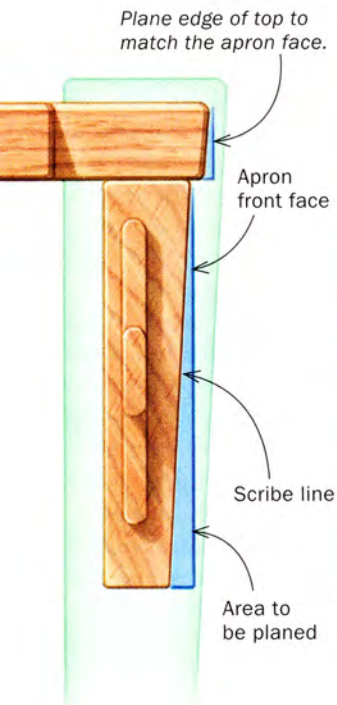
Repeat the process on all the aprons and corresponding rail ends. Once all the holes are bored, test the fit. One way to simplify the test-fitting of dowel joints is to use dowels in only half the holes. It also helps to compress them by rolling them between a file and your bench. This keeps the dowel holes from loosening during multiple dry-fits.

Build and fit the frame-and-panel bottom

The drawer pocket's bottom is a panel set in a frame held together with bridge joints. These joints are easy to cut with a tablesaw tenoning jig, and their ample glue surface makes them very strong. Because the drawer runs directly on the frame, I oriented the frame's joinery so the grain is

APRONS AND TOP

To give the table a graceful, cohesive appearance, Anderson shapes the aprons and tabletop to match the legs.



Mark the profile on the apron. Measure the reveal between leg and apron at the top of the assembly, then mark the apron's bottom and end grain to match.



Make shavings. The taper on the apron faces is gentle, so the waste can be removed with a handplane. Start with the iron set for an aggressive cut, then adjust for a finer cut as you approach the layout line to minimize tearout.



More curves. Anderson bandsaws a very gentle curve into the bottom edge of each apron. Afterward, she smooths the bandsawn edges. She shapes the curve in the underside of the drawer front after it is assembled and installed.

uninterrupted from front to back. I made the frame slightly wide, so I could hand-plane a perfect fit later. I added $\frac{1}{8}$ -in.-thick edge-banding to hide the end grain on the frame's front edge.

Although it is hidden most of the time, the panel inside the frame is more for beauty than strength. Use your primary project wood, and take care in assembling and finishing.

I cut the tongue on the panel, and the stopped grooves that hold it, on the router table with a fence and straight bit. Sand the panel before this step. Heavy sanding afterward may loosen the fit. Prefinish the panel and the inside edges of the frame. After glue-up, saw $\frac{1}{8}$ in. from the front edge and add the edge-banding. Flush the edge-banding and then plane the edges for the final fit.

Shaping is the fun part

Once all joinery has been cut and fit, the shaping begins. I shaped both outside faces of each leg in a pronounced taper that



Don't overlook the top. Bevel the edge slightly to harmonize with the shapes of the legs and aprons. Use a bevel gauge to transfer the angle from the apron faces.

Assembly

Anderson pre-finishes the entire table (other than the joints) before the glue-up, which takes place in several stages for simplicity's sake and to ensure the assembly remains square throughout. Afterward, she assembles, fits, and shapes the drawer.



Stage one: Side aprons go into the legs. Because the parts are prefinished, Anderson makes her cabinetmaker's marks on blue tape to help orient the parts for proper assembly.

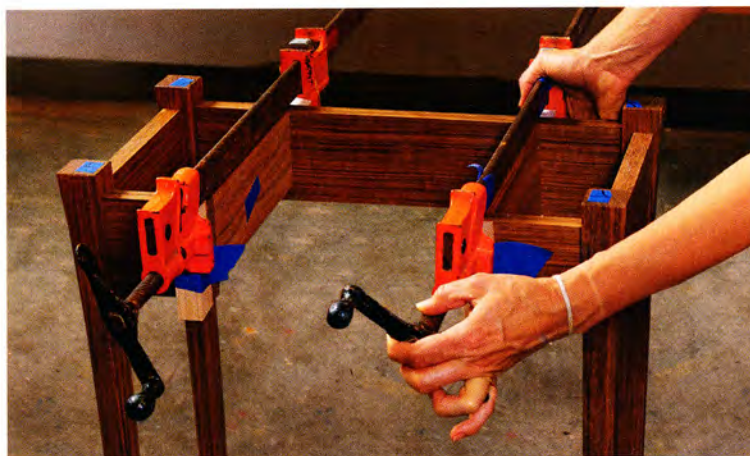
Stage two: Inner rails are next.

Glue the dowels into both ends of each rail. Tap the dowels home with a hammer to prevent them from seizing. Anderson uses a measured reference block to set the depth of each dowel. Let this glue dry before adding the front and back aprons (far right).



Dry-fit the legs to aid clamping.

The legs hold the aprons in proper position, making it easier to clamp the rails in place squarely.



ends in a graceful curve at the top of the leg. I also shaped the face of each apron to follow the taper of the legs for a consistent reveal where the two meet. Lastly, I planed a slight bevel into the edge of the top to match the rest of the piece.

To start shaping the legs, bandsaw close to one of your template layout lines. After the first cut, lay the template on the bandsawn surface and strike a new line for cutting the adjacent face. At the bench, use a combination of block and smoothing planes, scraper, and sandpaper to fair the curves and smooth the surfaces.

The taper in the apron's face is slight and easily planed in by hand. To lay out for the taper, dry-fit each leg-and-apron connection, measure the reveal at the top

of the joint, and mark the bottom edge of the rail with this measurement. Strike a line at this mark along the bottom edge, and connect the mark with the top edge of the apron front. This pair of lines guides the planing.

I used a block plane to chamfer the top and bottom edges of each leg to prevent chipout. I also used a spokeshave and block plane to shape a subtle curve on the bottom edge of each apron.

Dry-fit the table to make sure all the tapers and reveals are

consistent. The cut-out gap around the legs should be consistent and wide enough to let the top expand and contract.

Pre-finish and glue up

I almost always prefinish a piece before glue-up. When the parts are separate, there's no struggling to get a brush or pad into tight corners. The result is a very even finish, even one applied in multiple coats as with the shellac and wax on this piece. Prep by breaking edges and sanding parts to P400 grit, paying special attention to end grain. Tape off any surfaces that will get glue.



Gluing up a piece with a lot of components can become a desperate race to apply glue to all of the many surfaces and then get the joints together and clamped before parts start seizing. For greater control, I broke the process into four manageable stages.

Start by gluing and clamping the two side assemblies. With those in clamps, you have time to glue the dowels into the ends of the drawer rails.

After the glue has dried, glue the drawer rails into the front and rear aprons. Once this assembly is together, dry-fit it into the legs, check for square, and clamp.

When the glue is dry, unclamp and remove the leg assemblies. Apply glue to the tenons on the front and rear aprons, seat them in their mortises, and clamp.

When this assembly comes out of clamps, the last step is to glue the frame-and-panel bottom into its rabbets.

With the base complete, finish cutting and fitting the drawer joinery. Assemble the drawer after shaping its bottom edge to match the curve on the underside of the front aprons.

Once the drawer is glued up, shape its front and its bottom edge to match the aprons. Put the drawer all the way into the drawer pocket. Use a sharp pencil to scribe the shape from the front rail to the end grain on the drawer face. Be sure to scribe both sides of the drawer face. Plane



Stage three: Add the leg assemblies and drawer support. After adding the legs (inset, above), the frame-and-panel bottom of the drawer compartment goes into a pair of rabbets milled into the bottom edge of the drawer rails.

close to the lines. Sneak up on the final shape by checking it in the drawer pocket frequently as you work.

There are many ways to fasten the tabletop to the base. I used handmade brass brackets, but commercially made figure-eights would work well, too. Cut the recess for the fasteners into the aprons. Pre-drill and attach the brackets to the aprons and then pre-drill and attach the top. □

Jennifer Anderson builds custom furniture and teaches furniture design in San Diego.

Harmony in the details.

The organic curve of the leg is echoed in the shaped apron faces and the beveled edge profile on the tabletop.

readers gallery



JIM SYVERTSEN

Chesapeake, Va.

Syvertsen turned this mesquite burl vessel (6½ in. dia.) from a circular burl that grew 360° around a limb. The challenge was maintaining the appealing live edges while hollowing the walls of the vessel down to ⅜ in. thick. He finished it with Danish oil.



BRYCE GREEN

Albuquerque, N.M.

This walnut bench (52 in. long by 13 in. wide by 17½ in. tall; drawer box, 17 in. long by 11 in. wide by 5¼ in. tall) is Green's first project as a woodworker (and his first as a student at College of the Redwoods). Inspiration came from a bench by Charles and Ray Eames he'd seen in the book *Handcrafted Modern* by Leslie Williamson. "The whole process of making a piece was new to me," he says, "from creating a mock-up to applying a finish. I was constantly learning how to work with the wood, be present in the process, and be patient with myself." PHOTO: DAVID WELTER

TODD THILGES

West Bend, Iowa

Thilges started this cherry reproduction of an 18th-century Winchester tall case clock (12 in. deep by 22 in. wide by 96 in. tall) in a class taught by Jeff Headley and Steve Hamilton at Marc Adams School of Woodworking. Thilges made the feet, base, and waist during the five-day class and finished the rest on his own. The clock face and phases of the moon, custom painted by Kay Brown, include the year Thilges was married and a barn to represent his work as a farmer. He finished the case with potassium dichromate to create an aged look, boiled linseed oil, shellac, and lacquer. The clock works are by Green Lake Clock Company.



Submissions

Readers Gallery provides design inspiration by showcasing the work of our readers. For submission instructions and an entry form, go to FineWoodworking.com/RG.



MICHAEL J.C. HOLTON

Calgary, Alta., Canada

Asked to design a dining table, Holton originally drew one with a split down the middle of the top. But his client suggested that the split be in the legs instead. Holton liked that idea and produced this table (36 in. wide by 80 in. long by 30 in. tall). The split legs are joined top and bottom with stretchers. Holton made the table with wenge veneer over plywood and finished it with lacquer. PHOTO: JOHN DEAN

COSMO BARBARO

Edinboro, Pa.

Inspired by dentil details on Egyptian furniture, Barbaro made a series of pieces with a similar decorative treatment, including this mahogany dining chair (17 in. deep by 20 in. wide by 36 in. tall). He made the dentils by inlaying squares of wenge and fiddleback maple into the seat rails and chair back. Barbaro used bent lamination to make the back, upholstered the seat with nubuck leather, and finished the chair with Bartley's gel varnish.



CRAIG THIBODEAU

San Diego, Calif.

This marquetry cabinet (22 in. deep by 49 in. wide by 84 in. tall), is the largest marquetry piece Thibodeau has made. Made of wenge, ash burl, curly maple, and quartersawn maple, it includes roughly 200 dogwood flowers made of holly and satinwood veneer and 150 leaves made of dyed poplar veneer. The branches are mahogany. Thibodeau sand-shaded the individual petals and leaves to create the shadow effect. He finished the piece with satin conversion varnish.

PHOTO: CRAIG CARLSON





TWO DECADES OF INSPIRATION ON THE COAST OF MAINE

Peter Korn, founder and director of the Center for Furniture Craftsmanship in Rockport, Maine, started teaching classes in the small barn behind his house in 1993 and has gone on to build one of the finest craft schools in the country. Drawing teachers and students from around the globe, CFC offers classes for the amateur and professional furniture maker that range in length from weekend workshops to full-time, nine-month courses. The school also has a gallery that mounts four or five exhibitions each year and a residency program for visiting makers. The most compelling evidence of the school's quality might be what you see on these pages—original work by graduates of this year's Nine-Month Intensive course.



ERIK CURTIS

Poughkeepsie, N.Y.

Curtis adapted this piece from an 1898 chest by the English Arts and Crafts furniture maker Sidney Barnsley. He said he modified the original "until I had a piece I felt comfortable calling my own—

though the clear inspiration is inescapable." Curtis's chest (18 in. deep by 36 in. wide by 20 in. tall), in white oak with an ebony escutcheon, is finished inside with shellac and wax and outside with Danish oil.



JUDY BONZI

Rockport, Maine

Bonzi says her interest in the French Art Deco furniture maker Émile-Jacques Ruhlmann—"and in particular those crazy legs he made"—guided her in designing and building this table (14½ in. wide by 27 in. long by 25 in. tall). Each leg comprises eight pieces of riftsawn walnut, coopered and then faired to the distinctive Ruhlmann torpedo shape. Bonzi curved the aprons, which are also riftsawn walnut, to complement the curves in the legs. She cut the camphor burl veneer for the top in a four-way book-match and finished the piece with varnish.



YOSHY PINELES

Brooklyn, N.Y.

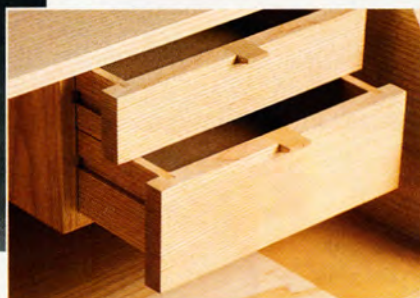
The branching leg design of this table (18 in. wide by 42 in. long by 32 in. tall) grew from Pineles's love of trees and vaulted ceilings. To make the table's thin top stiff and strong, he built it from plywood as a torsion box. He then veneered it with redwood burl. The legs—and the steam-bent arches face-glued to them—are solid red oak. Each leg and arch is fixed to the top with steel dowels and epoxy.



BRETT GABRIEL SIMON

Key Biscayne, Fla.

The idea for Simon's clever knock-down writing desk in ash (20 in. deep by 28¾ in. wide by 38¼ in. tall) came from 19th-century British campaign furniture—pieces used by military officers in the field. The base of Simon's desk is removable and quickly disassembles. The drawers are sized to hold standard paper and envelopes, and the space beside them is made to fit either a laptop or, for campaigns way off the grid, a portable typewriter.



ERIC CUTONILLI

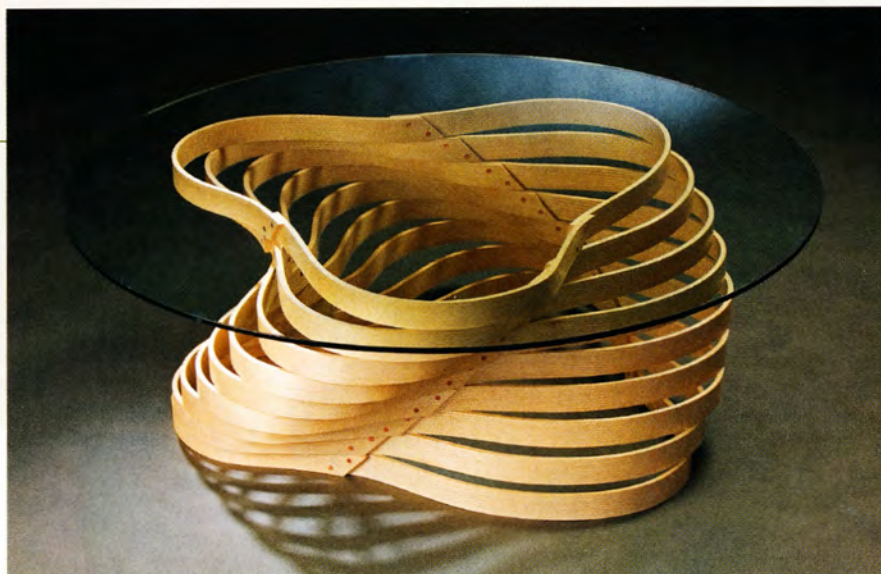
Poughkeepsie, N.Y.

Cutonilli was fishing after class when the inspiration for this hall table flew right over his head: a bald eagle, the first he'd ever seen. The stepped design of the legs, made by overlapping sheets of ⅛-in.-thick Baltic-birch plywood, is an homage to the eagle's enormous wingspan. Cutonilli faced the plywood with curly holly veneer and lipped it with solid holly before laminating the stepped sandwich on a curved form in a vacuum bag. The top is a torsion box mitered to the legs. The table is 11 in. wide by 40 in. long by 34 in. tall.

JASON HEBERT

Washington, D.C.

The idea for Hebert's coffee table (48 in. dia. by 17 in. tall) arose during the bending and laminating segment of CFC's nine-month program. To build the piece, Hebert steam-bent strips of ash and joined them into hoops with copper rivets. He used short sections of threaded steel rod secured with epoxy to attach one hoop to the next.



Strong and handsome: Half-blind mitered dovetails

ROUTER JIG SIMPLIFIES
A CHALLENGING JOINT

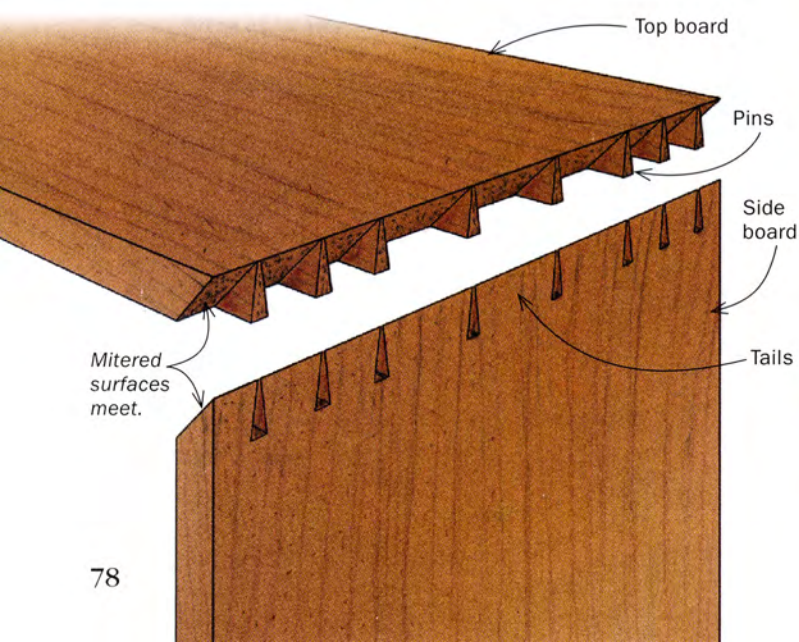
BY MICHAEL FORTUNE

When you use half-blind mitered dovetails to join a case piece or a table, you combine the visual effect of a miter joint—continuous grain wrapping around a corner—with the strength and classic appearance of dovetails. I used the joint on my sideboard (see the back cover), where I wanted a sleek, uninterrupted surface on top, but welcomed the visual punch of through-pins at the ends.

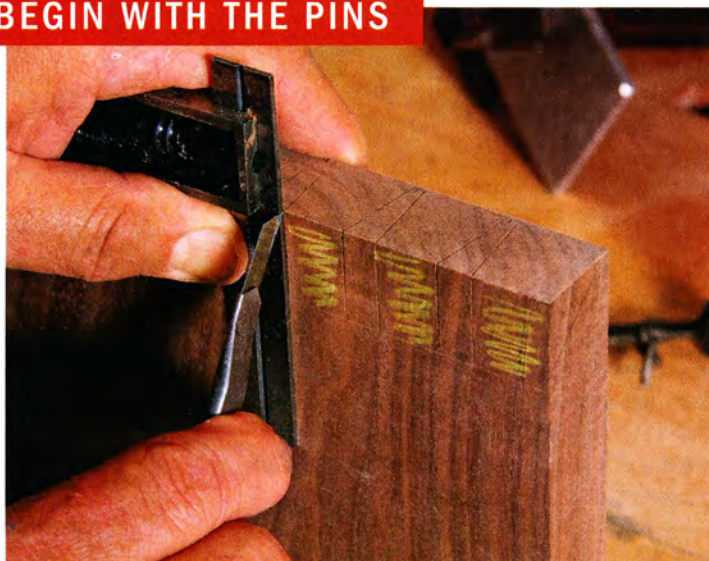
Typically, creating a perfectly true mitered shoulder surface between the pins is the most difficult aspect of making half-blind mitered dovetails. But I built a router jig that makes the process very straightforward. It holds the workpiece at a 45°

A LOOK INSIDE

The tails of a half-blind mitered dovetail are cut as normal tails and mitered afterward. The trick to the joint is mitering between the pins.



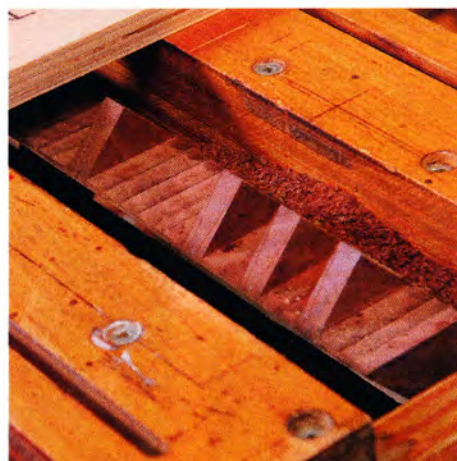
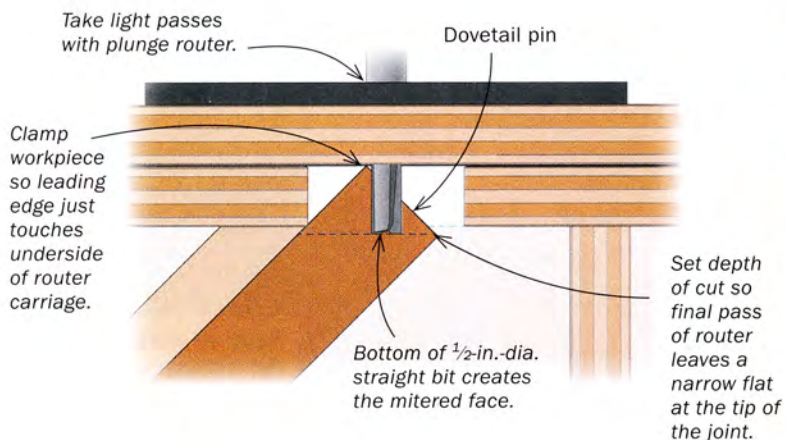
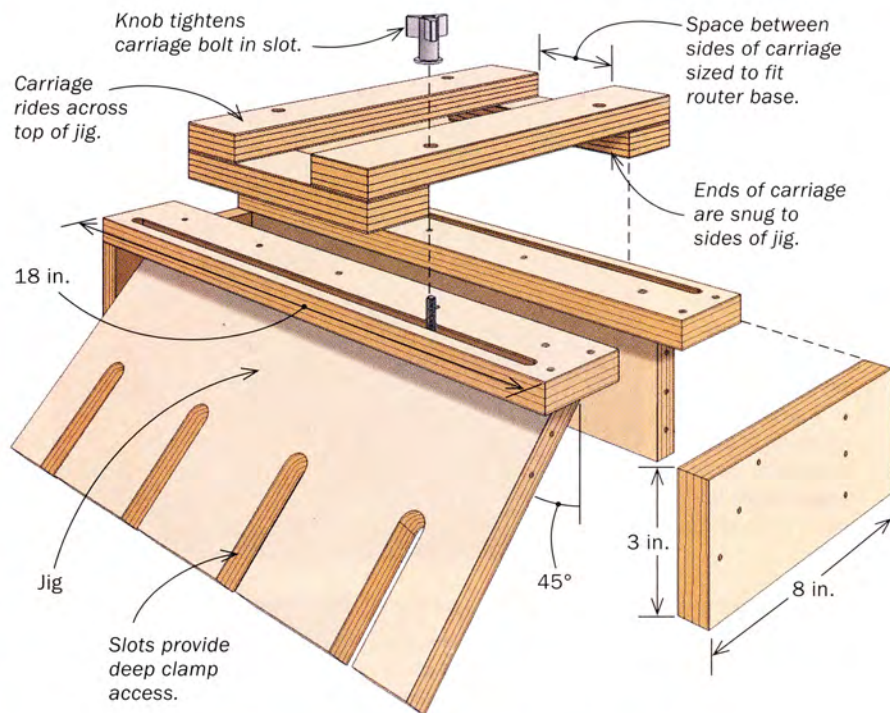
BEGIN WITH THE PINS



Mark the pins with a knife. Deep layout lines are essential to guide the routing. Don't lay out the miter so it comes to a complete point—leave a $\frac{1}{32}$ in.-wide flat at the tip to allow for planing and sanding after assembly.



Hog out the waste. Lock down the carriage for each pass, staying clear of the knife lines. Cut to full depth with a series of light passes. Then creep up on the lines.



Straight bit leaves the cheeks square. The router establishes the mitered face of the joint but leaves the pin cheeks vertical—as if they were finger joints. The rest is done by hand.

FINISH WITH HANDWORK



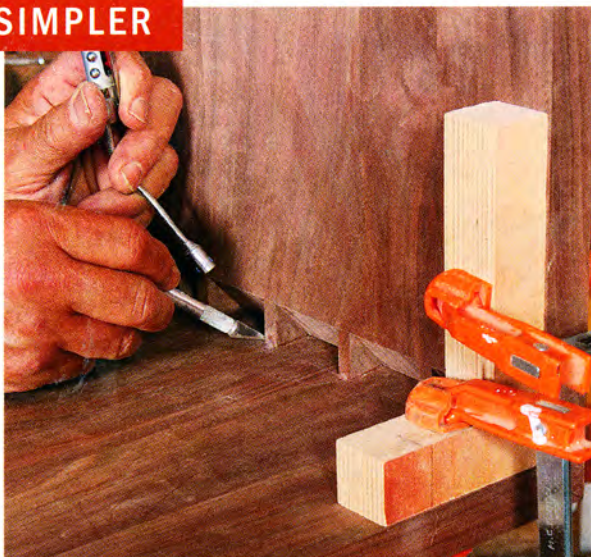
New dovetail tool: tin snips. To cut the angled shoulders of the pins, Fortune modifies a \$17 flush-cutting trim saw so it can fit between closely set pairs of pins.



Pare the angled cheeks. Follow the layout line down to the sawkerf to create the angled cheeks of the pins.

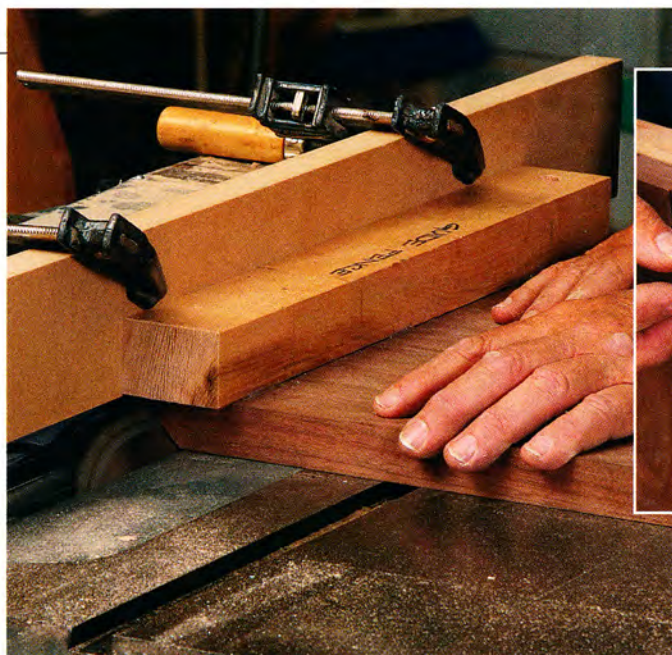
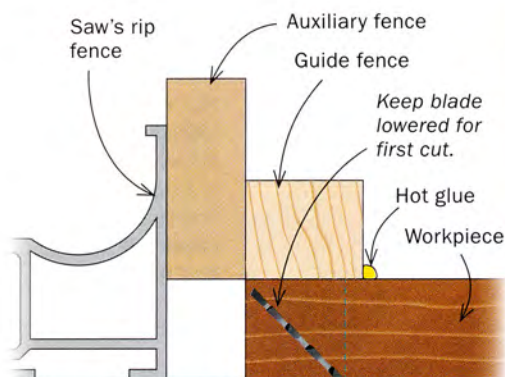
TAILS ARE SIMPLER

Tail boards start out square. After marking the tails from the pins (right), cut them as you would for ordinary through-dovetails. Fortune saws the cheeks and then pares the shoulders (far right) with the aid of a guide block clamped to the workpiece. Sandpaper keeps the block from shifting.



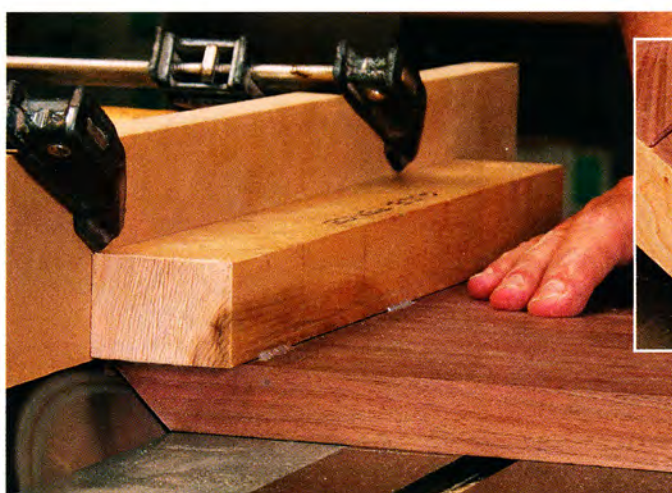
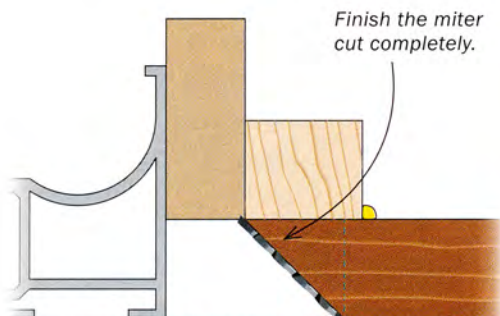
TWO CUTS MAKE THE MITER

First cut goes nearly through. A straight piece of scrap hot-glued to the workpiece rides against a raised auxiliary fence to guide the cut. To avoid trapping offcuts beneath the blade, make an initial pass with the blade slightly lowered.



Snap off the waste. After the first cut, remove the waste pieces, then raise the blade for the final pass.

Second pass completes the miter. With the majority of the waste removed, raise the blade and make the final trim cut.



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WHERE THE MITERS MEET



How to clamp a half-blind miter. Triangular clamping blocks adhered with quick-setting cyanoacrylate glue provide the purchase for clamps on the tail board. On the pin board, where the joint is blind, a long triangular block glued to a scrap of plywood (with sandpaper adhered below) and clamped in place does the trick.



angle, and you simply rout with a straight bit between your layout lines. To avoid the look of template-cut dovetails, I cluster the pins at either side of the joint and use wider spacing in the middle.

With the routing completed, the cheeks of the pins are parallel. I angle them by hand. First, using a flush-cutting trim saw with its blade held flat on the mitered surface, I cut the shoulder kerfs. Then I chisel away the waste to finish the cheeks. Mark and cut the tails just as for normal through-dovetails. I cut the cheeks with a bandsaw and finish the shoulders with a chisel. Only after the tails are cut does the tail board get mitered. I cut the miter on the tablesaw. To make the cut safe and accurate, I never run the mitered point against the fence. Instead, I guide the cut with a straightedge hot-glued to the workpiece and an auxiliary fence raised off the tablesaw bed.

Before assembly, I lightly chamfer the edges of the tails on the mitered face so the joint will go together more easily. And I apply glue only to the mitered faces and the pin sockets—the spaces between the tails—not to the pins themselves, which could swell and create a difficult glue-up. □

Michael Fortune is a contributing editor.



Clear the decks.

After assembly, knock off most of each clamping block with a few quick strokes of a chisel. Finish the job with a handplane, being very careful of the mitered edge. Use sandpaper to produce the finished surface.



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Strengthen miter joints with splines

Q: I like the technique Marc Adams uses to cut accurate miters on a crosscut sled (FWW #235, p. 34), but I noticed that there was no key or spline in the miter to reinforce the joint. Is there a biscuit hidden in the joint, or does he think it unnecessary to add strength with a biscuit or spline?

—THOMAS HALL, Greeley, Colo.

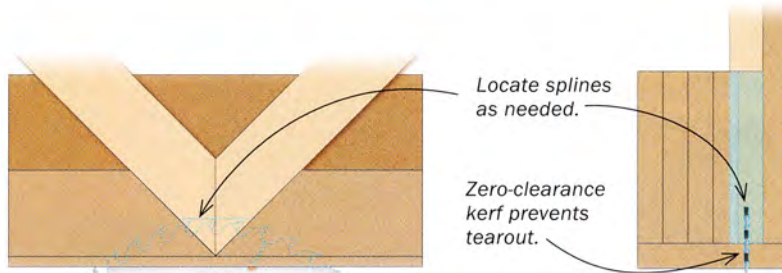
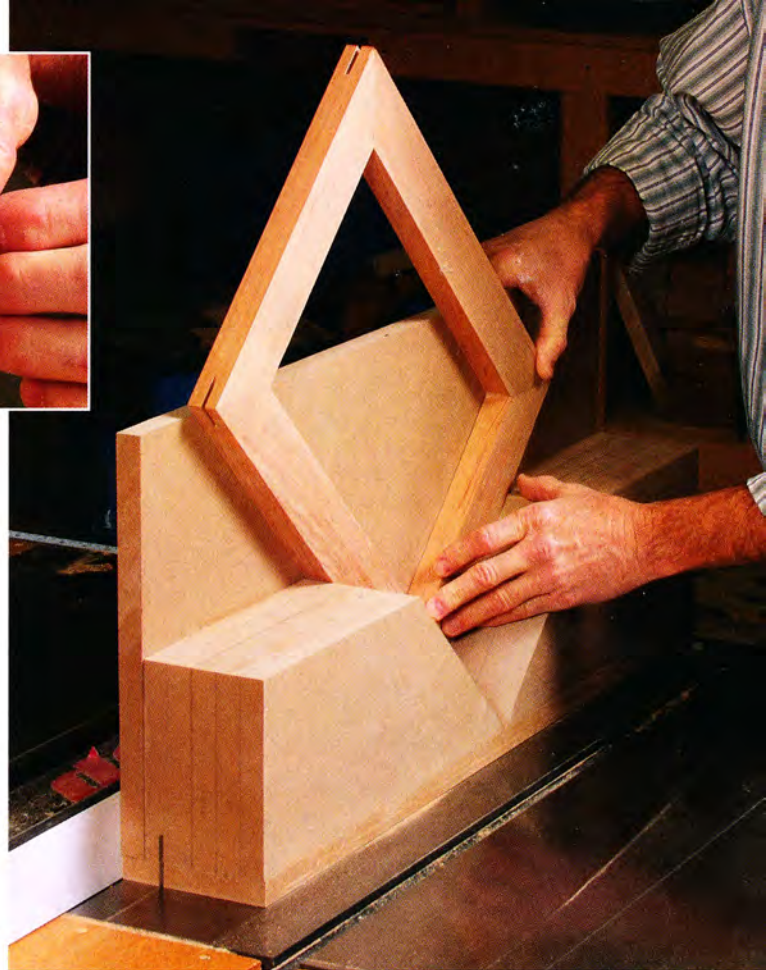
A: FLAT, OR FRAME, MITERS like the one shown in the article almost always need additional reinforcement to keep them together over the long term. Biscuits work OK, but my favorite technique is to assemble the mitered frame and then glue visible splines in the corners afterward. To do that, you must cut a slot in each corner after the frame is glued together. To cut the slots, I make a cradle jig from MDF that holds the frame at 45°. The jig rides against the rip fence and guides the frame through the blade.

—Marc Adams owns one of the largest woodworking schools in the world, in Franklin, Ind. Go to marcadams.com for a course listing.



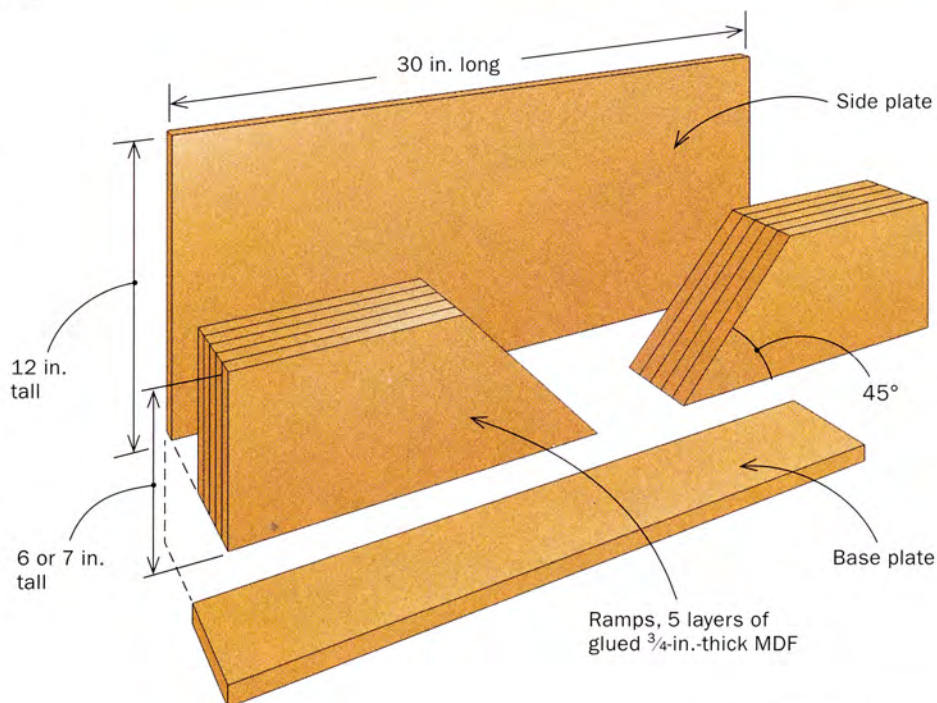
Easy splines.

The jig holds both frames and boxes safely as you cut clean slots through the corners (right). Plane a contrasting wood to fit the slots, glue in the splines with the long grain running across the joint, cut off the waste, and then plane and sand the splines flush.



MAKE A CRADLE JIG

Glue five layers of MDF together, joint the bottom flat and straight, and then cut through the block at 45° on the miter saw. Then just reverse the pieces to create the two ramps, and glue them to a base and side plate to create a square, solid jig.



Ask a question

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

Jointer-planer makes sense for a segmented cutterhead

Q: I'm about to replace my 6-in. jointer with a larger one and wonder whether I should get one with a segmented cutterhead. Any advice?

—CONRAD DEAN,
Prescott, Ariz.

A: SEGMENTED CUTTERHEADS are a wonderful upgrade. The carbide inserts last many times longer than straight steel knives, and that sharpness produces a lot less tearout. But they are not cheap. So, if I were going to buy a segmented cutterhead for just one machine, I'd probably put one in my planer, which mills away a lot more wood and can surface both sides after the jointer has straightened and flattened the first face. Of course, that won't solve your jointer problem. So, instead of buying a jointer or planer, save up and get a 12-in.-wide jointer-planer combo machine with a segmented cutterhead. Expensive, but it's worth it because you get a wide jointer and a planer, both of which use the segmented cutterhead.

—Asa Christiana is FWW's editor.



Best bang for the buck. When you buy a jointer-planer combo machine, not only do you get a very wide jointer with a segmented cutterhead, but you also get an equally wide planer with one.

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Stir satin finishes before use

Q: I recently used an older can of satin varnish, but there was a paste-like layer on the bottom of the can. What is it? Does it mean that the varnish is no longer usable?

—JACK ORTON,
Pendleton, Ore.

A: THE THICK MASS AT THE BOTTOM of the can is the flattening agent, the material that changes a gloss varnish to a satin one. These agents will come out of suspension and settle to the bottom of the can if not stirred regularly. You also will find the same mass at the bottom of a new can. If the finish is still good, the flattening agent can be reincorporated by stirring well. It's easier to do if there's less liquid in the can, so pour about half of the varnish into a clean container, and then stir the paste well into the remaining varnish in the can. Once it's incorporated, pour the reserved varnish back into the container, stirring again. If the paste doesn't redissolve into the varnish, it means the finish is too old.

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



Stir it up. Satin varnishes have flattening agents that settle to the bottom of the can.

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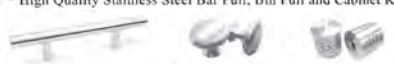
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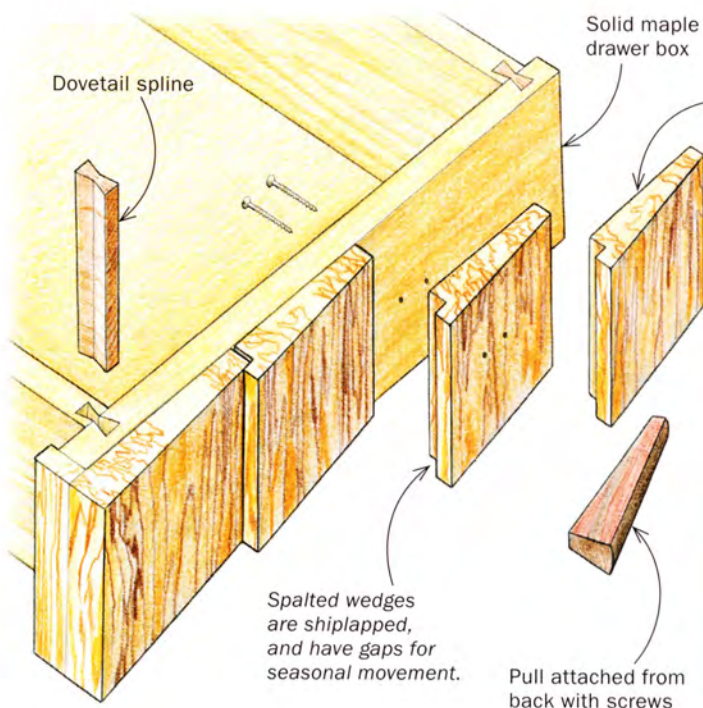
how they did it

Vertical-grain, stepped drawer fronts

BY JONATHAN BINZEN

When Michael Fortune decided to make drawer fronts from firewood for his sideboard (see the back cover), he knew he wanted the spalting lines to run vertically. Since the markings run parallel with the grain, that meant there would be a lot of seasonal movement side-to-side in the drawer fronts. Fortune also wanted to give the fronts a stepped surface to contrast with the smooth, curved edges of the walnut legs and top of the sideboard. He got his zig-zag surface and also solved the expansion problem by making the drawer fronts from a series of overlapping wedges of spalted maple with room between them for movement. He made the wedges with a pair of bandsaw jigs—one that cuts flat sides onto a rough log, and a second that allows him to cut the wedges safely.

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Two wedges from each blank. After drying the blanks on a rack under a fan for several weeks, Fortune used an MDF carriage to cut two tapered pieces from each one.

Jig makes furniture parts from firewood



Put a flat on the firewood. Two screws through a length of perforated angle iron secure the log while Fortune trims one side flat.



Slice the chunk into blanks. After creating a 90° face with a second pass on the angle-iron jig (left), Fortune cuts parallel slices from the log (above).

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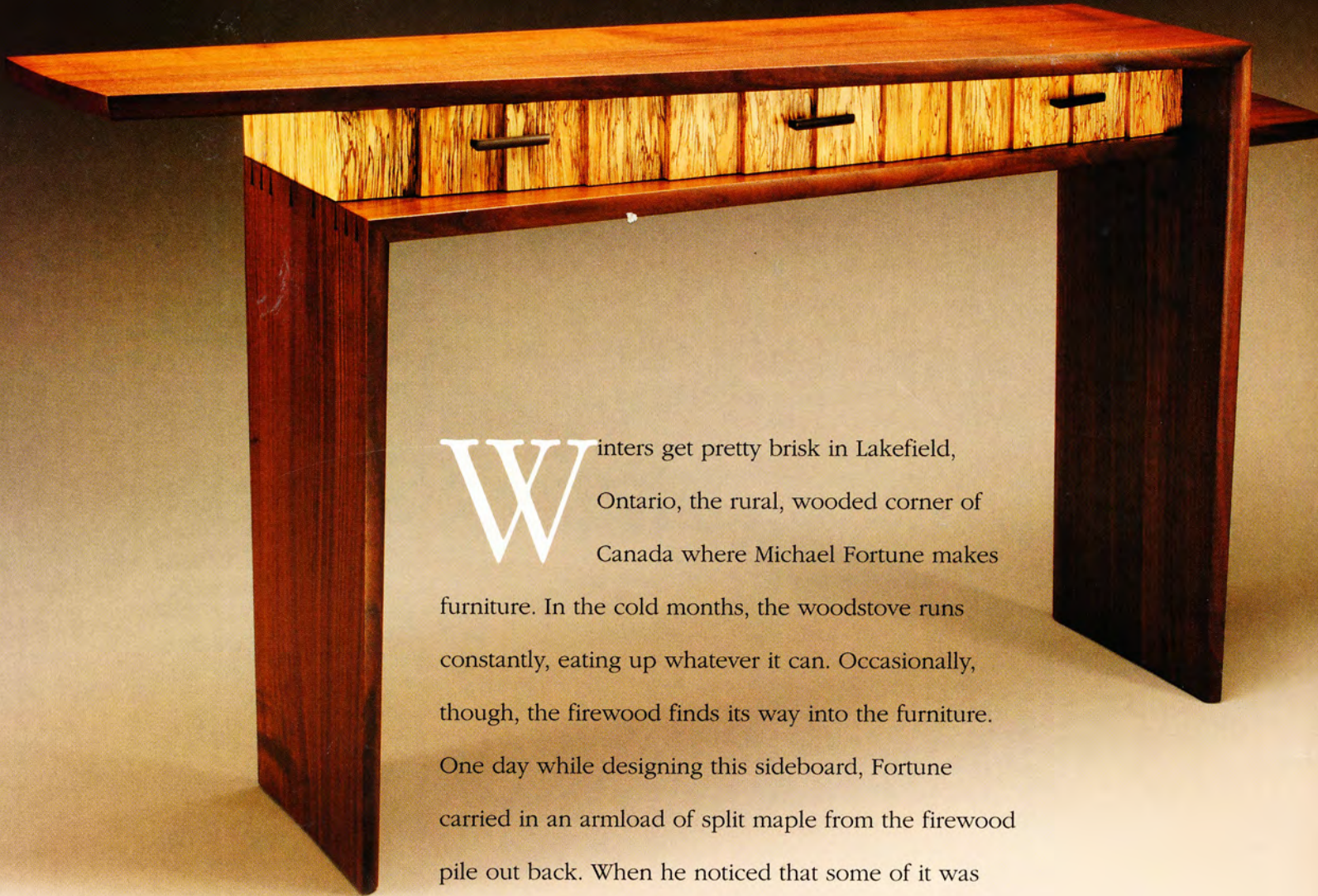
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From Firewood to Furniture



Winters get pretty brisk in Lakefield, Ontario, the rural, wooded corner of Canada where Michael Fortune makes furniture. In the cold months, the woodstove runs constantly, eating up whatever it can. Occasionally, though, the firewood finds its way into the furniture. One day while designing this sideboard, Fortune carried in an armload of split maple from the firewood pile out back. When he noticed that some of it was spalted, he realized he'd just found his drawer fronts—the jagged, dark markings in the creamy maple would pair beautifully with the sideboard's flat planes of walnut. He set some spalted pieces of firewood aside, and before the stove needed feeding again he'd made a couple of simple bandsaw jigs that let him turn gnarly logs into parts fit for furniture (see p. 90). A similar sideboard is featured in Fortune's "Develop Your Own Designs," on p. 42.

—Jonathan Binzen



Photos: Michael Fortune (top),
Jonathan Binzen (bottom)

How They Did It To have a look at the bandsaw jigs Fortune used to turn logs into furniture parts, turn to p. 90.

Slide Show To see a slide show with more of Fortune's furniture, go to FineWoodworking.com/extras.