

Fine
WoodWorking

Make custom handles
for your chisels, p. 37



Tools & Shops

ANNUAL ISSUE

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full-size features

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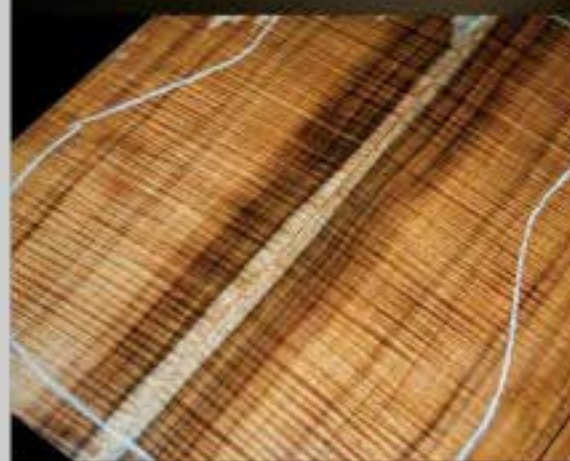
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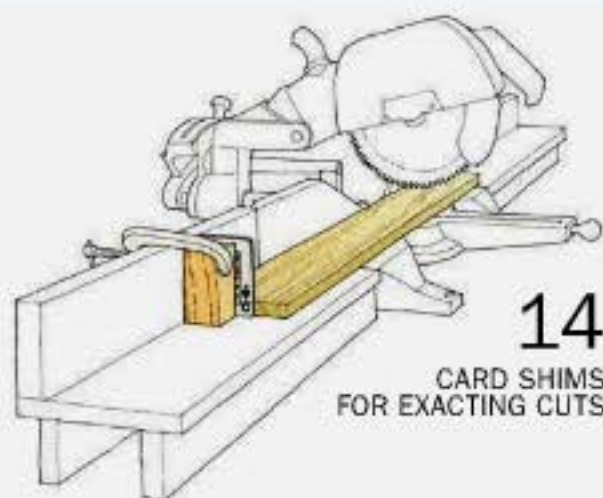
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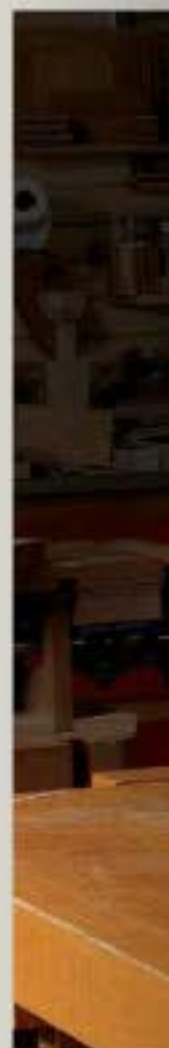
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14-IN.
BANDSAWS



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THIS MONTH ON FineWoodworking.com/extras

Visit our website to access free online extras, available October 22. While you're there, don't miss our collection of free content, including tool reviews, an extensive project gallery, and must-read blogs.



VIDEO

Romancing the Shop

Take a sentimental journey as one woodworker cranks out gorgeous shopmade tool handles from a log (p. 37). From splitting and bandsawing to turning and finishing, you'll see it all.



VIDEO

Minibench Maximized

This benchtop bench (p. 48) brings furniture components closer for precision detail work. But that's not all this versatile workstation can do. To find out more, take our video tour.



VIDEO

Jointer 911

Watch this step-by-step tutorial for tips on how to fix a poorly performing jointer.

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VIDEO WORKSHOP

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- Master the quintessential period fan carving
- Apply a period-accurate finish



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contributors

A native Salt Laker, **Chris Gochmour** (*"Tool Test: Miter Gauges"*) started his woodworking career in his grandpa's basement, where he built custom skateboards to sell to local board shops. Gochmour eventually found himself living in London, where he developed a passion for woodworking and fine furniture design. After earning an English literature degree, he returned to woodworking and began building handcrafted furniture. That venture has turned into a 30-year career. He also teaches woodworking at Salt Lake Community College, Marc Adams School of Woodworking, and at guilds around the country as well as in his studio. Married with two children and a yellow Labrador, his favorite pastimes are skiing in the nearby Wasatch Mountains, cycling along a river parkway, and building and using custom long boards.



Editing, photographing, and learning from some of the country's best woodworkers was like a dream apprenticeship for **Ken St. Onge** (*"Put a Shop in a Shed"*). Although the former *FWW* associate editor has switched careers and now works in marketing, he still gets to practice the craft by night, building furniture in a newly delivered workshop nestled among a stand of tall cherry trees 90 feet from his back door. He tweets about his shop and woodworking culture in general at @benchcarpenter.



John Tetreault (*"Chisel Handles that Fit Your Grip"*) started woodworking by building toy boats and skateboard ramps in the backyard, but the project that truly gave him the woodworking itch was a kitchen table he built with hand tools from old-growth black walnut he found stacked in a barn. When not in the shop, Tetreault spends time with his wife and 10-month-old daughter, who whispers "whassat?" at every new thing she encounters as she explores the world.

Roland Johnson (*"Tool Test: 14-in. Bandsaws"*) describes his start in woodworking as "a bit inauspicious"—he built an 8-ft. racing boat at the tender age of 14 and it sank the first two times he put it in the water. His woodworking has since advanced, and he's now turned to teaching as a way of paying his hard-earned knowledge forward. A contributing editor to *FWW*, he recently completed a series of online video classes for Taunton Workshops, available at tauntonworkshops.com. He is also a featured presenter with The Woodworking Shows.



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

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From the Editor

COME TO THE COLONIAL WILLIAMSBURG CONFERENCE ON 18th-CENTURY DESKS

I'm happy to announce that registration is open for the 17th annual Working Wood in the 18th Century conference, "Desks: The Write Stuff," presented by Colonial Williamsburg and *Fine Woodworking*. There are two sessions: Jan. 18–21, 2015, and Jan. 22–25. With live presentations by staff of Williamsburg's Anthony Hay Cabinet Shop, attendees will get an inside, in-person look at the design, construction, and evolution of 18th-century desk forms, with examples drawn primarily from the Colonial Williamsburg collection. In addition, guest presenter Robert Millard, who specializes in reproducing Federal-era furniture, will demonstrate the details and decoration in a Lady's Tambour Writing Desk attributed to John and Thomas Seymour (see photo, above).

Presenters at the conference are always top-notch—they're informative and entertaining—and the venue is hard to beat. While you're there, you can explore a treasure trove of furniture in the DeWitt Wallace Decorative Arts Museum, walk the Colonial Williamsburg grounds and chat with 18th-century characters in costume (be proper!), and visit boutique shops and cafés within walking distance. There's also a fabulous banquet event and cocktail hour. And this year there will be something new—a tool swap. *Fine Woodworking* editors will be available to chat between sessions. For more information, go to www.cvent.com/d/j4qsnv.

See you there.

—TOM McKENNA, editor

The perils of going pro

In spite of all the warnings, I am a couple of years into the attempt to make a decent living building custom furniture. Do you have any advice?

—ROB CLARK, Coulterville, Calif.

Christian Becksvoort replies: Time management, marketing, and knowing how to run a business are of the highest importance. Unfortunately, woodworking schools teach you how to do woodworking and joinery but neglect these three most important aspects.

Furniture making is a pretty basic blue-

collar endeavor. You have to decide whether you're doing this for therapy or for a living. A friend of mine finally graduated from a famous woodworking school, and his first project, a beautiful chair, took him six months. He tried to sell it for \$2,000. At 40 hours a week, that's \$2 per hour. He's back to his day job.

You have to build what customers want to buy, not what you want to build. Once you have a name and have a track record, then you can design art furniture and charge the big bucks.

I still spend about 60 hours a week on my business, but only 30 hours is in

the shop. The rest is non-billable time: Nobody pays me to sharpen, maintain machinery, have my work photographed, do bookkeeping, etc. And guess what? After more than 30 years in business, no customer has ever asked me how thin my shavings are.

If you don't have people skills, hire or partner with someone who does, or hire a rep. Have professional photos taken of pieces you want to show and build again. Get a professional designer to do your letterhead, business card, advertising, and website. Glad-hand at every social gathering, then maybe in 10 years you'll start to break even. Good luck.

Japanese tools in the limelight

Please tell Andrew Hunter I knew the hutch on the October cover was his work at a glance ("Make a Country Hutch," *FWW* #242). Like his earlier blanket chest, it shows that lively gleam pine gives when well-planed, and a nice clarity of design.

I feel like Japanese tools and views are under-represented in *FWW* in general, so it's been a pleasure to see a shop where they're being used with a natural ease on a material where they're very appropriate. I'd say his tools are closer in spirit to those used by colonial artisans than most of the fine post-industrial tools we have at our benches



now (and I love my Baileys, Bedrocks, and Lie-Nielsens). Let's hear it for the kiwa-ganna!

It was also a tickle to see in the same issue a Japanese hammer whomping on a Blue-Chip and a carver's mallet tapping dovetails with a double-hooped Japanese chisel (in Gerald Curry's great piece on drawers, for which I thank you).

—WILLIAM RICHTER, Berkeley, Calif.

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Folding extension tables for benchtop planer

Best Tip



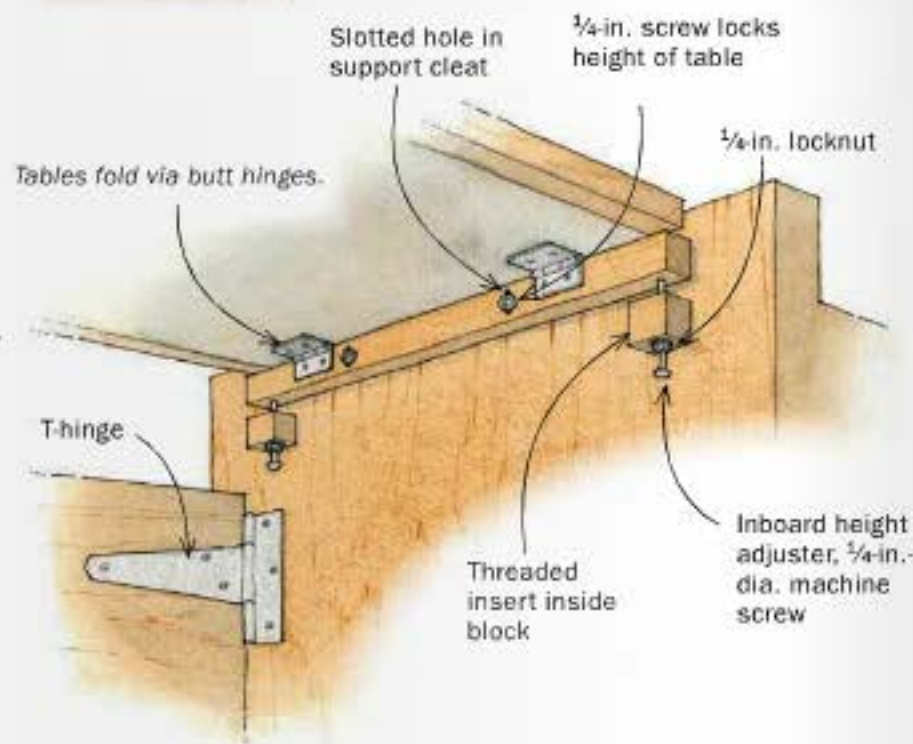
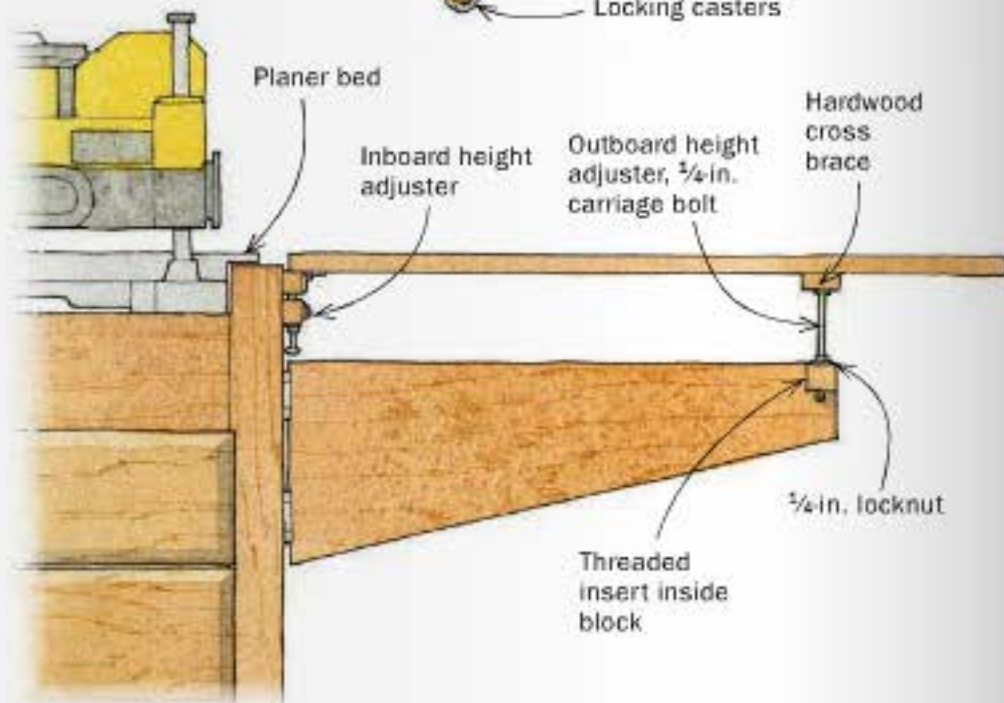
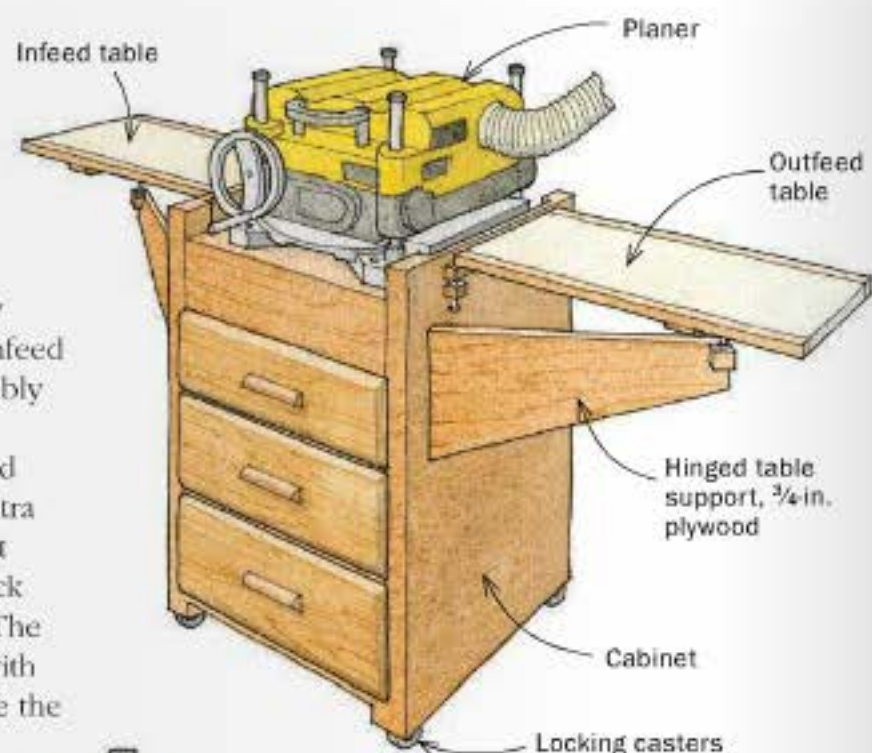
Jeff Bratt got serious about woodworking in 2002 when he signed up for a woodworking class, and he hasn't slowed down since. A member of the San Diego Fine Woodworking Association, he manages their website and participates in the Design in Wood Exhibition each year. Outside the shop, he plays music in a local old-time dance band.

One of the things I read before purchasing my new benchtop thickness planer was that the infeed and outfeed tables were fairly short and probably not worth the extra money. So I designed an inexpensive planer stand with adjustable infeed and outfeed tables, and built-in drawers for extra storage. The infeed and outfeed tables fold out of the way when not in use. The tables are slick melamine shelving material with oak edging. The planer fits tightly between the cabinet sides, with the top of the planer bed resting slightly above the sides. The plywood table supports are shorter than the width of the side so that they don't stick out when folded back, and the tables are a few inches shorter than the sides so that they don't touch the floor when folded down.

The height is adjusted at the infeed and outfeed ends of the table with a screwdriver and wrench—two machine screws with locknuts adjust the inboard end and one bolt with a locknut adjusts the outboard end. A hardwood cross-brace on the outboard end adds extra support, and a shallow mortise drilled in the center provides a sure registration point for the carriage-bolt adjuster.

To set the table height, unplug the planer and raise the cutting head to give access to the bed. Being careful of the blades, set a long straightedge across the bed and table. Loosen the screws in the support cleat and turn the vertical adjusters on the infeed and outfeed ends to flush the edge of the table with the planer bed. Then tighten the locknuts, bolts, and screws in the cleat.

—JEFF BRATT, San Diego, Calif.



A Reward for the Best Tip

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

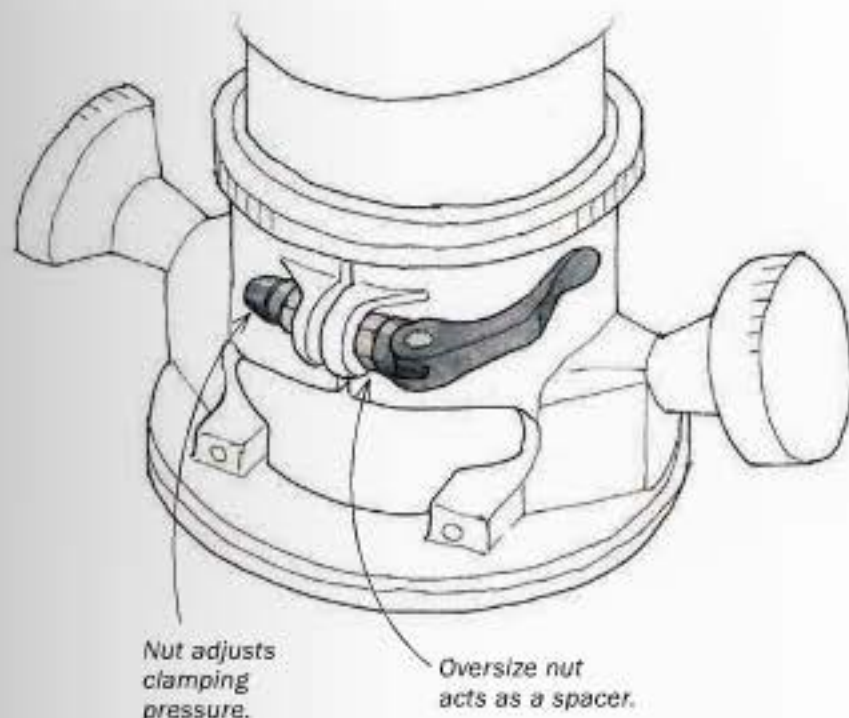
Better locking pin for a router base

Many older routers, including the popular Porter-Cable 690, use thumbscrews to lock the base after the depth has been set. If you don't tighten the thumbscrew sufficiently, it can loosen, change the bit depth, and ruin your project. I know by experience.

By substituting a cam-action clamp—the kind sold to lock a bicycle seat post—you can provide quick, accurate, and secure clamping for the router base. The seat-post clamp works just like the clamps that are standard on new routers, and can be purchased for about \$10 at most bike shops.

You won't need the ring that goes around the seat post, but you probably will need some spacers to make things work right. I used hex nuts a size larger than the threaded shank for spacers. The nut on the end of the clamp adjusts the clamping force.

—JIM WYLIE, Glendora, Calif.



Color-coded electrical outlets

For years I dealt with the frustration of running every power tool in my shop off a single 15-amp circuit. The breaker would trip frequently, often right in the middle of a cut. So I upgraded my shop wiring by adding three 20-amp circuits. I color-coded the outlet covers to make the circuits easy to identify, leaving one white and spray-painting the other covers blue and green.

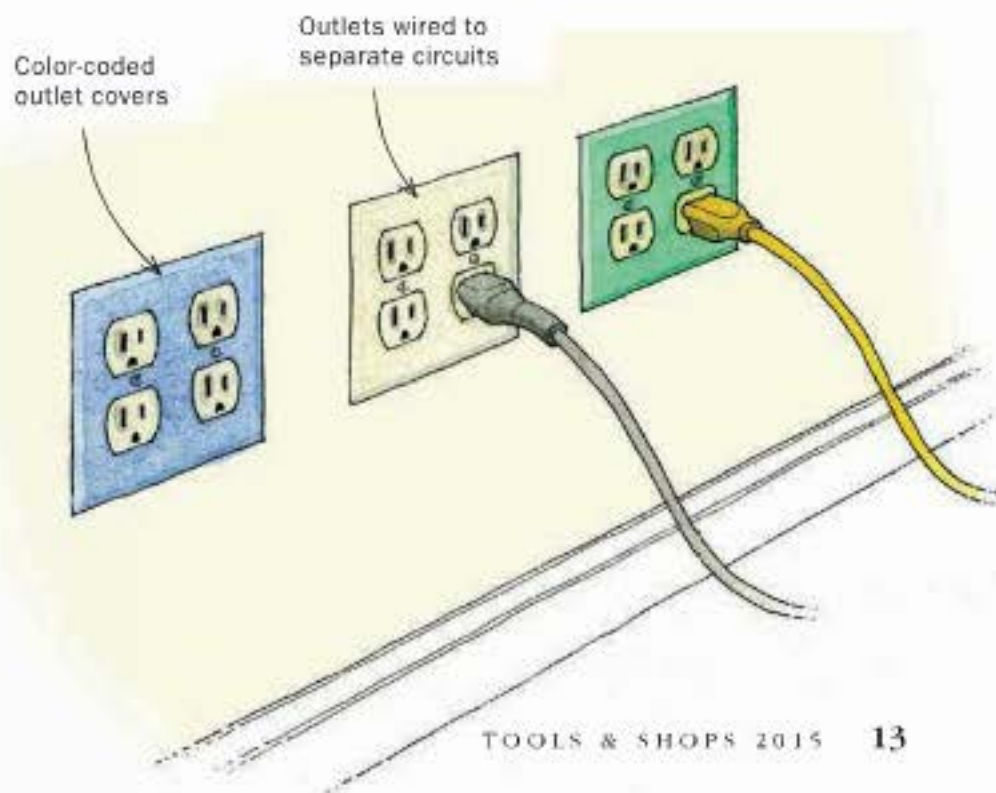
But I knew that running multiple tools (such as my planer and dust collector) on a single circuit could still trip a breaker. So next I wired outlets from all three circuits every few feet around the perimeter of the shop, so no matter where I'm standing I can reach at least two outlets. This has meant fewer extension cords, less unplugging and replugging, and lets me use multiple tools at once with no more tripped breakers.

—DYAMI PLOTKE, Islip, N.Y.



To eliminate this problem, I put my leftover varnish into mason jars and pump out the air with a FoodSaver vacuum pump. You'll need a handheld vacuum pump (\$20) and a jar sealer (\$10), which is a plastic cap that fits over the top of the mason jar. Pour the finish into the jar, put on the lid, and put the jar-sealer cap on top. Connect the handheld pump and remove the air from the jar. The resulting vacuum will seal the lid to the jar and the jar sealer can then be removed. You don't even need to add the screw-on ring—the lid will stay on with vacuum pressure alone. The mason-jar lids can be used over and over again, making this a low-cost solution.

—PETER LIMON, Irasburg, Vt.



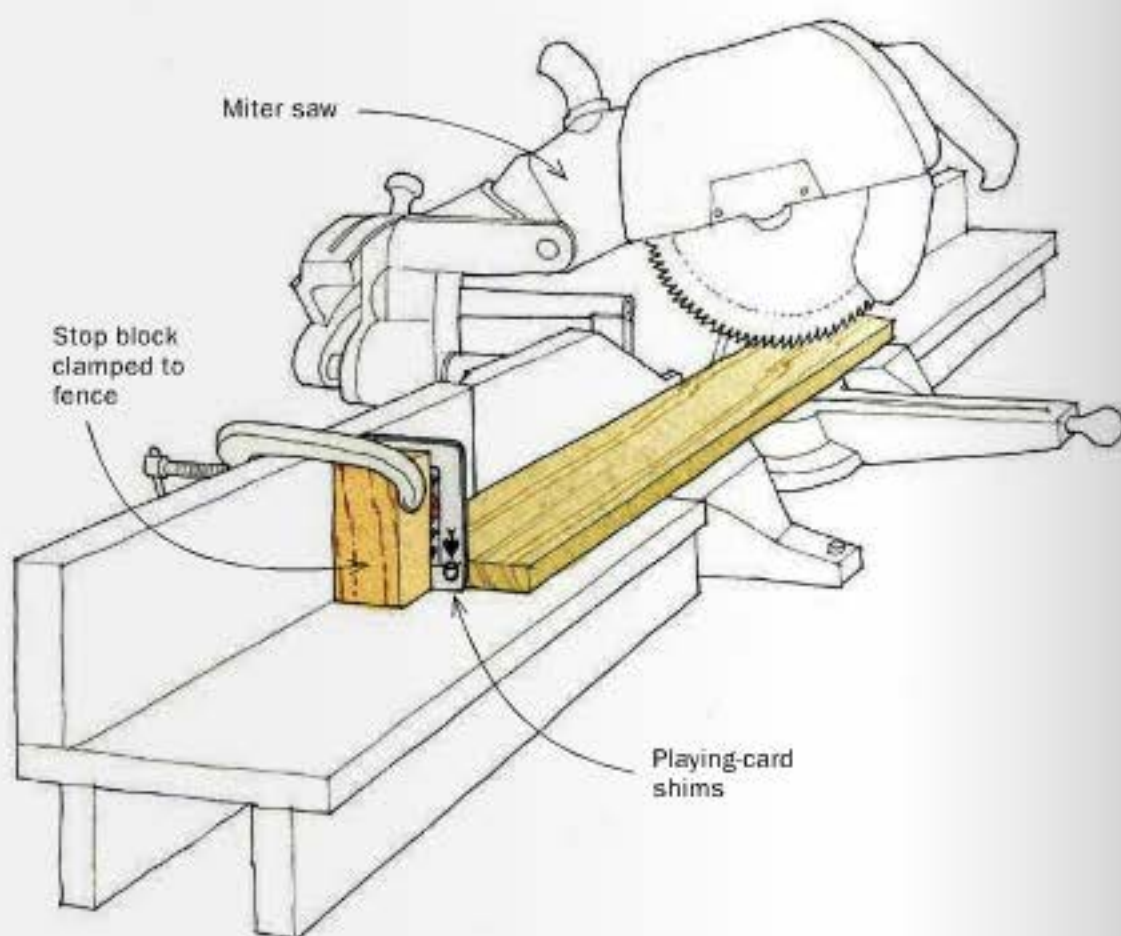
Use playing-card shims for perfect cutoffs

When cutting stock to length at the miter saw, I used to creep up on the length by loosening and reclamping the stop, but it was a slow and imprecise method. Now I use playing-card shims with my stop block to adjust cuts to the perfect length.

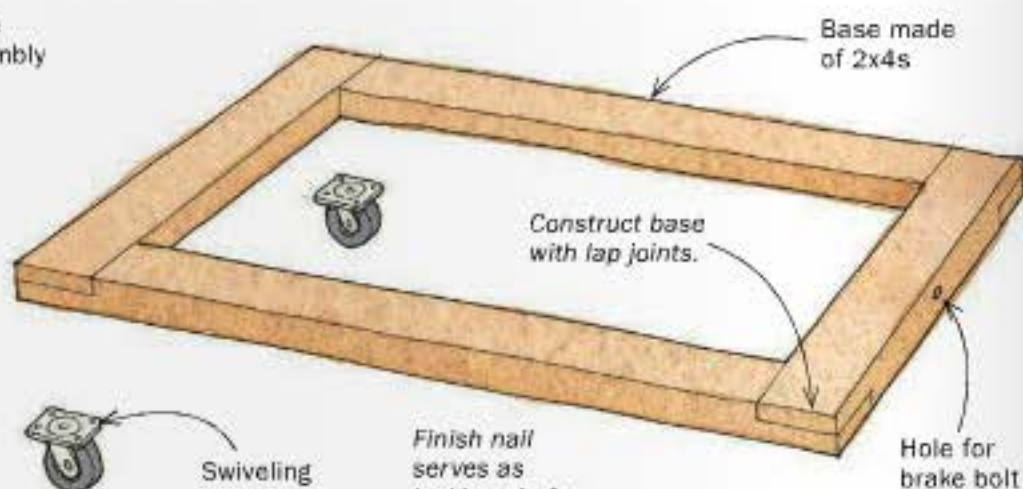
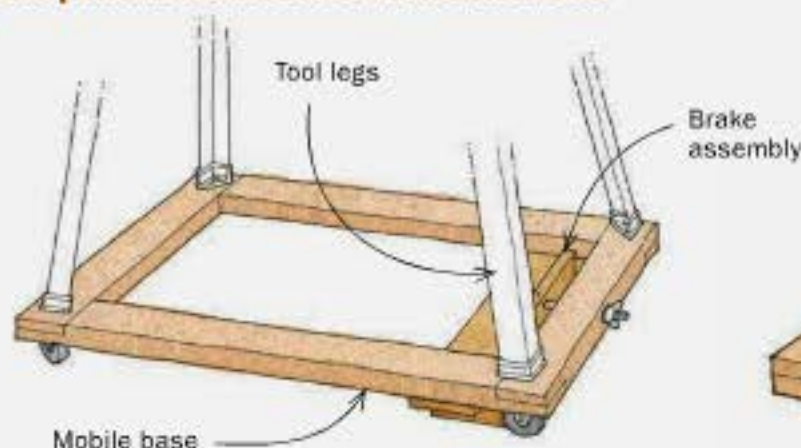
First, I set up an extension fence with the miter saw and set a stop block to make a cut that's just a bit long. I take a trial cut and then make final adjustments by inserting playing cards between the stop and the workpiece until the piece is the length I want. Each playing card is 0.010 in. thick and I may need two or three to get the length I need. With the exact length established, I can cut as many pieces as I need, and I know they will all be the same length.

I don't sweat it if I tear a card or lose it on the shop floor, because I know that even if the jokers are missing, I still have 51 more.

—R. HONEYCOMBE, Kitchener, Ont., Canada



Shopmade brakes for a mobile base

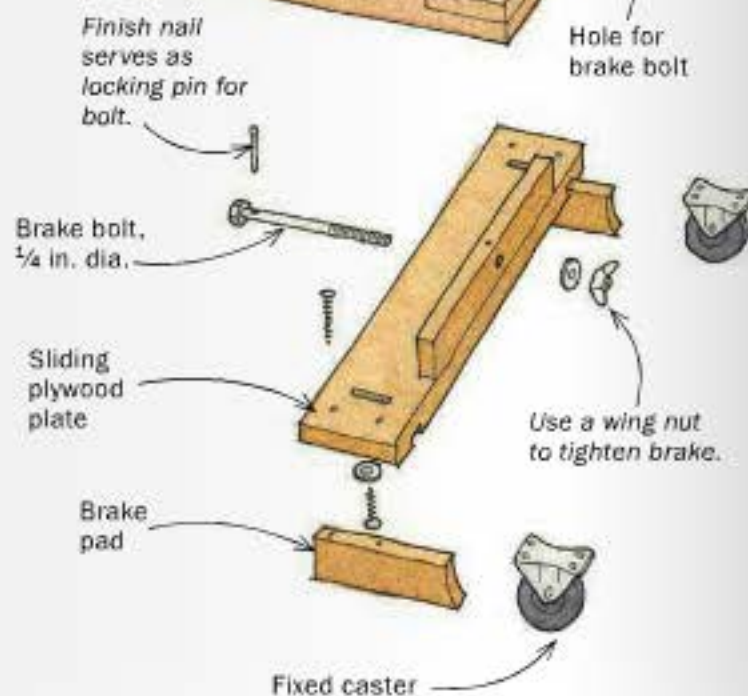


I really wanted all my stationary tools on wheels, but I didn't have enough money to buy commercial mobile bases. So I made a base out of a few 2x4s and scraps of plywood, and created a simple, effective brake that lets you lock the fixed wheels by tightening a single wing nut. The base works so well that I now have seven.

Start by purchasing wheels—two fixed and two swivel. Measure the tool base and add 2 in. to each dimension. This allows a 1-in. overlap for screwing the base to the tool. For a strong frame, I cut lap joints into the 2x4s. Before assembling the base, drill a hole through one end for the brake bolt.

The brake assembly consists of a sliding plywood plate and two plywood brake pads that tighten against the fixed wheels to lock them. I traced the wheels on the brake pad stock and cut and shaped them with a scrollsaw and drum sander. At final assembly, drill a hole through the shaft of the bolt for a small finish nail, then nail the head of the bolt to the plywood plate. The nail keeps the bolt from spinning as the wing nut is turned.

—GUY GERRARD, Orlando, Fla.



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■ MACHINES

Tablesaw is loaded with smart features

POWERMATIC'S NEW PM1000 TABLESAW looks a lot like its big brother, the PM2000, which I've owned since it was introduced a decade ago. Like the PM2000, the PM1000 is a great (and good-looking) saw. However, the PM1000's smaller footprint and 100-volt motor make it ideal for a home shop.

But there's more to the saw than its size, motor, and good looks. The T-square fence assembly and miter gauge are stout and accurate, which makes sense because they are the same models as those found on the PM2000. A well-positioned spring-loaded plunger locks the arbor for one-wrench blade changes. A convenient cam clamp allows quick and easy changeout from the shark-fin-style riving knife to the full blade-guard assembly. The split blade guard allows the plastic covers to be rotated independently and high enough that the fence can slip under the inside cover for narrow rips. The well-positioned power switch is hip-high and easy to find.



Cam-clamp convenience. The blade-guard assembly and riving knife can be switched out easily by flipping a lever.



Single-wrench blade changes. Push in a plunger to lock the arbor, then loosen the arbor nut with the wrench.

Massive chrome handwheels make short work of blade tilt and elevation with no perceptible lash in any of the adjustments, and the settings can be locked in place.

Cast-iron trunnions and a massive motor/arbor assembly create a stout power unit and the heavy iron soaks up any stray vibrations. A short, flat-belt drive gets all the power smoothly to the blade. The dust collection was excellent.

I ran a bunch of 6/4 and 8/4 white oak past a 40-tooth Woodworker II blade and had no problem keeping a good feed rate without bogging down the 1¾-hp motor. With the perfect combination of power and features, this saw is hard to beat for hobbyists.

—Roland Johnson is a contributing editor.



Tablesaw by Powermatic

PM1000
\$2,000



Blade guard works for narrow rips. The split design of the guard allows one side to lift and clear the fence. The other side stays down to cover the blade.

■ HAND TOOLS

Shooting plane is worth every penny

A **SHOOTING BOARD** is a tremendously useful bench jig, especially when fitting drawer parts, but it's only half the equation. You also need a plane. Just about any bench or block plane can do the job, as long as you can hold it on its side comfortably.

I've used many different planes for shooting, but none of them can compete with Lie-Nielsen's No. 51 shoot board plane. Everything about it is right. I was most impressed by how comfortable it is to use. It has a standard bench plane tote behind the frog, and I could easily wrap my entire hand around it. And because it's mounted at an angle to the sole (which is vertical on this plane), your hand, wrist, and arm are at a comfortable angle when using the plane.

The plane also has a huge sidewall, so it took no effort to balance and keep the blade square to the shooting board; that allowed me to put all of my focus and muscle into pushing it through the cut. Here's something else I loved: The No. 51 weighs more than 9 lb. All that heft allows it to power through end-grain cuts. The Bedrock-style frog is skewed 20°, which made adjusting the blade depth much easier than on standard bench planes, where the adjustment wheel is squeezed in between the frog and tote. This plane is a joy to use because it does its job extremely well.

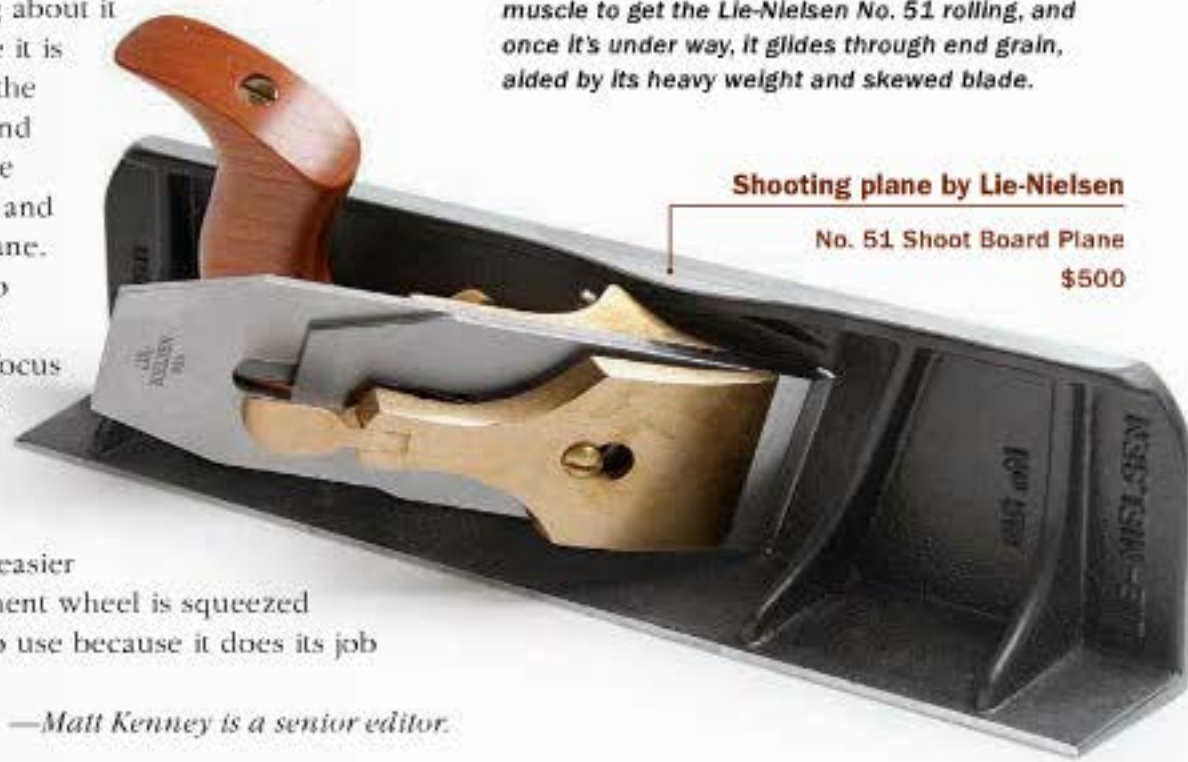
—Matt Kenney is a senior editor.



Excellent for end grain. It doesn't take much muscle to get the Lie-Nielsen No. 51 rolling, and once it's under way, it glides through end grain, aided by its heavy weight and skewed blade.

Shooting plane by Lie-Nielsen

No. 51 Shoot Board Plane
\$500



■ POWER TOOLS

Pin nailer leaves no trace

23-gauge pin nailer
by Senco

Finishpro 23LXP
\$210



I **MAKE CUSTOM BUILT-INS** for a living, and nearly every project includes base molding and crown molding. Often there are other applied moldings as well. An 18-gauge finish nailer is the standard tool for much of this work, but I also use a headless pin nailer in situations where an 18-gauge nail is overkill, such as pinning together the outside corners on smaller crown molding.

The Senco Finishpro 23LXP shoots 23-gauge headless nails. It is a solid, heavy-duty tool with a cast-iron body, but its moderate weight (2.7 lb.) is well offset by perfect balance and a comfortable grip. The swivel air-hose connector makes it easier to use, too.

The 23LXP can shoot nails between ½ in. and 2 in. long, so it's more versatile than my current pin nailer, which only shoots nails up to 1¼ in. long. There's a dual trigger for safety,

but once in firing mode you can hold the safety trigger down and fire sequentially without resetting. Unlike most nail guns, the tip doesn't need to be depressed to fire; that makes it easier to use but is also a safety factor to keep in mind. Best of all, the 23LXP leaves absolutely no indentation,

thanks in part to a replaceable plastic nose protector.

And the headless 23-gauge pins leave a hole that is nearly invisible. All in all, I'd happily replace my current pin nailer with the Senco Finishpro 23LXP.

—Tony O'Malley makes cabinetry and furniture in Emmaus, Pa.

■ MACHINES

Kreg improves its pocket-hole machine while cutting the price

I HAVE BEEN USING A KREG FOREMAN pocket-hole machine for eight years, and have always liked it because it cuts pocket holes very quickly. But the new Kreg Foreman DB210 beats it, hands down. It is much easier to set up and operate, and it costs half as much as the old model. That's amazing.

Here's what I like about the DB210. The clamp height and drill depth are controlled by locking screws that can be adjusted without opening the machine, which allows you to work more quickly. Bit changes and fence adjustments are made without tools and are quick. It has a tape and two built-in stops. The handle, which looks a lot like a miter-saw handle, is comfortable and has an integrated switch. Finally, when hooked up to a shop vacuum via the 1¼-in. port, dust collection is very effective, keeping the worktable clean.

I do have two small complaints about the DB210, but neither would keep it out of my shop. First, burrs created on the bottom of the workpiece when a pocket hole is drilled can catch on the grooves machined into the aluminum top. Second, the fence's stops did not retract fully behind the fence's face, and workpieces can catch on them.

—Mark Edmundson is a professional furniture maker in Sandpoint, Idaho.



Built-in bit. Hiding beneath the table is a motor with a drill chuck. Clamp the workpiece on the table and pull the lever down to raise the bit into the work.

Pocket-hole machine by Kreg

Foreman DB210
\$400



■ TURNING

Turning tools are on point

I RECENTLY TRIED THREE gouges from Carter and Son Toolworks: a ¾-in. roughing gouge, a ½-in. spindle gouge, and a 5/8-in. bowl gouge. The handles are aircraft-grade aluminum, which absorbs vibration as well as any material. The business end of each tool is made from M42 high-speed tool steel, and all arrived sharp. The fit and finish was excellent.

The roughing gouge worked great. It is made for spindles, and shouldn't be used for face work. I used it to plane pepper-mill blanks, which it handled easily with little need for sanding. The spindle gouge also performed well, cutting tenons, coves, and beads.

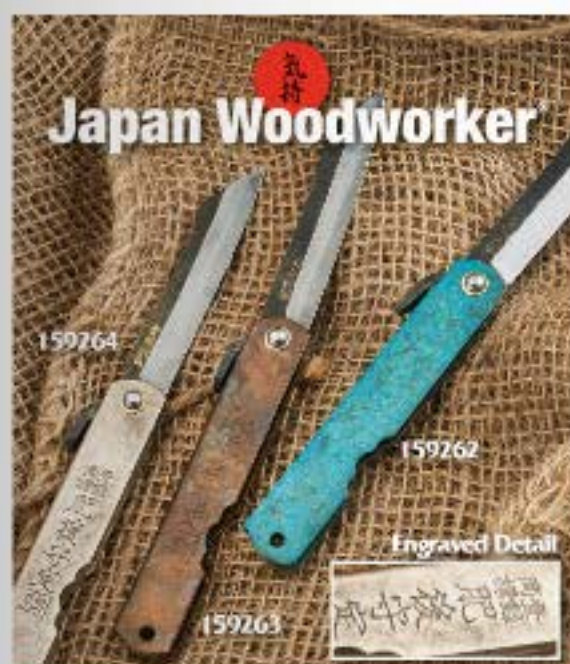
I found the handle a bit heavy, making it hard for me to create precise cuts. According to the manufacturer, a lighter handle is available. I put the bowl gouge to work rounding bowl blanks, including some of cottonwood, which is the most abusive to tool steel. It held an edge better than most tools I have used.

—Mike Maboney is a professional turner in Mt. Auburn, Calif.



Turning tools by Carter and Son

\$180 for 5/8-in. bowl gouge (left)
\$180 for ¾-in. roughing gouge (center)
\$140 for ½-in. spindle gouge (right)



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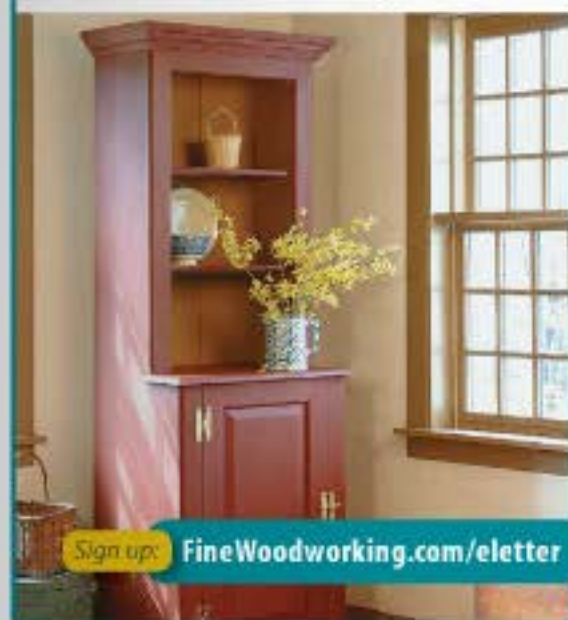
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fundamentals

Make a simple, sturdy crosscut sled

BY MARC ADAMS



While your tablesaw's miter gauge will work OK for cutting smaller workpieces to length, nothing controls large and small work better than a good crosscut sled. With it, you'll get furniture-quality crosscuts as well as clean, accurate dados, rabbets, bevels, and much more. To explore the possibilities of this essential jig, check out my article, "Cut Precise Joints on the Tablesaw," in *FWW* #235.

Crosscut sleds are safer than miter gauges because of the way the workpiece is carried and supported by

a long fence, which also offers a solid perch for stop blocks. The cutoff piece is also controlled, pulled back toward you in a straight path, instead of being left next to the blade to possibly climb onto the back of it and kick back at you.

A crosscut sled doesn't have to be complicated to be effective. Here I'll show you my simple approach to building one. I recommend making your sled as wide as the top of your tablesaw (not including the right-side extension table, if you have one). Front to back, it should be at least 20 in. deep to handle most cabinet parts, but I like to make it the full depth of the saw table. By the

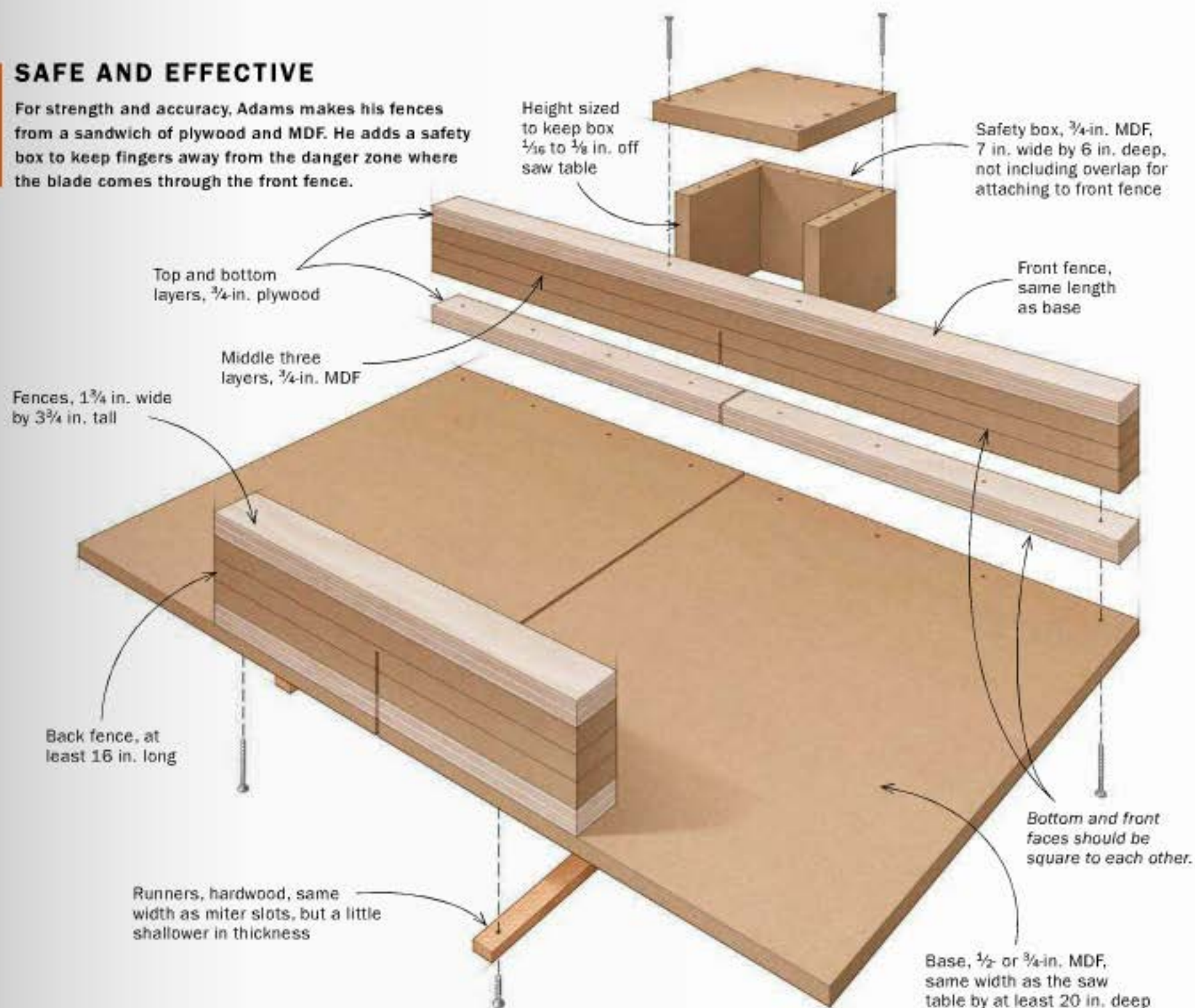
way, you can make the base of the sled from $\frac{3}{4}$ -in. MDF, like most of the other parts of the sled, but I recommend using $\frac{1}{2}$ -in.-thick material if you have it. This will give you an extra $\frac{1}{4}$ in. of cutting capacity above.

Start with the runners

The two runners on the bottom of the sled must fit perfectly into the miter slots on the saw table, with smooth sliding action but no wiggle room. These runners can be made from any dense hardwood, which is what I do, or purchased from woodworking catalogs and websites in a variety of

SAFE AND EFFECTIVE

For strength and accuracy, Adams makes his fences from a sandwich of plywood and MDF. He adds a safety box to keep fingers away from the danger zone where the blade comes through the front fence.



FENCES ARE A SMART SANDWICH

The core of each fence is three layers of MDF for stability, while the top and bottom layers are plywood, which holds screws better.



Glue up and clean up. Rip the strips of plywood and MDF $1\frac{3}{4}$ in. wide, and then glue and clamp them (above) to make tall blocks for the short and long fences. After the glue dries, scrape off the squeeze-out, and then clean up the edges on the jointer (right) and planer.



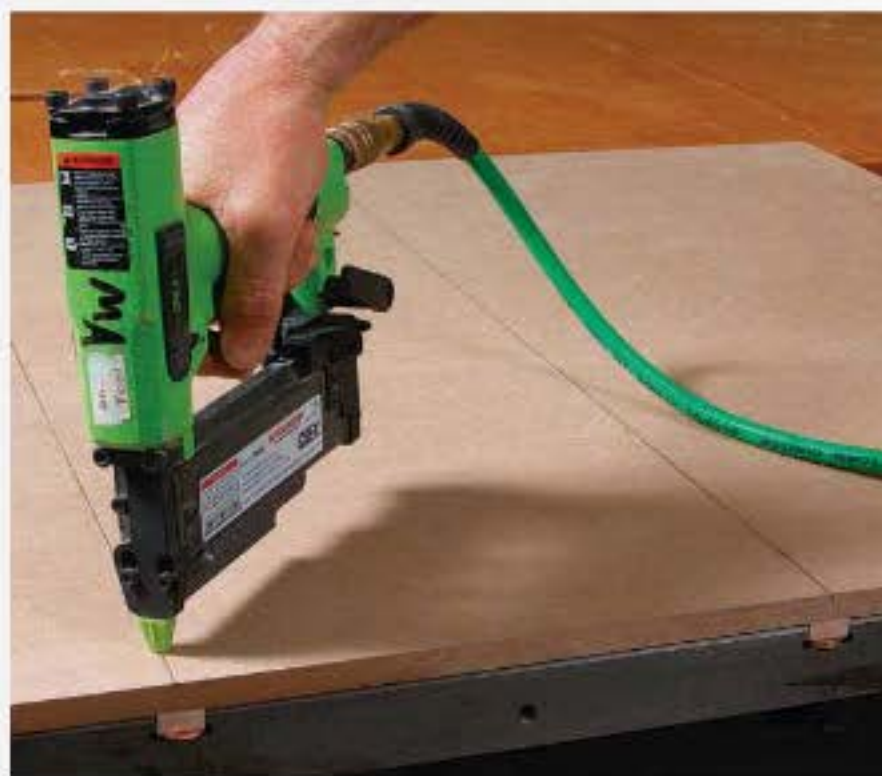
Front fence needs extra care. On the long front fence, lightly joint one of the plywood layers square with one edge of the sandwich, and keep track of those two good surfaces.

ATTACH HARDWOOD RUNNERS

Trick for perfect runners. Mill a board until its edge slides smoothly in the miter slots with no wobble (right). Then lay the board on its face and rip off strips for the runners.



Shim them up. The runners are thinner than the slots are deep, and you'll need to shim them flush with the surface for the next step. Adams used pennies as shims (above). After aligning the front of the sled and the runners with the front edge of the saw table, mark lines on the base over the centerlines of the runners, and drive a few short brads into each of them (right).



Flip and fasten. Now flip over the sled and drill, countersink, and drive screws (above). The nails will hold the runners in alignment while you lock them down permanently. Next, add the back fence (right). Align it with the edge of the sled, and screw it into place. Just keep the screws away from where the blade will pass through.



materials. Whatever you choose, check the size of your miter slots first. Most are $\frac{3}{4}$ in. wide by about $\frac{3}{8}$ in. deep, but some vary, especially on small, portable saws. Also, the runners should be slightly thinner than the depth of the miter slots so they don't get hung up on debris.

If you make the runners yourself, cut them from the edge of a flatsawn board, so they are quartersawn across their width and therefore less likely to shrink and swell.

Smart method for solid fences

You'll need two fences, front and back. The front fence, where workpieces rest, is the critical one. It must be flat, straight, and square to the table—and it must stay that way for years to come. The back fence is there simply to hold the sled together once it has a groove cut down its middle.

I make each fence from a sandwich of MDF and plywood, as opposed to the right-angle brackets or thick pieces of solid wood that most people use. The MDF is there because it is very smooth and stable. The top and bottom layers are plywood because it holds screws better than MDF. The fences I've made this way for my school have remained very flat, straight, and strong over the long haul.

Careful assembly ensures accuracy

With the runners and fences in hand, you are ready to assemble the sled. I do that differently, too.

I place the base on top of the runners, mark the center of the runners on the top of the base, and then drive short pins or brads down through the base to lock those runners in place temporarily. I then flip the base over and attach the runners permanently with screws.

Dial in the fence with test cuts

The key to an accurate front fence is attaching it temporarily, using test cuts to dial in its position, and then locking it down in that same spot. The only way to know that the fence is truly square to the path of the blade is to make cuts with



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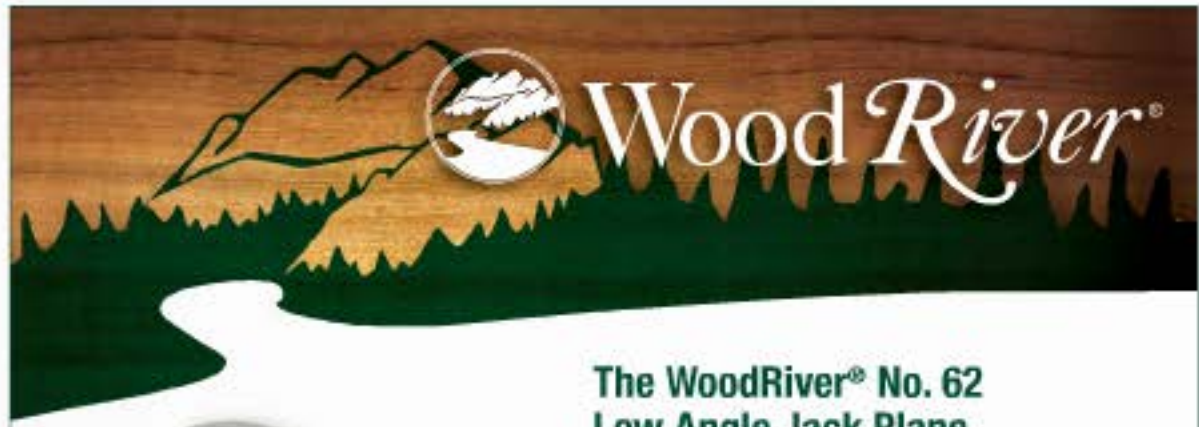
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SQUARE UP THE FRONT FENCE



Build in some wiggle room. Align the fence with the edge of the base and drive a single screw at one end, into a normal hole (left). Be sure the two square faces are positioned correctly. At the other end, drill two holes and chisel or file out the middle to create a short slot. Then align that end of the fence with the base, too, and drive a screw into the middle of the slot (right).



it. Don't feel alone if it takes a number of rounds of cuts and adjustments to get the fence perfectly square; this is often a slow and tedious step.

Add the safety box and you're done

The most dangerous area on a crosscut sled is the exit side of the front fence, where people tend to put their hands and where the blade can pop out unexpectedly. I attach a very important safety feature there: a small box that covers the area and keeps fingers clear.

Finish up by sanding the sharp edges on your sled to make them easier on your hands, and start making clean, accurate crosscuts. □

Marc Adams runs one of the country's largest woodworking schools (marcadams.com).



Test cuts tell the truth. Rip the edges of a strip of MDF parallel to each other, and mark a line along one side to keep track of which side is which. Then make a test cut (left). Flip one of the cutoff pieces, and bring the cut edges back together (above). A gap means the fence is not square.



Make an adjustment. Figure out which way the fence is skewed, and then loosen the screw in the slotted hole, give the fence a tap in the right direction, and retighten. Make as many test cuts and adjustments as you need.



Lockdown. When there are no gaps in your test pieces, flip the sled over and drive a row of screws into the fence to lock it in position.



Don't forget safety. Attach a box to the front fence to cover the spot where the blade emerges, and be careful not to push the sled too far forward in use.

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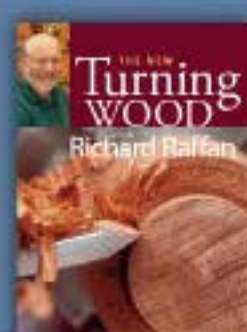
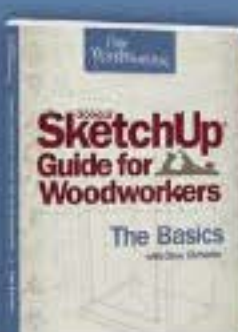


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Set up your tablesaw for success

BY ASA CHRISTIANA



Some power tools will do their best work right out of the box. Don't expect that from your new tablesaw. Unlike a cordless drill or router, a tablesaw needs a tune-up on day one.

If you are incredibly lucky, every part and accessory will arrive perfectly aligned. I've heard of such miracles but never witnessed one myself. The trouble is that a misaligned saw is a dangerous saw, and you won't know until you make a cut. At best it will be rough and inaccurate; at worst the board will kick back at you or become jammed against the fence or blade midcut.

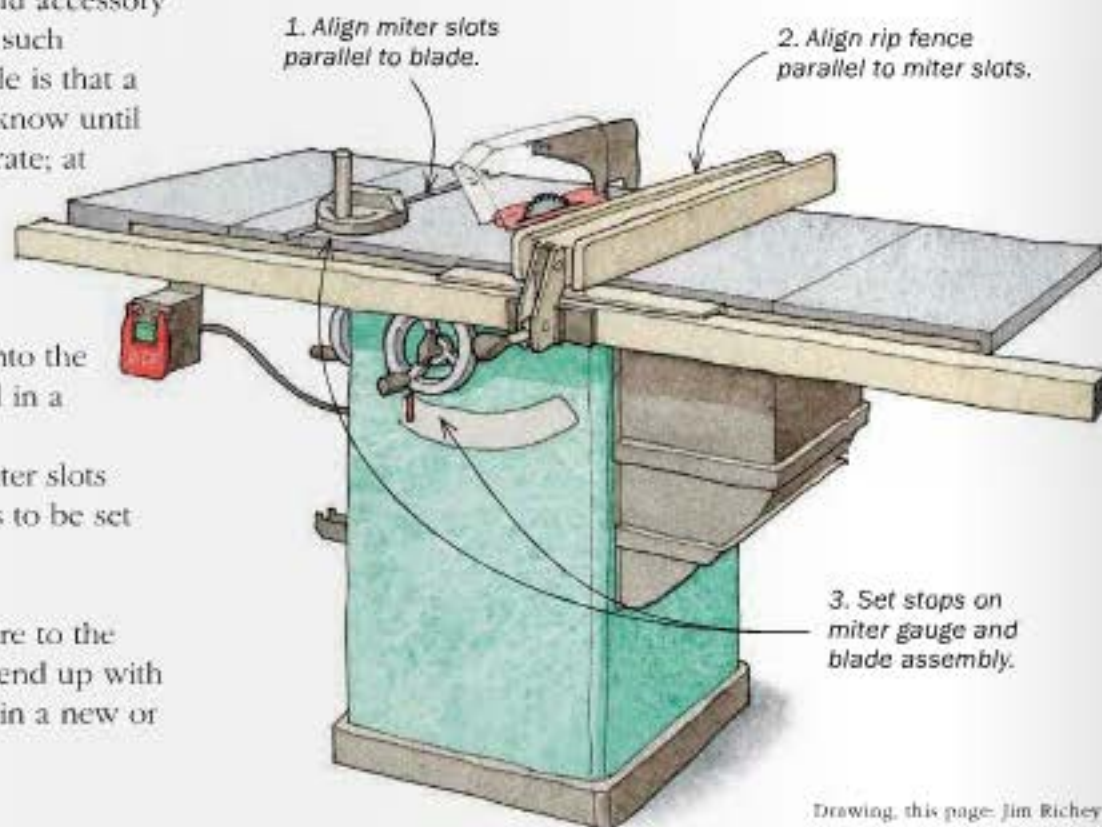
A tablesaw is designed so that the teeth at the front of the blade do all the cutting, and the teeth at the back spin freely, without rubbing or cutting into the board. For that to happen, the board needs to travel in a perfectly straight path through the blade.

So the first step is aligning the table so that the miter slots are parallel with the blade. The rip fence also needs to be set perfectly parallel to the blade.

From there, the tune-up switches from parallel to perpendicular, as you set the blade and fences square to the table. Those 90° angles are essential if you want to end up with tight joints and square projects. So before you plug in a new or

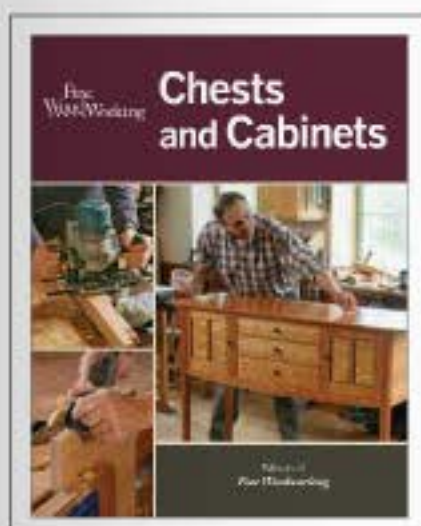
THREE STEPS TO SAFE, SMOOTH, SQUARE CUTS

For perfect crosscuts, align the table's miter slots parallel to the blade. For ripcuts, align the fence with a miter slot, and it will be parallel to the blade, too. The last step is setting two built-in stops for square cuts.



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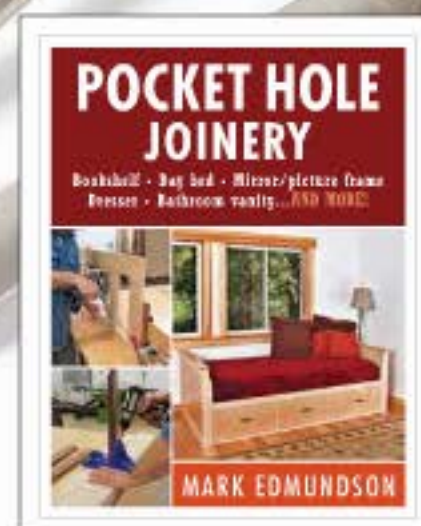


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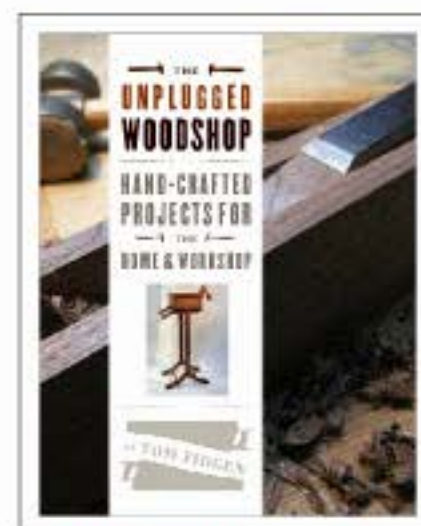
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Align the blade and table

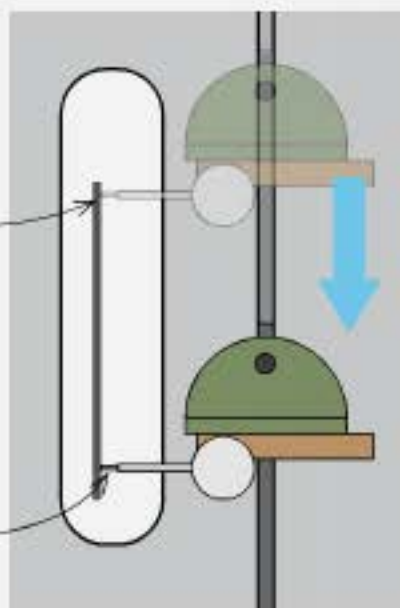
The miter slots must be parallel to the blade, and a plunge-style dial indicator is the best tool for checking. Screw it to a small wood block, clamp the block to the miter gauge, and slide the gauge back and forth to take readings at the front and back of the blade.

1. CHECK ALIGNMENT

Zero the dial at the front. Clamp the wood block onto the miter-gauge fence so the indicator is pushing against a tooth. Move the blade and miter gauge to find the high point on the tooth, and then zero the dial on the indicator.

First check reading at front edge of blade.

Then check and compare reading at trailing edge of blade.



Check at the back. Mark the tooth you measured earlier, and rotate it to the back of the table for another check. The dial shows a different reading at the back, meaning that this table is misaligned.

TIP

COMBINATION SQUARE WORKS, TOO



Close enough for safe cuts. Although not as precise as the indicator, a combo square can be used in a pinch. Run its fence against the edge of the miter slot, and check that its ruler just touches a tooth at the front and back of the blade.

used machine for the first time, go through the following steps. Once your saw is dialed in, it will stay that way for a very long time.

Align the blade parallel with the miter slots

To align the table (and its miter slots) with the blade, you're going to have to go under the hood, at least a little. Most tablesaw manufacturers attempt this step at the factory, but even the best machines can get knocked out of line during shipping, and used machines are a crapshoot.

How you check this alignment is the same on all saws, but the way you adjust them differs a bit. To check, take a measurement from the edge of one of the miter slots to the front and back of the blade. If the measurements are the same, the blade and table are aligned. I recommend using a 0-to-1-in. dial indicator for this step. Get the plunge style. You can find one on Amazon.com for \$20 to \$30.

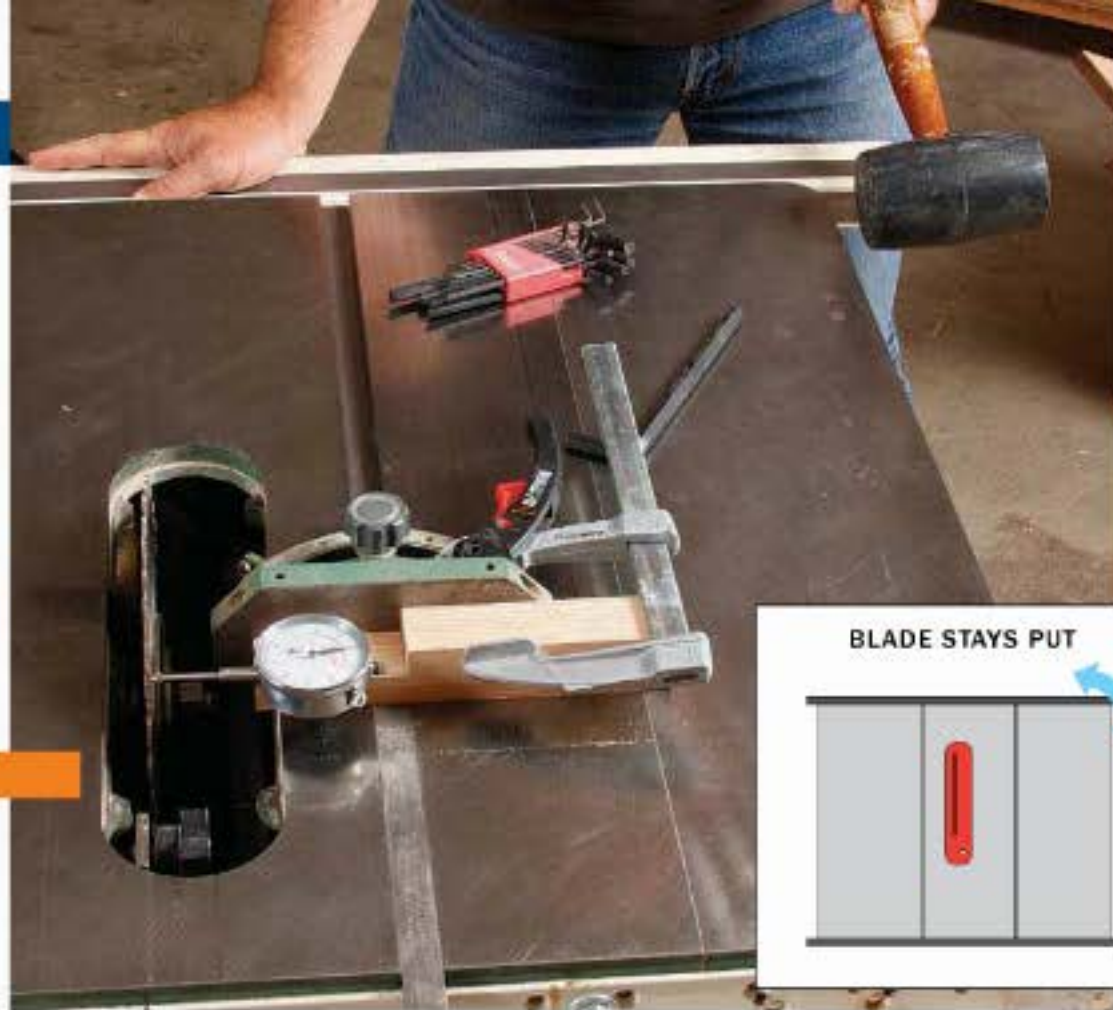
Start by raising the blade as high as it will go to increase the distance between back and front, which will give a more

2. ADJUST AS NECESSARY



CABINET SAWS: SHIFT THE TABLE

Loosen three of the four bolts that attach the table to the saw cabinet (above). Give the table a tap at one of the loose corners (right), and recheck the blade alignment. Lock down the bolts when the readings at the front and back of the blade are within 0.001 in. of each other.



BLADE STAYS PUT



SMALLER SAWS: SHIFT THE BLADE ASSEMBLY

Loosen three of the bolts that attach the blade assembly (trunnions) to the underside of the table (above). Place a wood block against the loose end of the blade assembly, which is underneath the table, and give it a few taps. As before, lock down the bolts when you get the blade aligned.

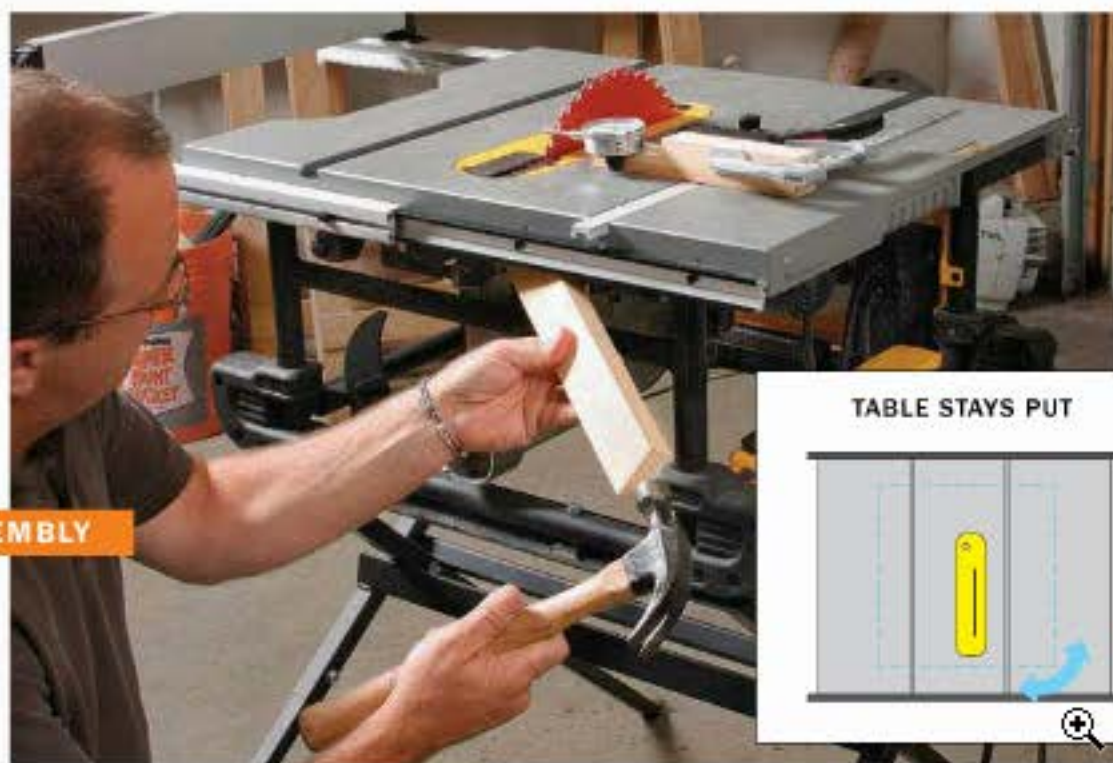
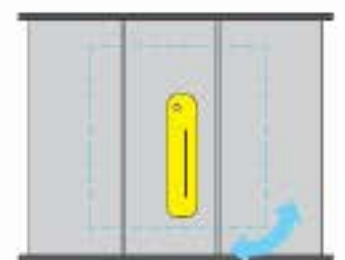


TABLE STAYS PUT



precise measurement. In case the teeth are a little uneven or have some pitch built up on them, rotate the blade and use the same tooth for each measurement. The two numbers should be within 0.001 in. of each other, 0.002 at the most.

If your measurements match on the first try, buy a Powerball ticket. If not, you'll need to make an adjustment.

Adjusting cabinet saws—On these saws, the trunnions (the assembly that holds the blade) are attached to the cabinet, and the table is attached independently, meaning you can move it and the blade stays put.

Adjusting job-site saws—On smaller saws—called job-site, portable, contractor, or hybrid saws—the blade assembly is usually attached directly to the tabletop. That means you'll have to go a little farther under the hood. Check your manual, and

take a look under the table for the attachment points. Newer saws make them easier to access.

Align the rip fence and check the splitter

The rest of the tune-up is easy. Now that the miter slots are parallel with the blade, you can simply align the rip fence with one of the slots and know that it is square to the blade, too. Just line up the fence with a miter slot, feel for misalignment using your fingers, and adjust the fence.

All saws should have some form of splitter behind the blade, designed to sit in the slot that it cuts, preventing the board from turning sideways and kicking back. If the splitter is not aligned with the slot, the board will pull away from the rip fence or jam against it—both bad situations. On some saws you can simply

Align the rip fence

Once you have the miter slots aligned with the blade, you can simply line up the rip fence with a miter slot to see whether it is parallel to the blade, too.



Go by feel. Clamp down the rip fence along the edge of one of the miter slots. Use your fingertips to check if the fence is flush with the slot from the front all the way to the back (above). Adjustments vary, but all are easy. On T-square fences like this (right), there are simple set screws on the bracket that rides the guide bar.



flex the splitter sideways to align it; on others there will be a way to adjust it at its base. If all else fails, use thin shims or washers at the attachment point to shift it slightly one way or the other.

Two stops make accuracy more convenient

For ripcuts and crosscuts alike, you also need the blade to be square to the table. There is a stop on the saw to help you return the blade to a perfect 90° every time. You can use a square to realign the blade after each bevel cut, and test cuts to be really sure, but it's nice to have a stop you can rely on.

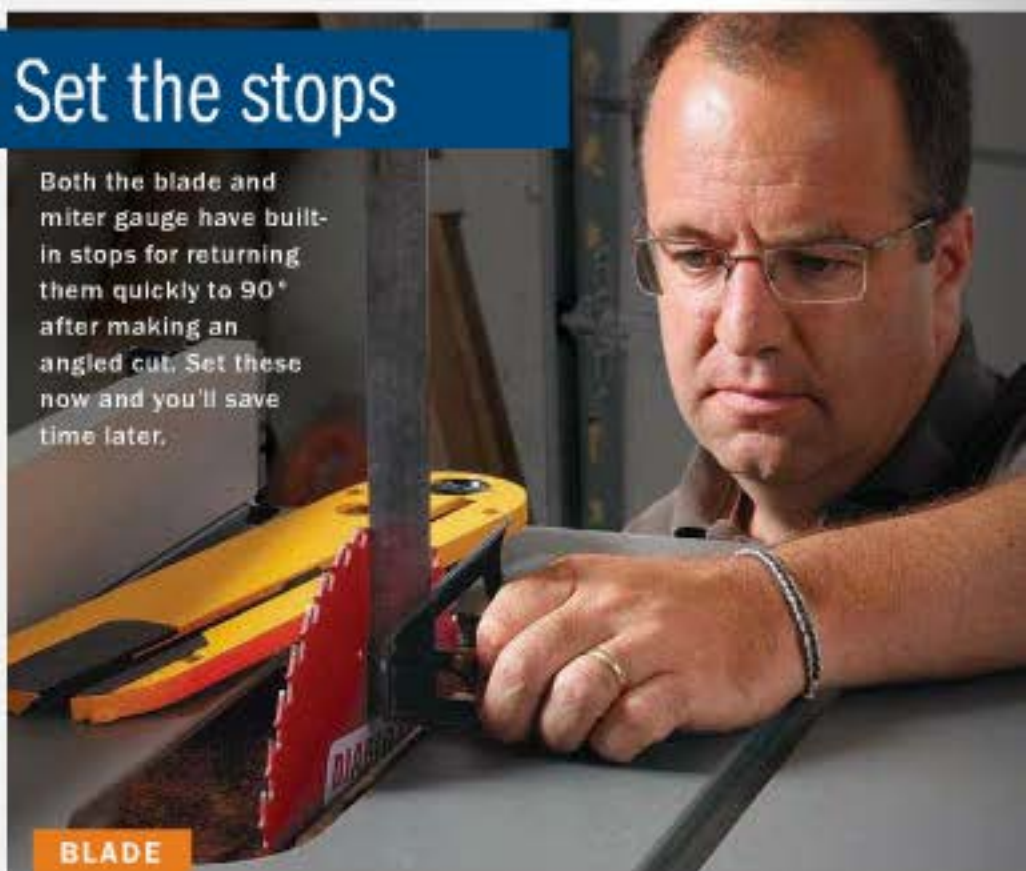
The miter gauge that came with your saw also should have a stop on it for the 90° setting. If that stop is wiggly or sloppy in any way, replace the miter gauge with an aftermarket model (see p. 54 for a review of these). Before squaring the fence, add a long sacrificial piece of plywood or MDF to it.

The tablesaw is the most important machine in the shop. Invest in a good one, and then invest the time it takes to set it up for success. □

Asa Christiana is special projects editor at FWW.

Set the stops

Both the blade and miter gauge have built-in stops for returning them quickly to 90° after making an angled cut. Set these now and you'll save time later.



BLADE

Square the blade. Use a square to get the blade as close to 90° as possible. Then make a test cut on a thick, flat piece and check that with your square. That's the only way to know if your saw is accurate.



Now set the stop. The stop's location differs on various saws. Loosen it, push it against the blade assembly, and lock it in place.

MITER GAUGE



Square the fence to the blade. It's always good to attach an auxiliary fence to a miter gauge, so do this first. Get the fence as close to square as you can with a triangle or square, and try a test cut as before. Then adjust the set screw that acts as the stop.



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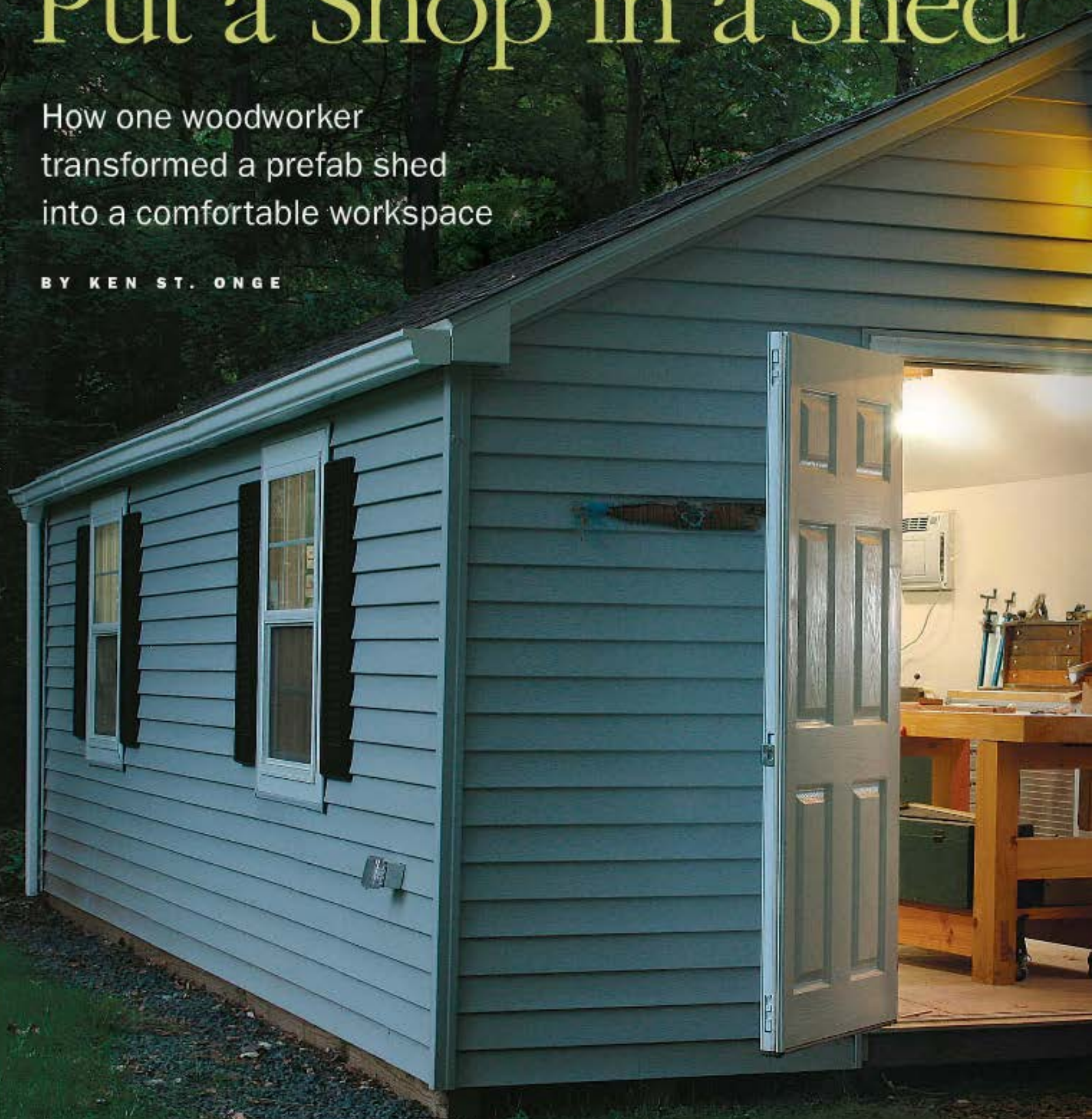
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Put a Shop in a Shed

How one woodworker transformed a prefab shed into a comfortable workspace

BY KEN ST. ONGE





Working as an editor at *Fine Woodworking* is a great job, and one of the best benefits to the job is access to an amazing shop. It's big, bright, heated and cooled, and full of great tools and machines. You could build just about anything in it.

After I left the magazine for a new job, I did all of my woodworking in my small two-car garage, but it was a struggle. Power, lighting, and temperature control were limited. And because I shared space with our cars I was always moving machines around, often while in the middle of a project. On top of that, my tool and machine collection had long since eclipsed the space. For all these reasons, fixing up the garage wasn't an option. My finished basement is a family room, so it was out, too. An addition to the home or a stand-alone building would have been too expensive. I had to find a better path to a shop.

Then, one day, I saw a flyer for a company that makes and delivers completed sheds to your property, and thought, "Could it work?" As I've since discovered, the answer to that question is an emphatic "yes." Because a pre-built shed doesn't need a cement foundation and is completely constructed in a factory setting, it's much less expensive than building an addition or stand-alone shop on your property. These sheds can have taller ceilings than a garage and bigger doors than a basement, both big pluses for a woodworker. You can put a shed just about anywhere, which is a great thing if you want to avoid disturbing your sleeping family and neighbors.

There are some challenges. First, you need to do some site work to make way for the shed. And sheds aren't typically built to handle heavy machinery such as tablesaws, bandsaws, and jointers, so I needed the manufacturer to beef it up. It also needed to be outfitted with electricity and insulated against the heat and cold. In the end, I spent around \$9,000 to get a shed ready to become a shop. Any site or electrical work you need done will cost extra. I'll tell you about my experience, which should help you decide if this is the right option for you.

Before buying a shed, decide where to put it

The prospect of a new shop is exciting, and I was tempted to pick out the shed right away, but I discovered that I first

Get the yard ready

There is some site prep to do before the shed arrives, some of it requiring special equipment and serious labor. However, many shed manufacturers will do the work for an additional charge.



You might need to take down some trees. Being a woodworker, St. Onge painted the ends of the logs and set them aside for future turning projects.



Firm, level foundation. The crushed stone used to support the shed is easy to level, but the ground beneath needs to be level, firm, and flat, too. That's where the hard labor is.

Path for electricity. To satisfy local building codes, St. Onge had to bury the shop's electrical supply from the main house. Check for other pipes and wires before digging.



needed to figure out where in my yard I could put it. It turns out that there are four things that determine the size and location of your shed: local building codes, how level the site is and how accessible it is for delivery, and then figuring out how to get electrical power to the shed.

My town requires a shed to be at least 5 ft. from any property line, and smaller than 1,000 sq. ft. I picked a shed that was 14 ft. wide by 24 ft. long, plenty big enough to hold all of my machines and benches, and well within the town's square footage limit.

Now I had to find a spot for it. Keeping the local codes in mind, I looked around my backyard for an area that was fairly flat and level. If your yard is like mine, there is no spot that's both level and flat, so the next best thing is an area that can be made that way without too much work. Aim for a location with no more than a few inches of elevation change, because you'll need to dig deeper into the high areas to create a level area.

Then I had to lay out the exact spot for the gravel pad that will support the structure. Most gravel foundations need to be at least a foot larger in each direction than the shed, so I marked out a pad slightly larger than 16 ft. by 26 ft.

Before digging, you should verify with the shed company that there are no



Delivery requires a lot of space. A shed might be small for a building, but the manufacturer needs a wide path to get a truck into your yard to offload the shed onto the gravel pad.

obstructions—trees, rocks, fences—that can interfere with delivery of the shed or entry to it. Pre-built sheds are typically delivered by trailer, so you'll need enough room for the truck and trailer to maneuver, and a grade that's not too steep for them to back over while they're placing the building. Prior to delivery, I had to take down some trees and level my yard's grade.

After you have all of that sorted out, you can get to work on the gravel pad for the shed. Check with the manufacturer for requirements on how deep to make the pad, and what type of gravel to use.

I was hoping the shed would be close enough to my house that I could wire it for electricity without needing a sub-panel in the shed. My electrician said that 100 ft. is the tipping point. Mine was just a bit farther away, so I'd need a subpanel. Per

local codes, I also had to dig a trench for conduit and the electrical wires.

Customize the shed for shop use

When I was picking the size and model of the shed, I spoke with the manufacturer about its future life as a woodshop full of machinery. They advised me to reinforce the floor, spacing the 2x4 joists 8 in. on center. This would prevent the floor from sagging under the weight of my tablesaw, bandsaw, lathe, bench, jointer, and planer. The additional joists, it turned out, also made it easier for me to bolt the machines to the floor.

I was planning to heat and cool my shop, so I sprang for the best doors and windows I could afford. The better insulated and easier to air-seal they are, the less expensive it will be to heat and cool

the shop. Also, make sure the door is big enough to get machines in and completed projects out. I also had the manufacturer install housewrap between the sheathing and siding (not a standard option) to help prevent water vapor from penetrating the walls.

For cooling, I planned to use a wall-mounted air conditioner, so I asked the manufacturer to frame out an opening for it. The upcharge was less than \$100, and it saved me from having to retrofit the opening after the shed was delivered. The shop is heated with a 240-volt wall-mounted electric heater that I installed near the door.

Electricity and insulation complete the transformation

After the shed was delivered, I hired an electrician to install the sub-panel and

Add the comforts of home

Nobody wants to work in a stark storage shed. Add electricity, insulation, and drywall first, then hang lights, and heat or cool your new shop as needed.

Install the wiring. St. Onge hired an electrician to ensure that all the work was done to code, and that the supply was adequate for his machinery and power tools.



run circuits for lighting and outlets, I had worked out where I was going to put all of my tools beforehand, so I gave the electrician a map identifying where I wanted the outlets and boxes for the lights.

When the electrician completed the wiring, I got to work on sealing the walls, around the windows and doors, and between the floor sheathing. After that, I insulated the walls. I then hung drywall, mudded the seams, and painted the walls.

When I finally used my shop for the first time, it was glorious. I built a hanging till for my handplanes, and it was much more enjoyable than working in my garage. I couldn't be happier. □

Ken St. Onge, who lives in central Connecticut, is blissfully at work in his new shop.



No matter where you live, seal and insulate. Spray foam along the studs (top), and caulk between the floor joints (right) minimizes air movement between the inside and outside, while insulation (below) helps keep the shop cool in the summer and warm in the winter.



Hang drywall. Then paint the walls and ceiling a bright color, which will reflect light and brighten the space.

Chisel Handles that Fit Your Grip

Transform your old chisels with homegrown handles

BY JOHN TETREAULT

The first chisel I remember buying was an old Buck Brothers socket chisel. I've since added a few vintage Stanley 750s and other tag-sale finds, all of them socket style. Some of them had handles that were damaged or just missing, but they were all made from good old tool steel. They sure didn't look like a set, but after I spent some time at the lathe and used some repurposed materials, they do now.

Making handles for your chisels is a simple task and a great way to bring together a mismatched set. It's also a chance to customize the fit to your own hand. A few small scraps of any dense hardwood will do the trick. For my handles, I dove into my firewood pile, home to an abundance of local hardwoods that work

➤ **Online Extra**

To see Tetreault craft one of these chisel handles, watch the video at FineWoodworking.com/extras.

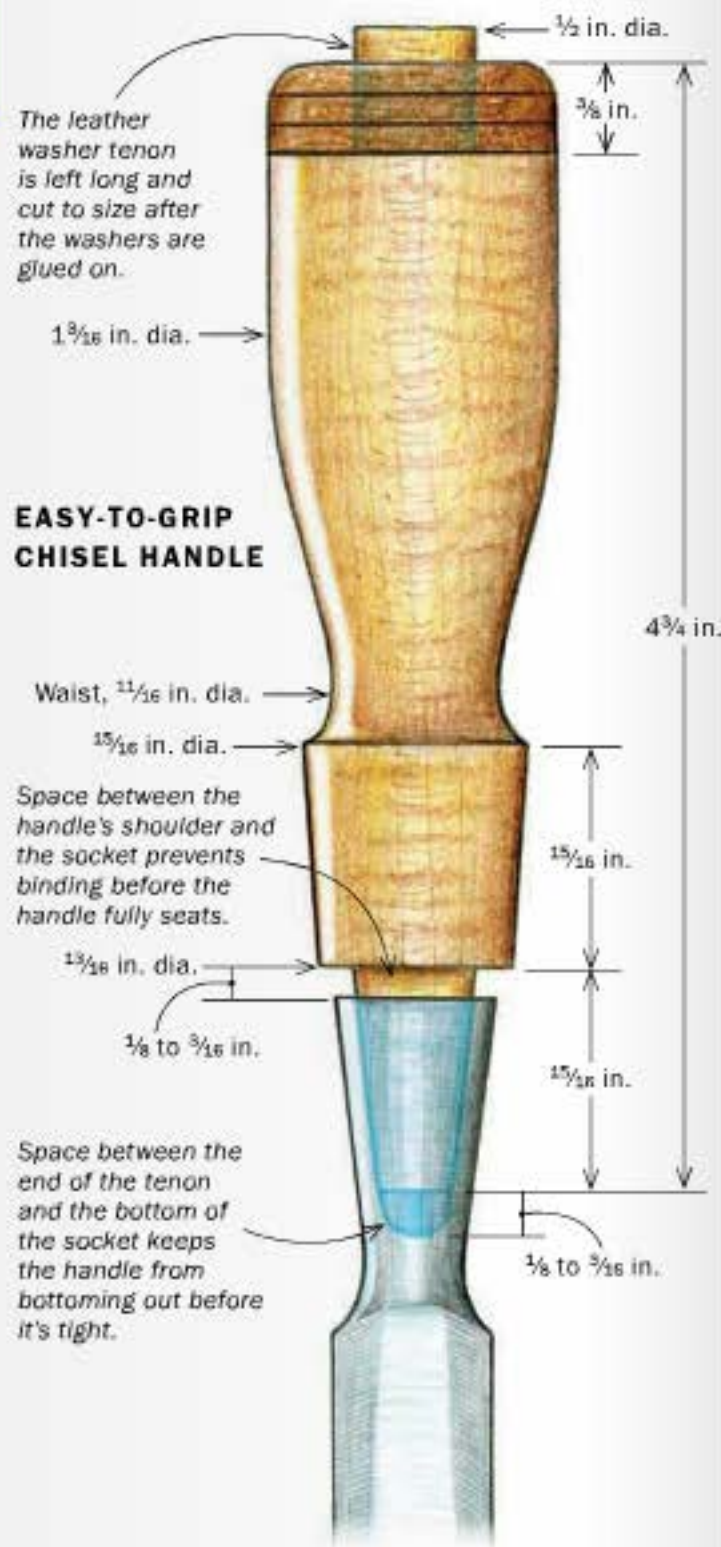
Rough in the handle shape



From old to new. Tetreault turns two handles from one spindle. Using the old handle as a reference, he marks the handle's transition points on the cylinder with the lathe spinning. He makes certain to include both ends of the tapered socket tenon and the base of the washer tenon.



Turn the tenons. After turning the washer tenon (left in photo, below), Tetreault turns the socket tenon to a cylinder using a small gouge. He uses calipers set to the major diameter of the socket tenon of the original handle (left) to gauge his progress. The tapering happens after the two handles are separated from the spindle.



TIP

HOW TO SIZE A SOCKET



The clay trick. When he has no old handle for reference, Tetreault uses a piece of clay to reveal the socket's inner dimensions. He forms the clay to a point, presses it into the socket, and twists it free. He'll take measurements straight from the clay.

Fit it to your hand



Rough in the shape. Tetreault uses a parting tool to define the waist of the chisel (above). The grip of the handle begins to take shape (right) as he uses a small gouge to contour it to his grip, making sure to round out the hard angle where the waist transitions into the shoulder.



well for handles, such as locust, maple, or beech. You just have to be sure the wood is dry enough to use. The firewood I chose had been air-drying in the stack for about a year. I brought the logs into the shop for a few weeks to let them acclimate before turning.

Shape the stock and cut the tenons

I roughly squared two adjacent sides of the log at the bandsaw using a shopmade sled, jointed those sides, and then cut blanks to rough size at the bandsaw. I let the blanks sit for a day or two before milling them to about 1 1/4 in. square. I cut the stock just long enough to make two handles. A longer blank can result in excessive vibration of the spindle, especially when you're turning the tapered tenon.

Turn each blank into a cylinder at the lathe using a roughing gouge, keeping the 1 1/4 in. diameter. You can use an old chisel handle as a model or create an entirely new shape as you mark the transition points on the blank.

Now turn the tenons for the leather washers. The washers help to absorb shock and direct the mallet blow down the center of the chisel, as well as preventing the end from "mushrooming" or chipping out. This is probably more of an aesthetic preference than a necessity, since a rounded end on a good, dense hardwood will go a long way. Use a parting tool to turn a tenon on each handle, about 5/8 in. long and a hair over 1/2 in. dia. This will allow the washers to stretch over the tenon to ensure a tight, no-gap glue-up.

The toughest part of making a socket chisel handle is fitting the tapered tenon snugly. If you're using an old handle as a model, use calipers to take dimensions directly from that tapered tenon. If the handle is missing, simply push a piece of clay or plumber's



Get a grip. Tetreault pauses regularly during the shaping process and gets a good feel for the handle (above), stopping work only when it feels right. He sands the handles while they're still on the lathe. For straight sections he uses a flat sanding block (left), for concave parts he uses a dowel wrapped in sandpaper, and for convex areas he holds the sandpaper in his hands.

Taper the socket tenon

Split the set. With the handle shaped and smoothed, cut the blank in two with a handsaw so the leather washer tenon and the socket tenon can be refined independently.



Find your center. To mark the centers precisely on the separated handles, Tetreault uses a center head and rule to strike a few lines across the tenon end. The point where they meet is the new center.

putty into the socket, gently twist it out, and take dimensions from that. Make a quick sketch and jot down the length of the tenon and the diameters at both ends of the taper.

Use the parting tool to define the shoulders at each end. Now switch to a small gouge to make the small and large ends meet. Remember to leave it slightly oversize at this point. Once the handles are cut apart, you can mount them back on the lathe and use a small sanding block to make the taper straight and true.

A big advantage to making your own handles is custom-fitting them to your hands. There are no rules here; simply go by feel. Start by using a parting tool to define the waist, then use a gouge to shape the handle to suit your grip. Turn off the lathe once in a while and see how the handle feels in your hand. Adjust the dimensions and when they feel right, sand the grip up to P220-grit. Be sure to move the tool rest out of the way before sanding to avoid getting anything caught between the piece and the rest. When I made my set, I perfected the grip one handle at a time.

Separate the handles and fine-tune

Once the handles are shaped and sized, it's time to cut them apart and fit them to their chisels. I use a handsaw to cut them apart, being sure to leave the adjacent tapered tenon and washer tenon with a little extra length on either side. The tenon should fit the socket with $\frac{1}{8}$ in. to $\frac{3}{16}$ in. of clearance between the handle shoulder and the socket's end, and also between the tapered tenon's tip and the bottom of the socket. This clearance allows the handle to be beaten into the socket without bottoming out. Check the fit by twisting the chisel on the tenon. High spots will appear smooth. Chuck the handle on the lathe between



Mark the tenon's length. Tetreault uses the old handle for reference.



Taper to the line. Tetreault uses a beading and parting tool to taper the tenon. To check his progress, he uses calipers set to the original tenon's dimensions.

Finishing touches



Prep the washers. After scraping the leather clean and drilling $\frac{1}{2}$ -in. holes into it, Tetreault uses a sturdy pair of scissors to cut out the washers.



Stack them up. Put a coat of Titebond III between each layer of leather, stacking them three high, and then place the handles in the clamping caul.

centers and use a sanding block to sneak up on a perfect-fitting taper.

Glue on the leather washers

Leather washers add a classic look, but must take a beating as well. Quality leather and a proper glue-up will ensure your washers will be on for good. You can buy leather, but I used an old belt. Using a Forstner bit, drill $\frac{1}{2}$ -in. holes every few inches and scrape off any finish with a razor blade to get a good glue surface. Then cut the leather into squares with sturdy scissors.

Gluing on the washers can be tricky. To help, make a caul that clamps two handles at a time. Drill two $\frac{5}{8}$ -in. holes, about 4 in. apart, in a scrap of softwood. Add a second piece of softwood with two $\frac{3}{8}$ -in. holes at the tapered tenon end and the caul is complete.

Apply glue to the tenon and between each washer as you stack them up to the desired thickness. Place the end of each tenon in a hole in the clamping caul and compress the washers down tight. When the setup is dry, remove the leather waste and sand the washers flush with the handle at the belt sander. Then round over the ends slightly for a smooth transition.

Dip for a durable finish

This may be the easiest finish you'll ever apply. Open a can of satin polyurethane and put on rubber gloves. Remove any dust from the handle and dip it in the can by the end of the tapered tenon. Let the excess drip off and place the handle in a shopmade drying rack made from scrap. When dry, lightly sand with P400-grit paper and dip it once more. As a final step, I apply a coat of a recipe I used on our butcher-block table: beeswax with a bit of mineral oil. Your new handles will feel great and smell even better. □

John Tetreault is a deputy art director at FWW and a professional furniture maker.



Clamp them tight. A simple caul allows Tetreault to apply even pressure on the washers, snugging them down onto the tenon for a tight, even fit.



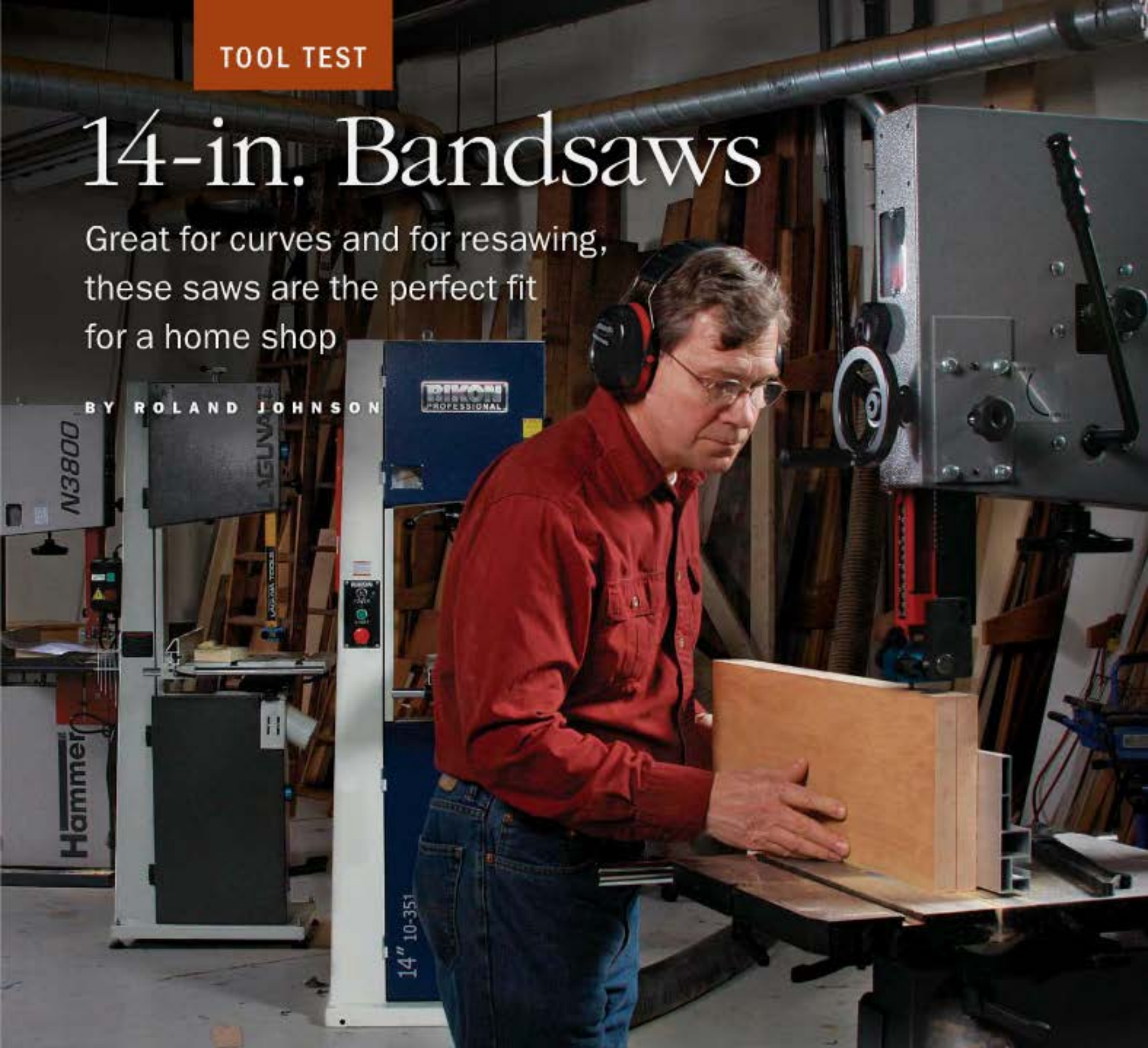
Clean up the leather. With the glue dried, sand the leather flush with the handle (above) and round over the pommel for a comfortable grip. To apply polyurethane to the handles, dip them into the can and then place the handles in a simple shopmade rack to dry (right)



14-in. Bandsaws

Great for curves and for resawing, these saws are the perfect fit for a home shop

BY ROLAND JOHNSON



The bandsaw may be the most versatile machine in the shop. You can use it to cut curves and joinery, to rip boards (rough and milled), and to resaw. Bandsaws come in a range of sizes, from benchtop models to industrial giants. But the perfect size for many woodworkers is 14 in. It's the first bandsaw most of us should get, and could be the only one you'll ever need. A 14-in. bandsaw's small footprint fits easily in most home shops.

I've tested a lot of bandsaws, and I've never found one that couldn't rip or cut curves. The real test is resawing wide boards, because it requires a lot of cutting height, a strong motor, and a guide post that doesn't flex. So I tested only saws that can resaw

boards at least 10 in. wide without the addition of a riser block, and that have motors of 1½ hp or more.

I tested the saws like I would use them when making furniture. I cut curves, made ripcuts, resawed wide boards, changed the blade, and adjusted the guides. I also checked features such as dust collection and the fence, which have a direct impact on the saw's performance. Read on to see which saws made the cut, and which ones fell short.

Contributing editor Roland Johnson wrote the book on bandsaws (Taunton's Complete Illustrated Guide to Bandsaws, The Taunton Press, 2010).

Packed with power and user-friendly features

After all of the tests were complete, two saws stood out. The Powermatic 1500 and Laguna 14/Twelve are both great saws, and earn Best Overall honors. The Laguna also is a Best Value, sharing that title with the least-expensive saw in the test, Steel City's 50155G.



AUTHOR'S CHOICE
BEST OVERALL **BEST VALUE**

LAGUNA 14/TWELVE

Street price: \$1,097

The Laguna is full of smart features. No tools are needed to install a blade and adjust the guides. It has the largest throat of the saws tested, making blade changes much easier, and the aluminum throat plate has leveling screws. The guides are ceramic, a welcome feature on a saw in this price range. The motor is wired for 110 volts, a plus for those without access to a 220-volt circuit.



AUTHOR'S CHOICE
BEST OVERALL

POWERMATIC PM1500

Street price: \$2,900

This is a great saw all around. All of the important adjustments are made without tools, and the guides can be set accurately with ease. Tracking the blade is simple, too, due to the window in the upper housing and yellow tires on the wheels. The 3-hp motor easily handled the resaw test—better than all of the other saws.



AUTHOR'S CHOICE
BEST VALUE

STEEL CITY 50155G

Street price: \$700

This saw does an excellent job resawing, and has very good dust collection. Although blade changes and guide adjustments aren't as easy as they are on the Powermatic and Laguna 14/Twelve, they aren't difficult either. The 1½-hp motor is wired for 110-volt power, so this saw can be used on a standard house circuit. The lamp and mobile base are convenient additions.

Details that make a difference

HASSLE-FREE BLADE CHANGES

Unless your bandsaw is dedicated to a single type of cut, say for resawing, you'll need to change blades. It should be easy to install blades, and then to tension and track them.



Quick-release tension speeds up blade changes. Most saws have a lever that releases or engages tension on the blade. Flip the lever and the tension releases instantly. Without it, blade changes take longer.

Guards shouldn't get in the way.

On the Oliver and General International (shown) saws, the blade slot pinches together at the top of the guard, making it difficult to install and remove the blade.



Window makes blade tracking easier. You can see when the blade is centered on the tire. The Hammer, both Laguna machines, and both Rikon saws have one. A light-colored tire, like the one on the Rikon 10-325 (shown), is a great aid, too.



Online Extra

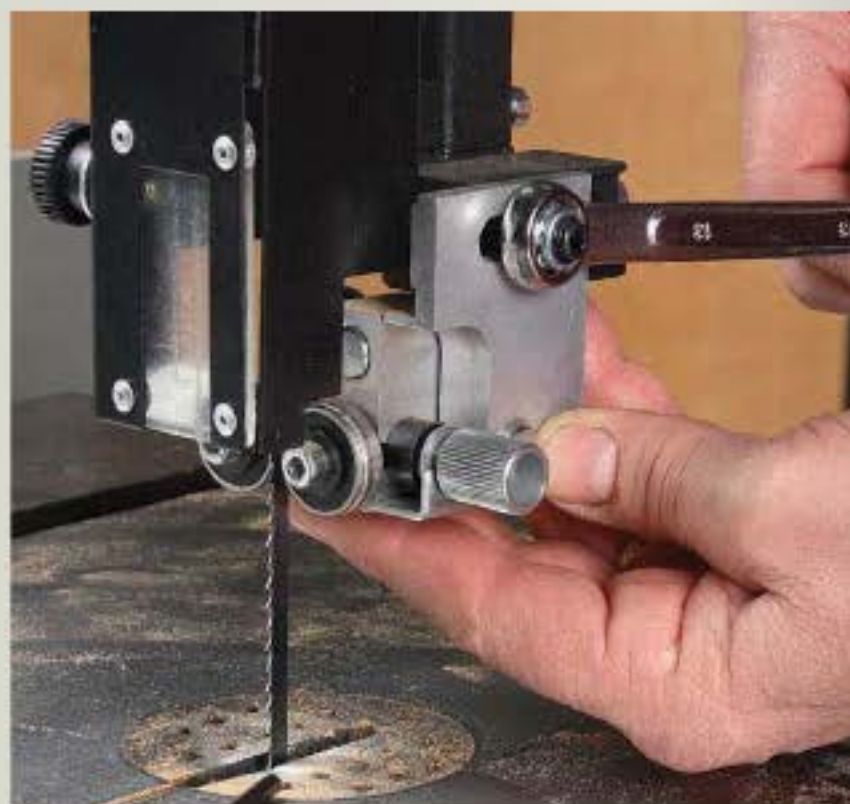
To watch a video on the right way to change a bandsaw blade, go to FineWoodworking.com/extras.

GUIDES THAT ARE A SNAP TO ADJUST

Setting the blade guides should not be a frustrating experience. Toolless adjustments make it a quick and stress-free job.



Tool-free is the way to go. The guides on the Powermatic PM1500 were the easiest to set up and adjust.



Tools slow you down. The guides on the Laguna 14 SUV require two different wrenches (one box end, one Allen), making adjustments more cumbersome.



FENCES THAT RIP AND RESAW

Johnson prefers the versatility and safety of two-position fences, especially when they can be adjusted without tools.



Two-position fences are safer. No matter how tall the workpiece is, you can always get the guide bearings close to it with this type of fence. The lower position also provides plenty of clearance for your hand or a push stick.

GOOD DUST COLLECTION

Bandsaws create a lot of dust quickly, especially when resawing, and you need a well-placed dust port to catch it.

Right under the table works best. It pulls in the dust as it's made, and gets nearly all of it. The Rikon 10-351 (shown) and both Laguna saws have a port there.



Lower ports miss too much dust. Falling dust is able to escape the port's reach. Both the Grizzly (shown) and Hammer saws have low ports.

FOOT BRAKE SPEEDS UP THE WORK

The brake brings the wheels and blade to a halt within seconds, allowing you to begin your next cut more quickly. Without a brake, it can take 30 seconds or more for the wheels to stop spinning.



Stop it with a step. The foot-activated brake frees up both hands to control the workpiece. Five saws have a foot brake: General International, Hammer, Laguna 14 SUV (shown), Powermatic, and Rikon 10-351.

14-in. bandsaws compared

Johnson tested the bandsaws by resawing 10-in.-wide cherry, and cutting curves in 1-in.-thick poplar. Along the way he evaluated the ease of changing blades, adjusting the guides, and using the fence. Each saw was equipped with its own pair of Carter bandsaw blades—one for resawing, one for curves.



General Int. 90-170B



Grizzly G0457



Hammer N3800



Jet JWBS-14SF

MODEL	STREET PRICE	MOTOR (HP)	RESAW CAPACITY	EASE OF BLADE CHANGES	EASE OF GUIDE ADJUSTMENTS	GUIDE-POST ALIGNMENT
General International 90-170B	\$1,595	1½	12 in.	Poor	Good	Fair
Grizzly G0457	\$1,050	2	10 in.	Good	Good	Very good
Hammer N3800	\$2,075	2	12¼ in.	Good	Good	Poor
Jet JWBS-14SF	\$1,600	1¾	13½ in.	Very good	Excellent	Good
Laguna 14 SUV	\$1,700	3	14 in.	Good	Good	Excellent
BEST OVERALL CHOICE Laguna 14/Twelve	\$1,097	1¾	12 in.	Very good	Very good	Excellent
BEST VALUE CHOICE Oliver 4620	\$1,403	1½	12 in.	Fair	Good	Good
BEST OVERALL CHOICE Powermatic PM1500	\$2,900	3	14 in.	Very good	Excellent	Very good
Rikon 10-325	\$1,000	1½	13 in.	Fair	Poor	Very good
Rikon 10-351	\$1,500	2½	14 in.	Good	Good	Good
Steel City 50114	\$700	1¾	12 in.	Poor	Fair	Poor
BEST VALUE CHOICE Steel City 50155G	\$700	1½	12 in.	Good	Good	Very good



Laguna 14 SUV



Oliver 4620



Rikon 10-325



Rikon 10-351



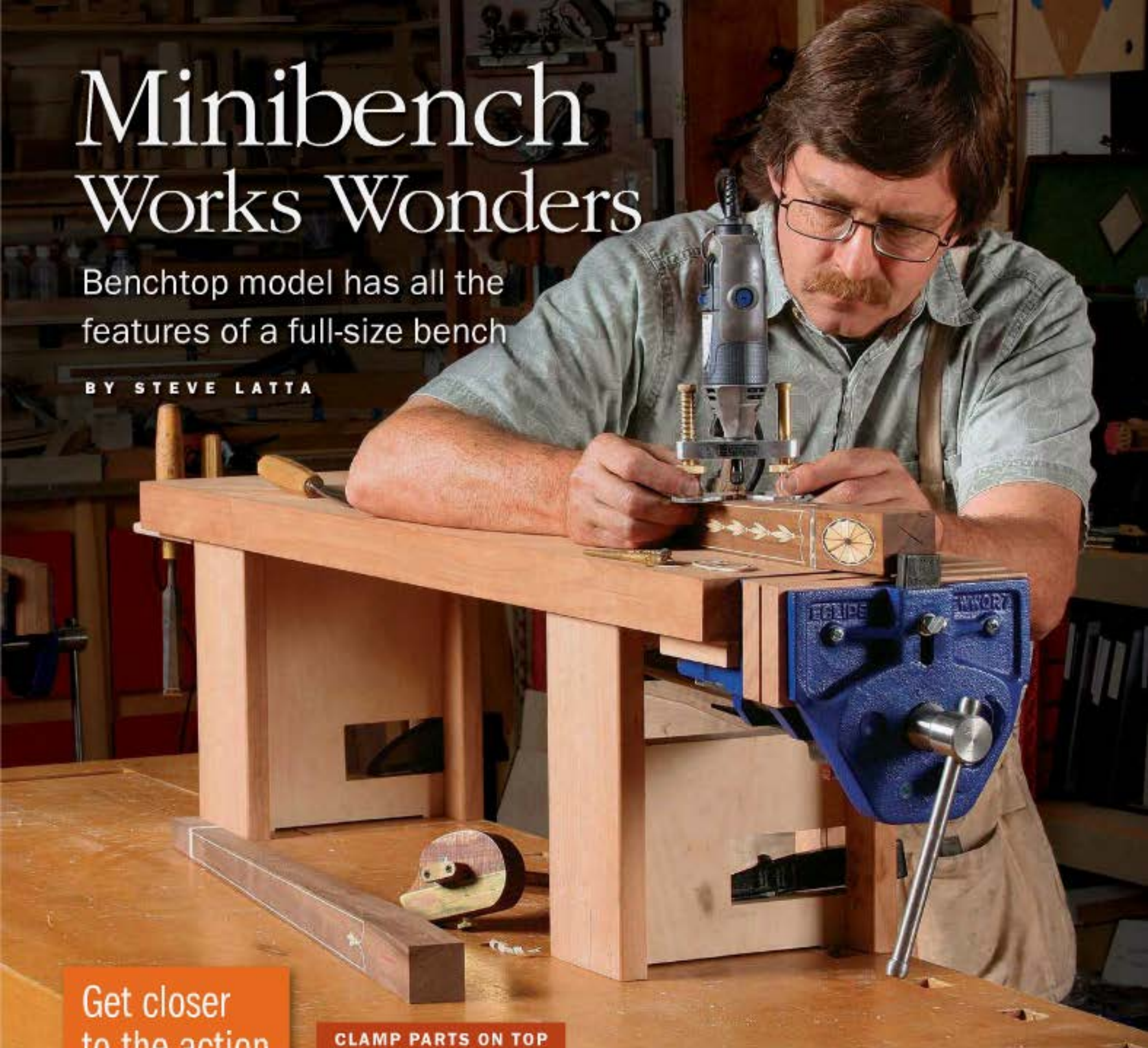
Steel City 50114

GUIDE-POST RIGIDITY	DUST COLLECTION	FENCE	RESAW CUTS	CURVE CUTS	COMMENTS
Very good	Very good	Very good	Good	Good	Stout upper guide post provides solid support for resawing. Foot brake stops blade quickly.
Good	Fair	Excellent	Very good	Very good	Great two-position fence changes over quickly. Table height is perfect for detail work. Base cabinet provides convenient storage for blades and gear.
Fair	Very good	Very good	Very good	Good	Guides are adjusted without tools. Blade guard slightly obscures view of the cut line. No quick-release tension lever.
Good	Very good	Excellent	Good	Good	Has a great two-position fence with an etched scale and micro-adjust knob.
Good	Excellent	Good	Excellent	Good	Huge throat plate makes it very easy to get blades in and out. Motor easily handles massive resaw capacity.
Good	Very good	Very good	Good	Very good	Excellent two-position fence, big table, and plenty of power.
Very good	Very good	Very good	Very good	Good	T-square fence has rollers for easy movement and T-slots in the fence rail for add-on like a tall resaw fence.
Good	Good	Excellent	Excellent	Very good	Fence and guides are easy to adjust, and front brake stops the blade quickly. Every adjustment is made without tools.
Poor	Fair	Good	Good	Very good	Yellow tires and window in upper housing make blade tracking very easy. Base cabinet provides convenient place to store blades and gear. Includes lamp.
Fair	Excellent	Good	Very good	Very good	Tool-free blade-guide adjustments, big door on the blade guard, and unique blade tension lever make for quick blade changes. Includes LED light.
Poor	Poor	Poor	Fair	Good	Dust drawer in base catches dust that falls into cabinet. LED work light on upper cabinet is bright.
Good	Very good	Fair	Excellent	Fair	Includes casters for mobility, a circle-cutting jig, and a lamp. No quick-release tension lever.

Minibench Works Wonders

Benchtop model has all the
features of a full-size bench

BY STEVE LATTA



Get closer
to the action

CLAMP PARTS ON TOP

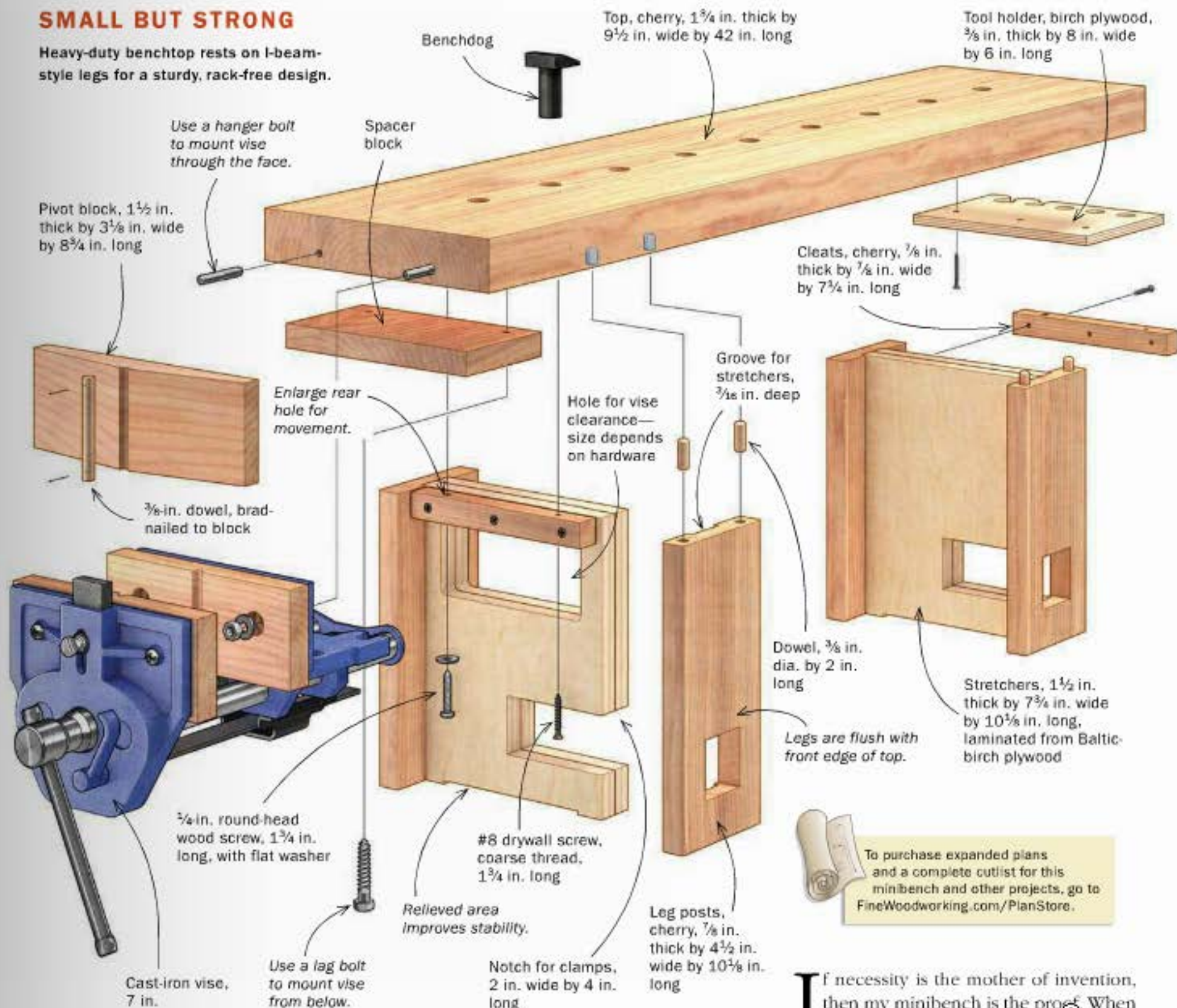
The minibench puts your work at a comfortable height for detail work. It's perfect for inlay, for trimming furniture parts, and for intricate carving.

IN THE VISE

OR ON THE FRONT

SMALL BUT STRONG

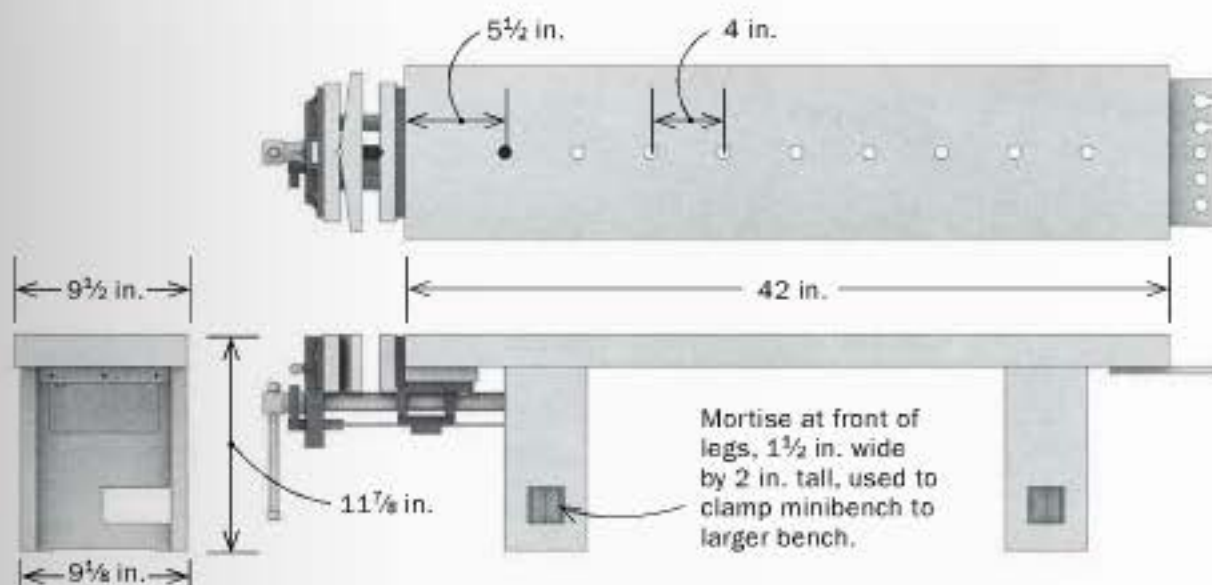
Heavy-duty benchtop rests on I-beam-style legs for a sturdy, rack-free design.



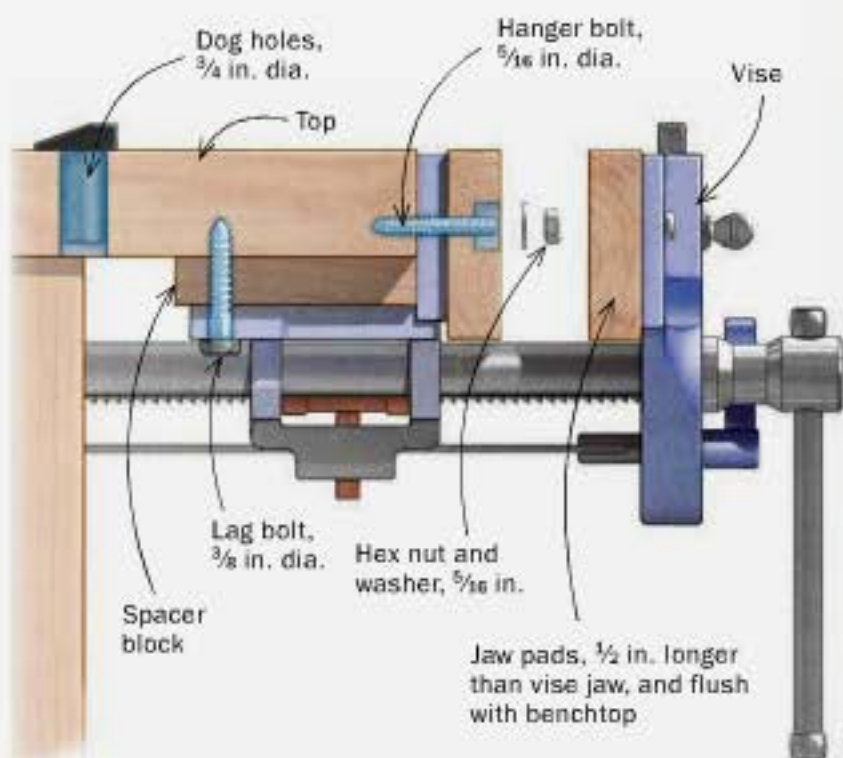
To purchase expanded plans and a complete cutlist for this minibench and other projects, go to FineWoodworking.com/PlanStore.

If necessity is the mother of invention, then my minibench is the proof. When I first built it, I wanted to raise my work to a more comfortable height, and to hold legs and other furniture parts for joinery cuts and detail work. Clamped on top of my regular bench, the minibench gets the work closer to my eyes without bending over. The 42-in.-long top is perfect for most furniture parts. It has a vise on one end, and the dog holes make it easy to hold parts. Plus there's plenty of clearance to use most types of clamps, making it easier to handplane and carve more accurately.

I can clamp a workpiece to the front of the base when working on the edge of a piece, like hogging out the waste between dovetail pins or mortising the hinges on a



Make the top



Drill the dog holes. To avoid blowout, Latta uses a spade bit in the drill press. He sets the depth stop for just after the point comes through, then flips the benchtop and finishes from the other side.



Get the vise at the right height. Glue on a spacer block to locate the top of the vise $\frac{3}{16}$ in. below the benchtop.



Bolt on the vise. Two hefty lag bolts and two hanger bolts help keep this vise right where it needs to be. With the benchtop upside down, set the vise in place and sink the lag bolts.

door. And a tool holder on one end helps me keep track of wayward tools. The small benchtop consolidates my work area, helping me stay focused on my task. Because the work area is limited, tools seem to get put back more often too, letting me work more efficiently. For all these reasons, this minibench has become my primary bench.

Pick a tough wood for the top

The benchtop is cherry, but most hardwoods will do. Ultimately, you need a wood



Take the bite out of the jaws. Bolt on hardwood pads to create a non-marring surface inside the vise jaws.

Add a pivoting jaw for tapered work

A pivoting-jaw insert holds shaped furniture parts such as tapered legs in the vise. It's pretty simple to make. The pivoting block has a dowel attached to the back that rides in a matching half-round in the jaw pad, letting it swivel freely from side to side. The jaw is held in place by the vise's clamping pressure, so it's easy to remove.

Not square? No problem. The pivoting block helps the vise conform to an out-of-square workpiece, putting pressure where needed, to hold a tapered leg, for instance.



Drill for the dowel. Clamp a backer block to the pivot block and drill a $\frac{3}{4}$ -in. hole on the seam to create a half-round channel for the dowel. Then drill the wooden jaw pads the same way.



Angle the back. Latta relieves the back on each side of the channel, so that the block can pivot freely in both directions.



Attach the dowel. Fasten the $\frac{3}{4}$ -in. dowel to the block with glue and a few small brads.



that's wear-resistant and tough enough for benchdogs and hold-downs. Mill the top to final dimensions, then drill the $\frac{3}{4}$ -in.-dia. holes for the benchdogs at the drill press. They should be centered on the top and spaced about 4 in. apart down the length.

I wanted this compact bench to have a vise, so I chose an Eclipse 7-in. quick-release vise with a built-in benchdog—a must for holding long furniture parts like legs and rails. The quick-release makes for fast, easy adjustments. Mount the vise

so that the jaws are $\frac{1}{16}$ in. below the top of the bench, to protect you from dulling your sharp tools on the metal jaws. Set the height of the vise by using a spacer block mounted under the benchtop. The thickness of the block will depend on the vise you use. After gluing on the spacer block, you can install the vise.

I-beam legs are light and sturdy

The top rests on two strong I-beam legs, consisting of two hardwood posts and a

stretcher made from a double thickness of $\frac{3}{4}$ -in. Baltic-birch plywood. Both legs are mounted flush with the front edge of the top so that work can be clamped there. Each leg is mortised on the front to make it easy to clamp to your regular workbench. The leg closest to the vise needs a clearance hole for the vise hardware.

Glue up the stretchers for the legs and cut them to size. Relieve the bottom edge of the stretchers at the tablesaw using a dado blade and a miter gauge with a tall

Make the legs

The legs are shaped like an I-beam, with two hardwood posts connected by a thick plywood stretcher. A mortise in the front of each leg makes clamping to the benchtop quick and easy.



Relieve the bottom of the stretcher. Latta uses a dado blade. He attaches a tall fence between two miter gauges and clamps on blocks to stop the cut 1 in. from each side.

fence. This relieved area creates two small feet and helps keep the legs from rocking on any irregularities. Next, mark the front of the stretchers for the clamp notches. Make the two long cuts on the bandsaw using a fence and a piece of 1/4-in. plywood underneath to prevent blowout, and finish the cut using a scrollsaw. Next, mark and cut out the mortise for the vise in one stretcher.

The leg posts are cut from one board. Mill it to thickness and width, then plow the groove for the stretchers. Use a stretcher to check the fit as you go. Now you can cut the posts to length.

Because sharp wood corners can break and chip easily during the normal wear and tear of woodworking, ease the long edges of the posts with a 1/4-in. round-over bit on the router table. Then use the stretchers to transfer the marks for the clamp mortises to the posts. Cut them out, drilling the corners on the drill press and cutting the sides with a scrollsaw. Glue and clamp the posts to the stretchers, making sure the top and bottom edges are flush.

The top is attached to the legs with dowels and screws. The screws go through a cleat attached to each leg stretcher. The dowels are located in the front post to keep the top flush with the legs. To accommodate wood movement and direct it toward the back of the bench, I enlarged the clearance holes for the rear screws that go through the cleat and into the top. To



Cut out the mortises and notches. Drill the four corners of the mortise for the vise hardware and cut the sides on the scrollsaw. Make the long cuts for the notches on the bandsaw, then connect the ends on the scrollsaw.



Groove the leg post for the stretcher. Latta cuts the groove a little at a time, testing the fit with a stretcher as he goes.



Mark the leg post for the mortise. Use the stretcher to transfer the location of the clamp mortises onto the posts. Cut the mortises using a scrollsaw.

ATTACH THE LEGS TO THE BENCHTOP



Pop in a pair of dowel centers. Latta uses dowels to register the front of the benchtop flush with the legs. To locate the dowel holes in the top, he uses dowel centers.

install the dowels, drill two holes in the top of each front leg post using a $\frac{3}{8}$ -in.-dia. brad-point bit. Then use dowel centers to transfer the location of these holes to the top. Put the centers in the holes, and with the top upside down, position the legs correctly and press down. Use the dimples made by the centers to drill the holes in the underside of the top. Insert the dowels into the holes without glue. Now screw the cleats to the legs, then screw the legs to the top.

The last step is to make the tool holder from a piece of $\frac{1}{2}$ -in. plywood and drill a few holes in it for chisels and screwdrivers. Notch a couple of holes to the edge—that will allow it to hold wide chisels—then screw it on and drop in your favorite tools. Now you have a serious work station, and it's time to get to work. □

Contributing editor Steve Latta teaches woodworking at Thaddeus Stevens College of Technology in Lancaster, Pa.

Online Extra

To watch a short video of this minibench in action, go to FineWoodworking.com/extras.



Put some pressure on these points. A flat scrap of wood helps get the legs flush with the front of the benchtop. Then just add pressure. The pointed dowel centers will create a perfect set of dimples that mark where to drill.



Cleats keep it all together. Mount the cleats $\frac{1}{32}$ in. shy of the top (left), to ensure the legs are pulled tightly against the top. Put the legs in place, and screw them down. Sink the screws that connect each cleat to the top (below).



Miter Gauges

We compare eight models to see which are the most accurate and easy to use

BY CHRIS GOCHNOUR



A great tablesaw setup should include a great miter gauge as part of the package. This important accessory ensures safe, accurate crosscuts on boards and small panels and is great for joinery cuts, too. Unfortunately, the gauges provided with most new tablesaws often are less than ideal, with play in the miter-slot fit that can't be tuned, a head that's hard to read and set, and a fence that's too small (or nonexistent) to support your work.

Fortunately, several manufacturers have designed high-quality, aftermarket gauges that address these issues. I looked at eight fully equipped gauges (with fence) and put them through the gauntlet to try and find the ultimate companion to a good tablesaw. Before getting to the test, though, let's look at the key parts of a miter gauge.

What makes a good miter gauge

A miter gauge has three main parts that must work well together to ensure accuracy: a bar, a head, and a fence. The bar must slide in the slot without play, the head should offer a means of setting the gauge easily and accurately to a desired angle, and the fence should support the material firmly and provide a mounting place for stops or a rule.

Miter bar keeps the gauge on track—If the miter bar that guides the gauge doesn't fit in the tablesaw's miter slot, any pressure placed on the gauge while cutting will throw it out of line with the sawblade. This gives you inaccurate angles and joints that fit poorly. To remedy this, most gauges feature a way to adjust the fit of the bar so that it slides smoothly in the track. A gauge that can't be adjusted will make imprecise cuts.



Head ensures accurate angles—The head is the heart of the gauge, the key to accurate square or angled cuts. The scale must be precise and easy to read. Positive stops, or detents, at common angles are a plus. Adjustments should be quick and easy to make, while solid enough to avoid being bumped from a setting in use. Because the head is where you hold the gauge as you push stock through the blade, it should also have a handle that is comfortable and easy to grasp.

Sturdy fence that's versatile—Fences are a necessary component of a quality aftermarket gauge, both for safety and for increased accuracy and repeatability. Fences support the stock during the cut, so they should be solid and not slippery, to ensure the stock doesn't drift. Some gauges have telescoping fences that support a longer piece beyond the table's edge. The fence also

A CUT ABOVE THE REST

JDS ACCU-MITER

Street price: \$230



The traditional, protractor-style head on this robust gauge registers angle detents solidly with a spring-loaded pin. The sturdy telescoping fence holds stock well, and it comes with a micro-adjustable flip-stop and a flip-down stop on the end of the telescoping section. The rigidity of the fence and the weight of the head ensured extra-smooth action.



KREG MITER GAUGE

Street price: \$140



This all-aluminum gauge has all the features of a great unit with a price that's hard to beat. The nylon adjustment screws keep the gauge tracking well in the miter slot. The fence has a flip-stop that's curved to let work slide under it for quick repeat cuts. The head quickly registers common angles via a brass pin. The vernier scale is a nice feature.

should be easy to adjust, since its position is ever-changing in relation to the blade as different angles are set.

All the gauges tested have extruded aluminum fences, a big plus because they allow you to mount an adjustable flip-stop. The flip-stop is useful for repeat cutting and minimizing drift, and it can be flipped out of the way when not needed. The stop should be solid and fit the fence face tightly so it works even on pointed, angled board ends. A micro-adjustable stop is a plus because it enables you to fine-tune the setup. Another desirable feature is a rule mounted to the fence to locate the stop precisely.

Putting the gauges to the test

To get familiar with each gauge and test its accuracy and ease of use, I designed four simple tests: the straight-cut test, the miter

MITER BAR No play allowed

Split washers need a wrench. The three Incra gauges and the JDS Accu-Miter use split washers to adjust the bar's fit in the miter slot. With the bar in the slot, adjustments are made with an Allen wrench. This creates a no-wiggle fit, but you must remove the head to reach some of the washers.



Nylon screws are easiest. Adjustments on the Kreg and Woodhaven gauges are made with a flat-head screwdriver. It's easy, but you have to make the adjustments with the bar out of the miter slot because the screws are accessible only from the side of the bar.



test, the octagon test, and the long stock test. The straight-cut test ensured the 0° setting on the head was perpendicular to the blade. I used each gauge to cut a piece of poplar roughly in half, then I placed the halves edge-down on the tablesaw and flipped one over. Flipping the piece doubles any error in the cut and exaggerates how off the gauge is.

For the second test, I used each gauge to make an 11-in. by 14-in. picture frame. This tested the gauge's accuracy at one of the most common angles used, a 45° miter, and also gave me the chance to use the flip-stops to make repeat cuts.

I also made an octagon with 7-in. sides using the 22.5° setting on the gauges and the flip-stops once again. This tested the head's accuracy and the gauge's ease of use with smaller stock. The octagon shape also exaggerated any inaccuracies in the angles, making even a small error more obvious with larger gaps at the joints.

For the long stock test, I crosscut a piece of poplar, 1½ in. thick by 6 in. wide by 60 in. long. I checked whether the fence

HEAD Easy, accurate adjustments



Detents for every angle. The Incra 1000 HD has positive detents every 1° of its range and at 22.5°. This is a perfect medium between the 1000 SE's too-broad 5° increments and the 3000 SE's tedious ½° increments.



How to handle in-between angles. The Kreg uses a brass pin to lock in common angles. When operating outside these angles, the vernier scale allows accurate adjustments down to ⅓°.



Digital adjustment doesn't hold. The Ridgid was the only digital head tested, sacrificing detents for adjustability to ⅓°. While getting an angle is easy, tightening the handle causes the gauge to lose its setting.

FENCE Stops are a must

Flip-stops are standard. Each gauge comes with a flip-stop, but not all are created equal. The Kreg's curved stop lets material slide under it, so you don't have to lift the stop by hand. But its small contact area with the fence allows angled work to slide behind the fence.



Incra fits right in. The flip-stop on each Incra has ribs along the back that fit into the extrusion of the fence. This interlocking mechanism keeps mitered pieces from slipping between the fence and stop.



Micro-adjustments for small changes. The gauges from JDS, Woodhaven, and Ridgid have flip-stops that use a knurled knob to make micro-adjustments.

deflected, if the board slipped on the fence face, and whether the fence helped "hold" the stock during the cut.

One gauge truly shined through all the tests and is my Best Overall choice: the JDS Accu-Miter. It has a bar with low-friction nylon adjusters for a tight, silky fit, a head that was quick to set up and offered secure, accurate angle selection, and a telescoping fence with micro-adjustable flip-stops.

The Kreg miter gauge is the Best Value, because it offers a handful of features at an affordable price: a bar with nylon adjustment screws, an easy-to-use head with a vernier scale and solid detents, and a long fixed-length fence with a unique flip-stop.

Chris Gochnour is a professional furniture maker in Salt Lake City, Utah.

STRETCH THE FENCE FOR LONG STOCK

Long-distance support. A telescoping fence, like that on the Incra, helps hold long stock square to the blade.



Hold-down for long crosscuts. A long board hanging off the table can be hard to control safely as you cut it. JDS offers a clamp-down accessory (\$59) with its Accu-Miter gauge that keeps the stock firmly on the table.

MITER GAUGES PUT TO THE TEST

Straight cuts. To test the gauges' 0° setting, Gochnour made simple crosscuts. The good news is that every gauge tested made a perfectly straight cut at 0°.



Miter test. To test the accuracy of miter cuts, flip-stops, and head settings, Gochnour made picture frames. An accurate gauge will cut equal-length pieces.



The octagon test. Gochnour made octagonal frames using the 22.5° detent and the stops. This tested the accuracy of the detent system and the stops as well as each gauge's ability to handle smaller stock. If everything works as it should, the result will be geometrically perfect with gap-free joints.



INCRA 1000 HD

This gauge has the most accurate head, with easy adjustments that held securely at any angle. The bar fits securely and glides smoothly. The telescoping fence has a dual flip-stop secured to it that is unmovable once tightened down.



INCRA 1000 SE

The gauge has the same miter bar, fence, and flip-stop as the other Incra gauges, but the 1000 SE's head only has detents every 5°. While this gauge performed well, it lacks the ease of fine adjustment, down to individual degree, that the 1000 HD has.



INCRA 3000 SE

This gauge has the same head as the 1000 SE and 1000 HD, but has a secondary scale with detents at half a degree. This allows for incredibly precise setups, but adds complexity and considerable length to the unit, which reduces space in front of the blade and makes wide boards more difficult to cut.



MODEL	STREET PRICE	BAR ADJUSTMENT
Incra 1000 HD	\$190	Good
Incra 1000 SE	\$160	Good
Incra 3000 SE	\$290	Good
BEST OVERALL JDS Accu-Miter	\$230	Very good
BEST VALUE Kreg	\$140	Excellent
Osborne EB-3	\$120	Very good
Ridgid Digital Miter Gauge	\$90	Fair
Woodhaven 4911K	\$260	Excellent

DETENT USABILITY AND RANGE	FENCE QUALITY/RANGE	FLIP-STOP QUALITY	MITER TEST	LONG STOCK TEST	OCTAGON TEST
Excellent, 0°-90° in 1° increments	Good, 18 to 31 in.	Very good	Very good	Good	Excellent
Very good, 0°-90° in 5° increments	Good, 18 to 21 in.	Very good	Very good	Good	Excellent
Very good, 0°-90° in ½° increments	Good, 27 to 49 in.	Very good	Excellent	Good	Excellent
Very good, detents at 0°, 15°, 22.5°, 30°, 45°	Excellent, 18 to 34 in.	Excellent	Excellent	Good (excellent with optional clamp)	Excellent
Good, detents at 0°, 10°, 22.5°, 30°, 45°	Good, 24 in.	Good	Very good	Good	Very good
Very good, 0°-45° in 5° increments, and 22.5°	Fair, 24 to 42 in.	Fair	Good	Good	Excellent
Digital, in increments of ½°	Fair, 24 in.	Fair	Fair	Very good	Fair
Fair, detents at 0°, 10°, 15°, 22.5°, 30°, 45°, 60°, 90°	Good, 24 in.	Excellent	Excellent	Good	Excellent

OSBORNE EB-3

The unique triangulated system for setting angles makes this one of the easiest gauges to dial in quickly. The bar has expandable slots that are opened with setscrews to adjust the fit. This works well, but the steel bar doesn't provide any wear protection, such as nylon bumpers. The telescoping fence warps when extended, reducing contact with longer stock.

RIDGID DIGITAL MITER GAUGE

This gauge zeroes in quickly and the back-lit angle display is easy to read. While the head was accurate, tightening the handle threw it out of its setting. The simple, fixed-length fence comes with a micro-adjustable flip-stop and a fixed stop. This bar is the only non-adjustable one tested and had a sloppy fit in the miter slot, making for an inconsistent performance throughout the tests.

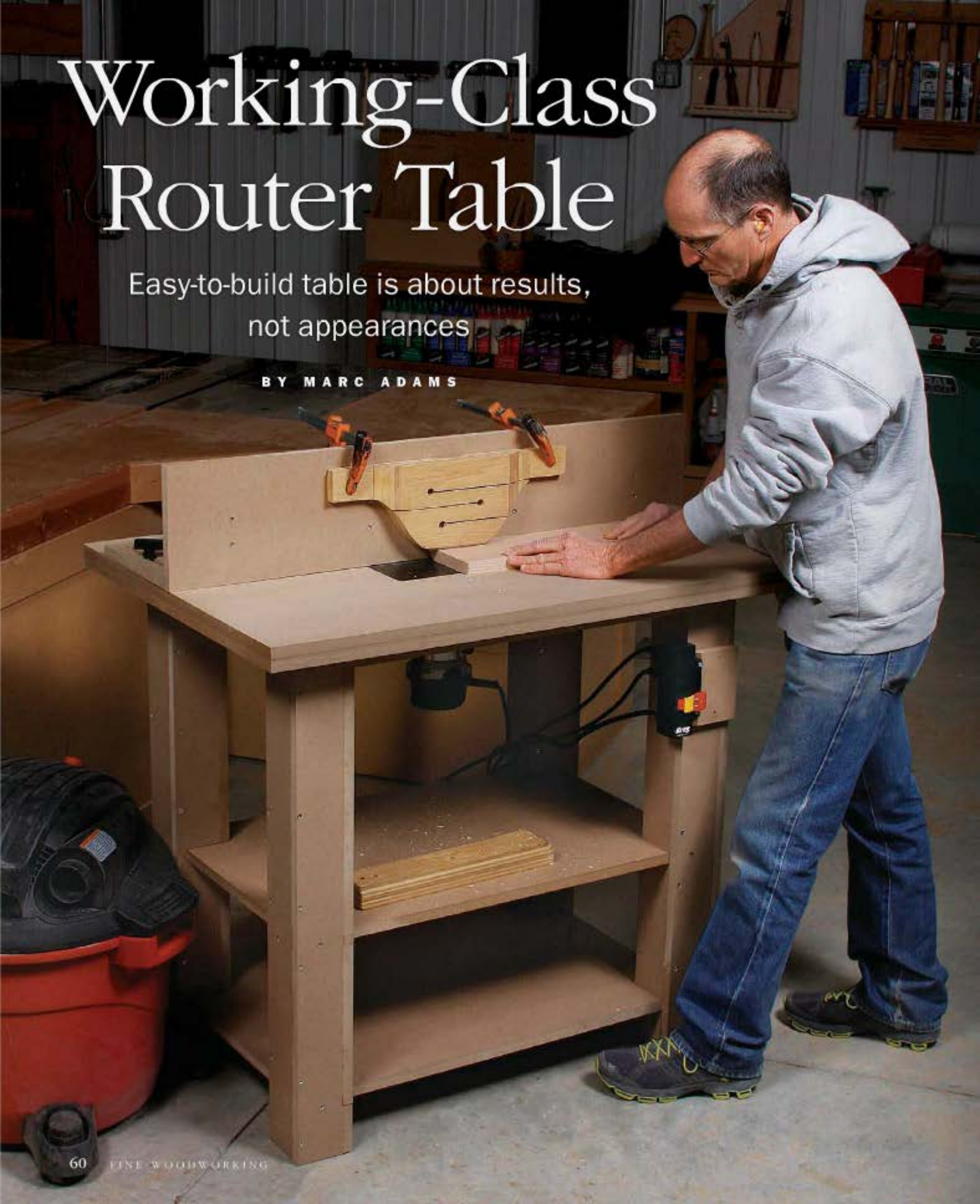
WOODHAVEN 4911K

The head has a vernier scale and a screw-in brass detent pin that, while accurate, slows down adjustments. The large head is easy to read, but it can contact a ¾-in. stacked dado blade when angled. The fence has a pre-made sacrificial fence, a micro-adjust flip-stop, and a standard flip-stop, but the attached ruler is sharp and creates a harsh pressure point on your hand during use.

Working-Class Router Table

Easy-to-build table is about results,
not appearances

BY MARC ADAMS



A router table is indispensable for a wide range of tasks. Armed with a big, solid fence, it can cut joinery, raise panels, produce moldings, and even edge-joint boards. Take off the fence and the table can be used for pattern routing.

I designed and built this router table years ago, when I needed something fast and simple. I always figured I'd replace it some day with something nicer. But nearly 30 years later, the original table is still in use at my school, and we have built seven more just like it. That's because the materials are affordable, the joinery is straightforward, the table is accurate, and it has all the features we require.

First of all, it is large enough for all sorts of work and has a strong bracing underneath so it won't sag. The base is heavy and solid, with two big shelves for storing bits and accessories. And a big switch, mounted on a front leg, turns on the router and a shop vacuum at the same time.

But my favorite feature is the fence, which is tall, square, and strong, with a box built in for attaching a shop-vac hose for dust collection.

Materials are affordable

The key to this table's low price tag—around \$200 for everything but the router—is MDF (medium-density fiberboard). Every part and piece is made from it. MDF is flat, durable, and somewhat heavy, which makes the table more stable. Its slick, hard surface is especially good for the tabletop; put a coat of wax on it and friction will be practically nonexistent. You'll need roughly 1½ (4x8) sheets of ¾-in.-thick material for this project.

How you attach the router is up to you. There are two main options: a router lift, with a router motor

in it; or a simple table-insert plate with a router screwed to it. Whatever you choose, the plate should be ⅝ in. to ½ in. thick and made from a material like aluminum or phenolic that won't sag from the weight of a big router. I went with the insert plate, attaching a router I already own, a more affordable approach than buying a lift.

You'll also need a simple plastic dust port designed for router fences, and some ¼-20 threaded knobs and T-nuts for attaching the fence. If you don't have a tool-triggered shop vacuum, I also recommend a double switch made for router tables, like the one we used (Kreg Multi-Purpose Router Table Switch, \$35).

Start with the base

The key to the base is how the legs are built. The fact that they are hollow, square columns allows you to chop up the inner sections to create notches for the shelves and support the internal bracing that prevents the top from sagging. It's a very straightforward way

All the features that matter most

TALL FENCE



The tall fence offers plenty of room for attaching featherboards (opposite), and ample support for vertical work, like routing sliding dovetails. The large table easily handles big sleds and large workpieces. A Kreg router-table switch turns on the router and a shop vacuum at the same time, and a dust port on the fence keeps the tabletop clear and clean.

BIG TABLE

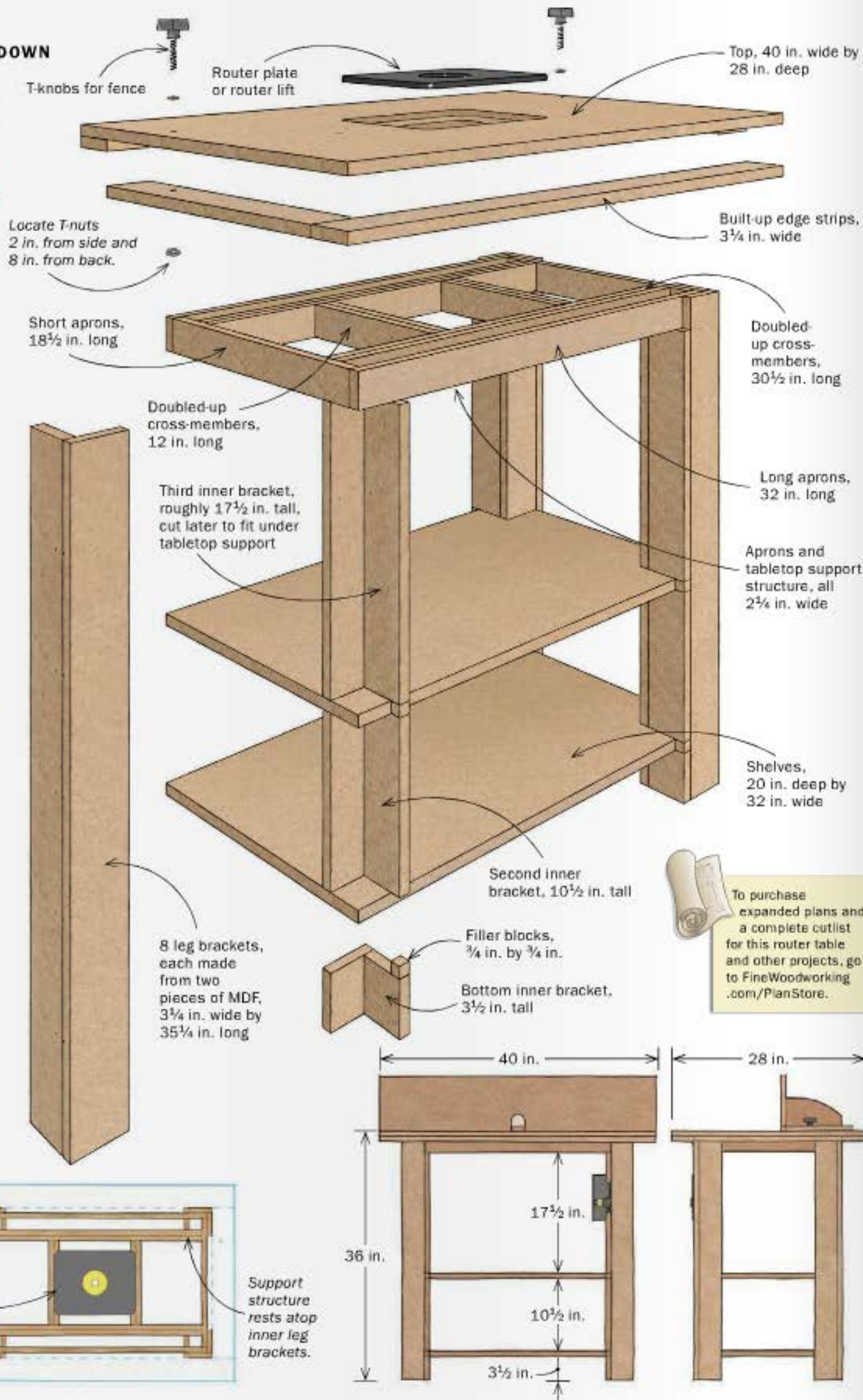


EASY-ACCESS SWITCH



MDF KEEPS COSTS DOWN

The entire router table, including the big, square legs, is made from $\frac{3}{4}$ -in.-thick MDF, about $1\frac{1}{2}$ sheets in all. Assemble the pieces with glue and drywall screws, or better yet, screws with deep threads designed for plywood or MDF.



Hollow legs are the foundation

The legs are square columns, each made from two L-shaped brackets. The inner brackets are chopped into sections, so lay out those cuts before building the brackets, to avoid putting fasteners there.



Glue and screw the L-brackets. After applying glue, Adams uses a pin or brad nailer (far left) to hold the parts in position. He then drills deep pilot holes, then clearance holes and countersinks in the top piece, before driving screws (left).

to make a big, stable unit. Because MDF is so close to a perfect $\frac{3}{4}$ in. thick, the project will come together predictably, and most of the pieces can be cut ahead of time. The only exceptions are filler strips at the top of the base, and the upper section of the legs (see drawing, opposite), which should be fitted as you build.

The legs come first. Start by joining pairs of the 16 long leg pieces to make eight L-shaped brackets.

The easiest way to assemble these brackets, and most of the other parts of the table, is to apply glue to the joints and use a brad or finish nailer to hold them together temporarily while you drill for screws. But if you don't have a nail gun, you can just clamp the pieces in place. Make sure to flush up all the edges, including the tops and bottoms, as you join the leg parts.

Pilot holes are critical when screwing into the edges of MDF. Size these precisely: Too large and the threads won't grip well enough; too small or too shallow and the MDF will split. The outer pieces at each joint need clearance holes to accommodate the shank of the screw plus a countersink for a clean look.

When making these L-brackets, locate the nails and screws so that they won't interfere with the next step—cutting up four of the brackets to create the interior parts of the leg columns. Start by cutting a $3\frac{1}{2}$ -in. piece off each of these brackets, and then a $10\frac{1}{2}$ -in. section. Leave the last piece long for now.

Now you can start assembling the base, including its storage shelves, from the ground up.

Fit the upper leg section carefully—The last inner leg bracket goes on top of the second shelf and supports the internal tabletop structure above it, which should end up flush with the tops of the legs. To make



Inner brackets get chopped before assembly. Chop only the first two sections of each bracket now (left), leaving the third for later. Attach the first inner bracket section to begin forming the legs (below). Be sure to orient the seams so the parts form a square.





The first shelf connects the legs. Attach it by screwing in from the outside of the legs first, then down through the shelf as shown into the bracket section below.

Assemble the base

Part of the genius of this table is how easily it goes together, and how the inner leg sections go on one by one to support the shelves.



Stage two. Add the next bracket section as before, with glue on every joint, and then attach the second shelf.



Measure for the final bracket section. To ensure that the tabletop support structure ends up flush with the tops of the legs, Adams puts one piece of that structure on top of the second shelf, stacking the final bracket section on top of it to mark its exact length (above). Do that for each corner of the table individually, in case there are differences, and then cut and attach the final bracket sections.



EXTRA BRACING FOR THE TOP

The central cross-members are double layers of MDF, which rest on the inner leg sections and prevent the top from sagging.



Screw in the aprons first. Use clamps to hold everything together while you drive screws from the outside in.

sure that happens, take a piece of that tabletop support structure and use it as shown on the opposite page to size the third set of L-brackets.

Top needs rigid support

The router and its insert plate will hang permanently from the center of the table, so the top needs serious support to keep it from sagging over time and making your cuts inaccurate. That's why I built a strong web of cross-members underneath it.

Start by gluing and either nailing or screwing together the four short cross-member pieces to build two thick beams, making sure the ends and edges are flush. These will be attached to two longer beams that are just as thick, but it's easier to screw on just a single layer of these long pieces at this point.

The top has a rabbeted opening for the router insert plate. Locate the short beams to support the thin lip of the rabbet. You'll need to do some measuring and drawing, based on your router insert plate, to make sure that happens. Laying out the locations of the short pieces also ensures that the ladder goes together square, with even ends.

After you attach the outer pieces to the thick inner pieces, you can glue and screw the additional pieces to the outside to complete the thick, strong assembly.

This ladder structure actually attaches to apron pieces around the top of the base, so those have to be attached to the legs first. Then you can drop in the big center section.

The tabletop has a built-up lower edge that fits around the base. It also needs T-nuts on the underside, but I waited to locate these until after I had made the fence.

I built up the lower edge for a few reasons: to attach the top, to provide a better clamping surface, and also to make the top look more substantial. The strips fit snugly around the legs, working with gravity to keep



Build a ladder. After gluing and pinning the layers together to form the short parts, it's easier to screw on just a single layer of the longer cross-members before attaching the outer layer with glue and nails.



the top from shifting. No fasteners are needed. I routed a $\frac{1}{4}$ -in. roundover on all edges of the top.

Easy way to install the insert plate

The most exacting step of the project is cutting a precise, rabbeted opening for the plate that holds the router. You must have the insert plate first because it will be used as a pattern, but whether the plate is part of a router lift or not, the technique is the same.

Start by locating the center of the top, and then center the insert on that spot and trace around it. Draw another line $\frac{1}{2}$ in. inside the plate outline. This will be the lip of the rabbet. I drilled a small access hole and used a jigsaw to cut a hole in the tabletop, following that inner layout line. Now put the insert plate back in place,

Drop in the ladder. It should sit at least partially on the inner leg brackets. As usual, add glue to every joint, and drill deep pilot holes to avoid splitting the MDF.

Make the tabletop

Adams attaches filler strips to the bottom edge to keep the top in place on the base. The only tricky step is routing a precise rabbet to hold the router insert plate.



Attach two strips. Glue and nail these on with the tabletop upside down. Line up their edges flush with the top.



Flip the top and fit the last two strips. Push the first two strips against the base before clamping on the last two, making sure they are touching the base too. If their outside edges don't line up perfectly, just hit them with a flush-trimming router bit afterward.



Ready to rout the rabbet. Place the insert plate in the center of the table and trace around it. Then trace another line $\frac{1}{2}$ in. inside the plate outline and cut along it with a jigsaw (above). Now put the plate back in place, and use carpet tape to attach guide strips around it (right).



and arrange MDF strips around it to guide a pattern-routing straight bit (bearing on top).

Fence is square and solid

To be sure the face of the fence is connected securely to the base, I use a tongue-and-groove joint. Start by cutting a $\frac{3}{4}$ -in.-wide groove, $\frac{3}{8}$ in. deep, on the back side of the fence face, near the bottom. The leading edge of the base then gets a rabbet, which creates a tongue that fits into the back of the face.

Before joining the two main parts of the fence, make the other cuts in them. Both the base and face need an opening for the bit to sit in, which doubles as access for dust collection. To cut these cleanly, I drilled first with a big Forstner bit and then made the side cuts with a jigsaw. I cut the adjustment grooves in the base in a similar way, drilling $\frac{3}{8}$ -in. holes at the ends, and then connecting them with jigsaw cuts.

Now you can cut out the four support braces. Their two primary edges must be perfectly square to each other. I cut a slight curve on the back side for looks. When attaching them, be sure to leave room for the dust chute as well as the clamp knobs.

Before moving on, use the adjustment slots in the base of the fence to line up the T-nuts in the tabletop. They get centered on the slots and placed about 8 in. from the back edge of the tabletop. Mark the tabletop and then drill very small holes through to the bottom side.



Setup trick. To be sure he gets the rabbet depth exactly right, Adams sets the insert plate and the router onto one of the guide strips, with the bit just touching the table.

Now flip over the top, and do the two-step drilling process for the T-nuts: a $\frac{1}{4}$ -in.-deep hole with a $\frac{3}{4}$ -in. Forstner bit, and then the $\frac{3}{16}$ -in.-dia. hole that goes all the way through. To make sure the T-nuts go in squarely, I use the clamp knob to pull them down while giving the occasional tap on top with a hammer and a $\frac{3}{4}$ -in. socket to set the little prongs that keep the nut from spinning.

Dust collection is the final step

You already have the access holes cut in the fence; all that's left to complete your

Rout away. A top-bearing pattern-cutting bit rides the guide strips, ensuring that the edges of the rabbet fit the plate. Brush off the router base and guide strips and make a second pass to be sure you've cut to full depth.



dust-collection system is screwing on an inexpensive plastic port made for router-table fences. If you are adding the double switch that powers up the router and vacuum at once, attach that now. To mount the Kreg switch, you'll need to attach a beveled piece of MDF to one of the front legs.

Now you can enjoy your great new router table. My students, staff, and I have been using ours for decades, and I wouldn't change a thing. □

Marc Adams runs the one of the country's largest woodworking schools (MarcAdams.com).



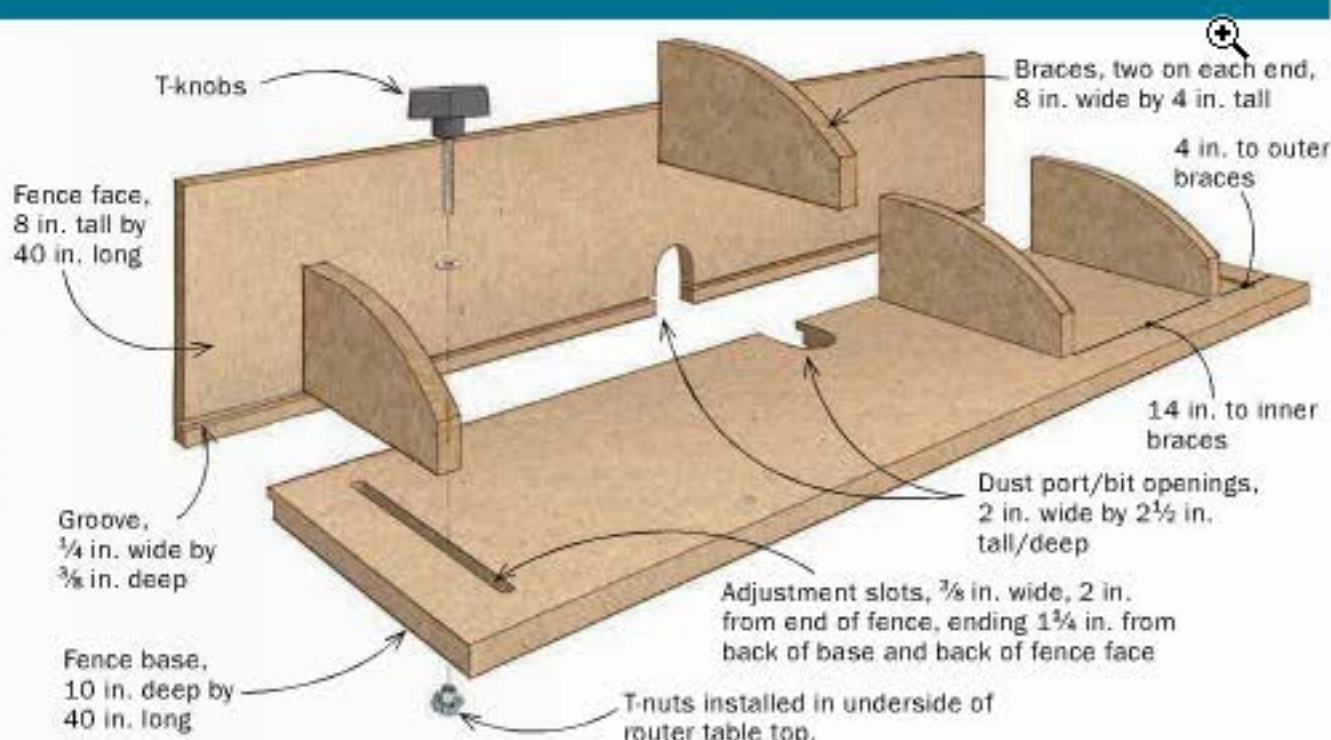
Smart way to check the depth. Before removing the guide strips, blow out the rabbet, drop in the insert plate, and check to see if a piece of MDF comes up flush to the strips.



Start by gluing and clamping the fence and base. Adjust your clamps if necessary to be sure the two pieces are square. Then add the support braces. Adams holds those in place with small sticks as shown, as he drills holes and drives screws.

Fence is big and stable, like the table

Support braces and a rabbet-and-groove joint ensure that the fence goes together square and straight, and stays that way.



Spindle Sanders

The best tool for sanding curved work

BY WILLIAM PECK



Oscillating spindle sanders are a go-to tool for sanding the edges of curved furniture parts while keeping them square to the surface. They're also helpful when cleaning up templates for pattern-routing. The oscillating action of the spindle and sanding drum mounted to it removes stock quickly and efficiently, because it uses most of the sandpaper sleeve. Some models even offer a tilting table if you want the edge

at a consistent angle. As with other woodworking machines, there are both floor models and benchtop models. The most economical option for a home shop is a benchtop unit, so I looked at what's available to see which ones stand out.

Big table is better

The table on an oscillating spindle sander, usually cast metal, supports the work. To get consistent results, the table must be flat and perpendicular

to the spindle. A bigger table is better because there's more area to help support your work whether working front to back or side to side. When considering size, it's important to also think about spindle placement because the more table there is in front of the spindle, the more room there is to work.

Some tables tilt so that you can sand at an angle along a curve. The tables on the Delta 31-483, General International, and Jet sanders tilt around the

spindle, where the Ridgid tilts on the portion of the table in front of the spindle.

Dust is the enemy

These units can produce a lot of fine dust, a nuisance and a health hazard if not handled properly, so dust collection is a prime concern. When hooked up to a Bosch VAC090A vacuum, most of the units I tested collected 90% of the dust or more.

Dust collection was poor on the Delta 31-483, the General

Features that matter

TABLE SIZE



Small tables can be problematic. With a small table, there is very little real estate in front of the spindle where the action happens. Large workpieces are difficult to handle.



Support where you need it. A larger table can handle stock of any size and makes it easier to sand wide or long boards.

THROAT INSERTS



Poorly sized inserts leave a gap. The inserts on most of the tested models were out of level with the tabletop, on average by 0.013 in. This gap can cause the workpiece to dip, throwing it out of square and binding as it hits the plate.



Close up the gap. The Wood River and Ridgid were the only models with throat inserts adjustable via set screws. A flush insert offers solid registration along the entire top and allows smooth passes for better results.



Tool free is hassle free. The Power-tec, Craftsman, and Ridgid models have thumbscrews for quick and easy drum changes. The thumbscrew applies pressure to tighten the sanding sleeve.

SPINDLE CHANGES



Tools in tight places. The Delta 31-483, General International, and Jet sanders have separate spindles for each diameter that thread directly into the motor. This design is strong and works well, but to change them you must reach under the table and use two wrenches.

Testing the sanders



Sanding squarely. To check that each sander removes material consistently from top to bottom, Peck marked a board's edge and made one pass. Peck then used a square to check down the length of the board.



Dust pickup. Most models captured more than 90% of the dust, leaving barely a sign of dust on the table (top). A few sanders, though, didn't fare so well in the dust test, collecting less than 50% of it (bottom). See chart on p. 70 for specific results.

Oscillating spindle sanders



RIDGID
EB 44242

BEST OVERALL

BEST VALUE

WINNER AND STILL CHAMPION

An earlier Ridgid model won Best Overall the last time we reviewed oscillating spindle sanders. This time was no different. The EB 44242 is the most versatile of the bunch, with a big table and great dust collection.



Two tools in one. The Ridgid's belt-sander attachment stores behind the unit, and attaches as easily as a standard spindle.



Last shop sander you'll need. With the belt sander, the Ridgid lets you accurately sand both curved and flat surfaces.



CRAFTSMAN
25100



DELTA
SA350K



DELTA
31-483

MODEL	STREET PRICE	TABLE SIZE	MOTOR RATING	SPINDLE/DRUM SIZES	SPINDLE STROKE	OSCILLATIONS PER MIN.
Craftsman 25100	\$300	18 in. dia.	2.6 amps	½ in., ¾ in., 1 in., 1½ in., 2 in., and 3 in.	1 in.	30
Delta SA350K	\$310	18 in. dia.	3.5 amps	½ in., ¾ in., 1 in., 1½ in., 2 in., and 3 in.	7/8 in.	60
Delta 31-483	\$430	14¾ in. by 14¾ in., tilting	7.5 amps	¼ in., ½ in., 5/8 in., 1½ in., and 2 in.	15/16 in.	29
General Intl. 15-220M1	\$490	14¾ in. by 14¾ in., tilting	7.5 amps	¼ in., ½ in., 5/8 in., 1½ in., and 2 in.	15/16 in.	29
Grizzly G0739	\$130	11½ in. by 15 in.	3.5 amps	½ in., ¾ in., 1 in., 1½ in., 2 in., and 3 in.	5/8 in.	60
Jet JBOS-5	\$490	14¾ in. by 14¾ in., tilting	7.5 amps	¼ in., ½ in., 5/8 in., 1½ in., and 2 in.	15/16 in.	29
Powertec OS-1000	\$190	18 in. dia.	2.6 amps	½ in., ¾ in., 1 in., 1½ in., 2 in., and 3 in.	1 in.	30
Ridgid EB 44242	\$200	14 in. by 19 in., tilting	3.5 amps	½ in., ¾ in., 1 in., 1½ in., and 2 in.	¾ in.	60
Shop Fox W1831	\$180	11½ in. by 15 in.	3.5 amps	½ in., ¾ in., 1 in., 1½ in., 2 in., and 3 in.	5/8 in.	58
Triton TSPS450	\$170	11½ in. by 15 in.	3.5 amps	½ in., ¾ in., 1 in., 1½ in., 2 in., and 3 in.	5/8 in.	58
Wood River 157889	\$170	11½ in. by 15 in.	3.5 amps	½ in., ¾ in., 1 in., 1½ in., 2 in., and 3 in.	5/8 in.	58

BEST OVERALL

BEST VALUE



GENERAL INTERNATIONAL
15-220M1



GRIZZLY
G0739



JET
JBOS-5

DUST COLLECTION	COMMENTS
Excellent	Motor stalled under heavy load. Includes onboard storage for drums with sleeves, inserts, and tools.
Excellent	Only table supplied with flush throat inserts. Includes onboard storage for drums with sleeves, inserts, and tools.
Poor	Metal case and throat inserts. No 3-in. spindle. Includes 4-in. dust collection adapter, which didn't improve performance during testing, onboard storage for spindles with sleeves, inserts. No tool storage.
Poor	Metal case and throat inserts. No 3-in. spindle. Includes 4-in. dust collection adapter, which didn't improve performance during testing, onboard storage for spindles with sleeves, inserts. No tool storage.
Very good	The noisiest machine, tested at 94 db. Includes onboard storage for drums with sleeves, inserts, and tools. Workspace in front of drum is limited to 4 in. wide by 9 in. long.
Poor	Metal case construction and throat inserts. Includes a 3/4-in. spindle but no 3 in., and onboard storage for spindles with sleeves, inserts. No tool storage.
Excellent	Motor stalled under heavy load. Includes onboard storage for drums with sleeves, inserts, and tools.
Good	Includes a 4-in. by 24-in. oscillating belt sander, adjustable throat for flush-mounted inserts, and onboard storage for drums with sleeves, inserts, and tools.
Very good	Includes onboard storage for drums with sleeves, inserts, and tools. Workspace in front of spindle is limited to 4 in. wide by 9 in. long.
Very good	Includes onboard storage for drums with sleeves, inserts, and tools. Workspace in front of spindle is limited to 4 in. wide by 9 in. long.
Very good	Adjustable throat for flush-mounted inserts. Table machining was rougher than similar units. Includes storage for drums with sleeves, inserts, and tools. Workspace in front of spindle limited to 4 in. wide by 9 in. long.



POWERTEC
OS-1000



SHOP FOX
W1831



TRITON
TSPS450



WOOD RIVER
157889

International, and the Jet, because the space below the table is wide open. This provides access when attaching the spindles using two wrenches, but significantly reduces the airflow. As a result, less than 50% of the dust was captured.

Easy spindle changes are a plus

What's great about these sanders is that you can change out the drum sizes to sand different-size curves. There are two ways to make this change. Most of these sanders have a single, permanently mounted spindle shaft that holds different-size sanding drums. The drums slip over the shaft and a nut and washer on top are tightened to compress the drum so that it holds the sanding sleeve tightly. Other units, such as the Delta 31-483, General International, and Jet sanders, use different size spindle shafts for each drum size—a less convenient system (see photos on p. 69).

Because of the various size spindle attachments, inserts, and tools required to replace the drum or spindle, it's helpful if the machine has onboard tool storage. Convenient storage options help avoid cluttering your bench or drawers with loose attachments, or worse, losing them altogether.

The choice is easy

Overall, it's hard not to see the versatility of the Ridgid unit. It has the largest table and the spindle is mounted toward the rear, providing an unbelievable amount of usable space. Its dust collection worked well and it had storage for all the drums, inserts, and tools. The real icing on the cake is that after all that, you also get an oscillating belt sander, which stores neatly in the Ridgid's sturdy plastic housing. Because of all this, I give the Ridgid the Best Overall and Best Value awards. □

William Peck is Fine Woodworking's shop manager.

This Stand Really Delivers

Adjustable work support is a versatile, sturdy shop helper

BY MICHAEL FORTUNE

THE FOUR TOPS

Including the roller stand at right, Fortune made four handy attachments, allowing the stand to be used with a variety of machine setups.

Ball bearings for curves. An auxiliary top with two sets of eyeball rollers supports the work for curved cuts on the bandsaw and router table.



Carpet top for finished parts. This attachment supports long workpieces that have already been surface-prepped or pre-finished, like this tall cabinet side.



Extension for tall tasks. The stand will extend as high as a bandsaw table. To support long pieces at his drill press, which is taller, Fortune clamps on a rectangular frame.



SIMPLE JOINERY, SMOOTH ACTION

Any scrap hardwood will do for the parts. Assembled with dadoes, screws, and biscuits, this stand has a broad, stable base and an adjustable column that slides easily and locks solidly. Other than the base, all parts are $\frac{7}{8}$ in. thick.

I made this support stand many years ago, and it has proved to be a very helpful friend. The top can be quickly and precisely adjusted from 44 in. high—tall enough for my bandsaw—down to 31 in., so it stores under my tablesaw's outfeed table.

Compared to store-bought stands, this one is more stable and easier to level. Adjustable feet accommodate uneven floors, teaming up with a broad base and a strong sliding column to keep the stand from budging under heavy work.

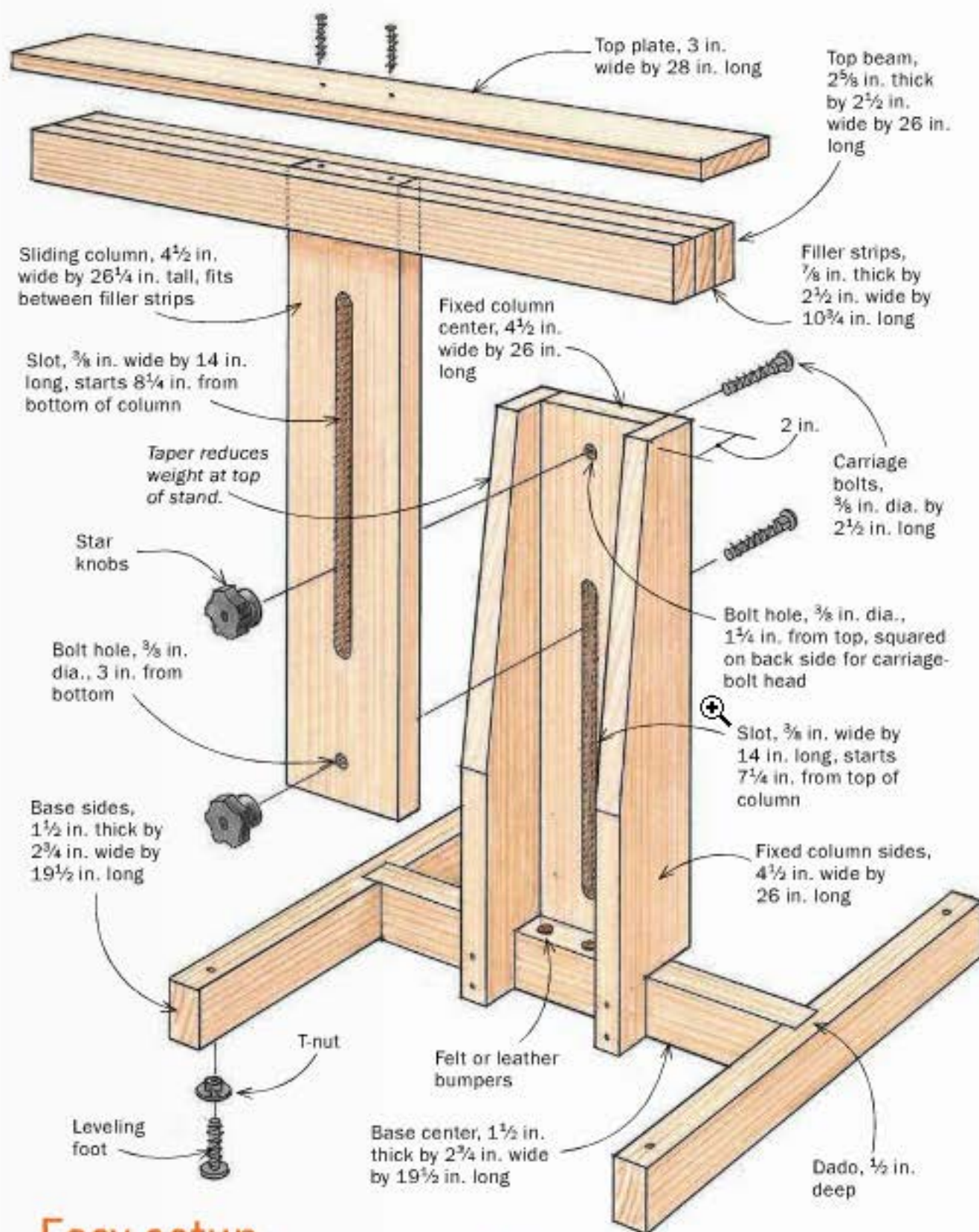
With a stable platform like this, it wasn't long before I was adding various rollers and other attachments, making the stand indispensable.

Sure-footed base keeps it stable

The base is broad and strong, yet the joinery is simple: just shallow dadoes and screws, with some glue for insurance. I found the heavy-duty, adjustable feet sold as appliance levelers at a hardware store, but similar products are available online, often called leveling feet. Avoid the ones with nylon feet, which will slide across the shop floor. Mine have $\frac{5}{16}$ -in.-dia. threaded posts that screw into T-nuts in the base.

Just above the base is a two-piece column. The fixed column has sides that guide the sliding column, which is screwed to the top. If I relied only on the bolts and slots to keep the sliding section aligned, the slots would wear out and the action would get sloppy. I use two large star knobs to lock the column, with one slot in the fixed part and one slot in the sliding portion.

I attached the sides of the fixed column with biscuits. The sides are notched at the bottom, teaming up with the center section to create a



Easy setup



Adjust the height and level the base. Use a stick to bring the stand level with the work surface (left). Set the roller attachments a little higher, so they bear the weight of the workpiece and will keep it moving. Then adjust the feet (right) to level the top with the table and correct any rocking.



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



Build the base first

Feet first. To install T-nuts for the leveling feet, Fortune drills stepped holes in the base parts. Then he threads one of the carriage bolts into each T-nut to tap it into place.

Fortune used appliance levelers, bought from a local hardware store, to level the stand. Similar products are available online.



Online Extra

Hot-rod your leveling feet for easier adjustment. Go to FineWoodworking.com/extras.



Build the base. The base pieces are joined with shallow dados, long screws, and glue.



Rout the slots. The fixed and sliding columns have $\frac{3}{8}$ -in. bolt holes and $\frac{3}{8}$ -in. slots, which must line up precisely. Drill the holes first, and then use them to set up the router for the long slots.



Fixed column is biscuited. After notching the outside pieces to fit tightly onto the base, attach them to the center piece.



Glue and screws anchor the column. Screw in from the front and back to attach the fixed column to the base.

Attach the top beam and plate

Column and top are one piece.

The pieces for the top beam are assembled around the sliding column. Put a clamp across the center pieces to make sure they are tight to the column, and make sure the column is square to the beam before the glue sets up.



strong bridle joint at the base. That joint is also glued and screwed.

The top plate on the stand is wide and strong, thanks to a thick support beam made of three layers of hardwood. Filler strips in the middle fit around the sliding column to create a bombproof joint.

Specialized tops are especially handy

The top plate works well as a basic support, but I've made a few auxiliary tops that are essential. All have cleats on the underside that fit around the top plate, with simple toggles that hold them on.

One of my favorite tops has a couple of sets of ball-bearing rollers attached to it. These let stock move in any direction, ideal for cutting curves on big, heavy pieces on the bandsaw or passing a long

Knobs finish the job. One of the bolt holes needs a square recess chiseled into it for the square section under the bolt head. The other bolt head fits neatly into one of the long slots.



curve over the router table. For straight ripping on the bandsaw, I found an old hard-rubber washing-machine roller and made a wooden holder for it. You can buy similar metal rollers from Rockler. For sanding and finishing large projects, I also made a carpet-covered top that attaches the same way as the others.

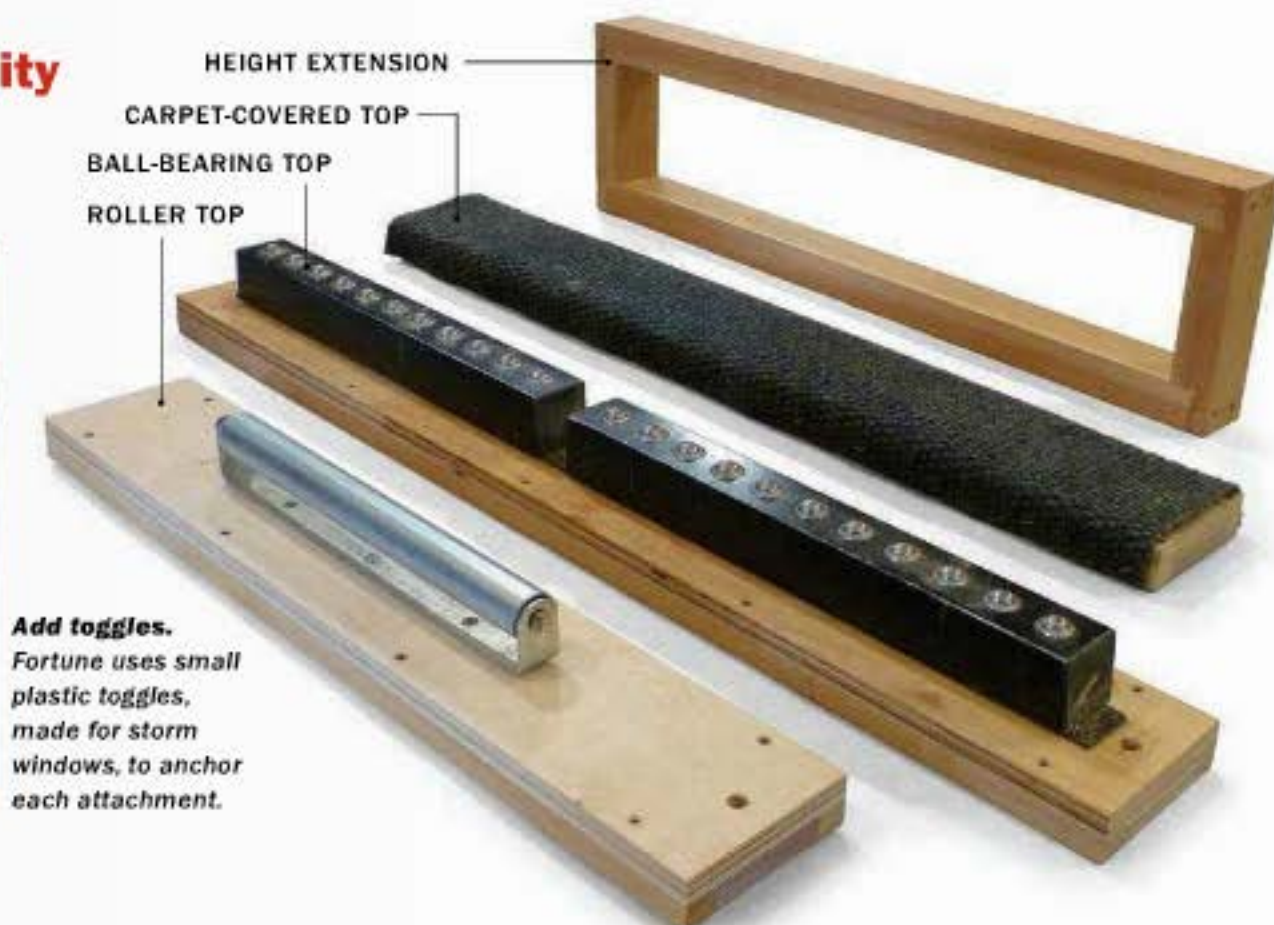
One of my drill presses is mounted on a tall stand, and I bring its adjustable table close to eye level for precise work. To support long pieces there, I made an extension frame that attaches to the top of the stand. □

Michael Fortune is a contributing editor.



Auxiliary tops add versatility

The cleats on the bottom of each attachment are the same thickness as the stand's top plate, and fit snugly around it.



Add toggles. Fortune uses small plastic toggles, made for storm windows, to anchor each attachment.

shop gallery

Amazing shops in unexpected places

After seeing the beautiful storefront shop Kate Swann and Carl Johnson created by renovating a 1920s auto parts store in Tampa (see the back cover), we decided to put together this portfolio of more great shops we've seen in spaces converted from other uses. To see an audio slide show with more photos of all these shops, go to FineWoodworking.com/extras.



REVERENCE FOR WOOD

In 1973, Hank Gilpin's woodworking teacher at Rhode Island School of Design, Tage Frid, tipped him off that a Baptist church just north of Providence was about to go on sale. When Gilpin saw the lower-level space where Sunday school, church suppers, and shuffleboard matches were held—a single room 30 ft. by 50 ft. with a 10-ft. ceiling and no obstructions—he thought it would be perfect for a shop. Forty-one years and thousands of pieces of custom furniture later, he still thinks so. He turned the main part of the church into living quarters for his family. In the shop, beyond adding a window, some lights, improved electrical service, and a woodstove, there was virtually nothing to be done but get to work building furniture.





FURNITURE IN A FIREHOUSE

Jeff Johnson, a furniture maker and sculptor in Poughkeepsie, N.Y., was in need of a place to live and work 15 years ago when he came upon this neo-Gothic 1909 fire station. He knocked on the door and asked if he could rent the third floor, which appeared to be vacant. The owner, an electrical contractor using the building for storage, said no, he wasn't looking for a renter; he wanted a buyer for the whole building. With help from the city, Johnson bought the firehouse and renovated the third floor for his home and shop. His brother Jeep, a glass artist, lives on the second floor and has his studio on the ground floor. Jeff, who teaches woodworking and furniture design at SUNY New Paltz, says he "chipped away at the renovation bit by bit as time and money permitted." Asked how the renovation took all told, he said, "I think we're still renovating."





FROM HENS TO HANDMADE FURNITURE

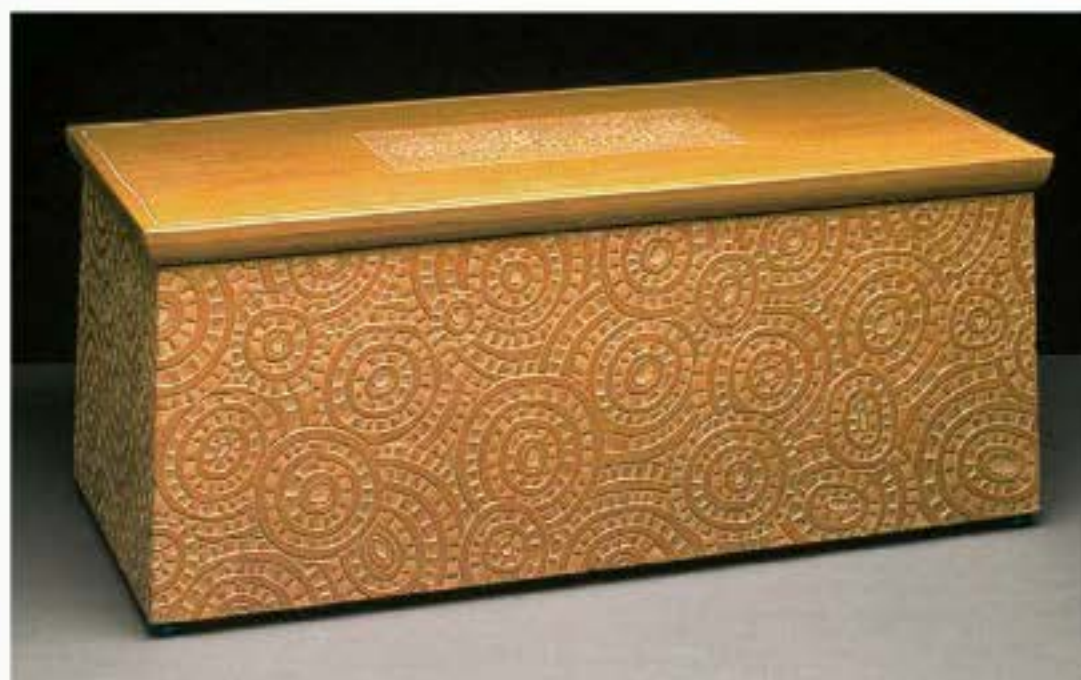
When Johnny A. Williams decided to ditch his marketing job in Manhattan and pursue woodworking as a profession, he found an ideal shop space right behind his mother's house on an old apple orchard and poultry farm in Newtown, Conn. The little red barn, built in 1944 as a henhouse, was a rudimentary structure, with cinder-block walls below and plywood above, and no insulation or power. But working alongside the carpentry crew, Williams soon helped turn the ground-floor space into a snug shop, and the loft into a gallery for his mother, Katherine, an antiques dealer. Along with a selection of vintage glassware, ceramics, and furnishings, the gallery also features some contemporary furniture made right downstairs.

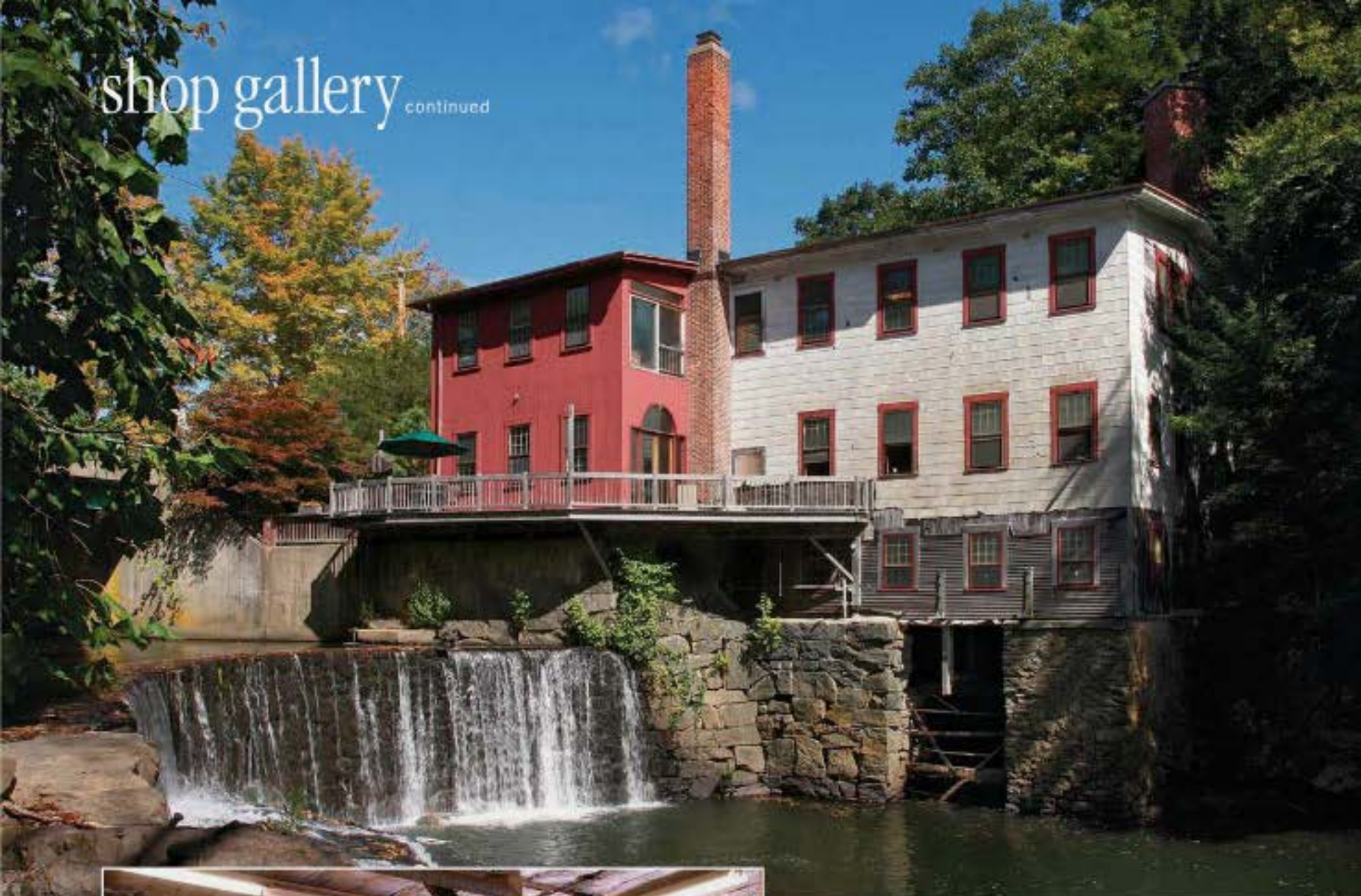




FRESH WORK IN THE EGG SHED

Petaluma, Calif., is a small city big into chickens—the poultry population there once topped 1 million. It also has a vibrant art scene, with many craftspeople and artists. The confluence makes for some interesting studio spaces. Furniture maker Michael Cullen has had three shops in Petaluma over the past 25 years. The first was in a former chicken coop, a long, narrow, low-ceilinged wooden structure. The second was in a concrete building with 18-ft. ceilings and drains in the floor that was built as a chicken slaughterhouse. And then there's his current shop, in a former egg-sorting shed, a 40-ft. by 60-ft. corrugated-tin building on an old chicken ranch. The ranch next door has 80,000 free-range birds on the prowl. The shed may lack post-and-beam, rippled-glass, crackling-fire romance, but once Cullen gave the disused space an industrial-strength cleaning and upgraded the electrical system, it made for a terrific shop, where he turns out custom furniture embellished with carving and milk-painted finishes.





FURNITURE MILL

"I always wanted to live and work in the same place," Andy Peklo says. For the last 35 years he's done just that in this 1835 mill built by a wool merchant on the Pomperaug River in Woodbury, Conn. When Peklo, an architect and furniture maker, bought the mill in 1979, "it was a rundown shell," he says, without heat, power, or water, and people had been camping in it. But the building had great bones: a chestnut timberframe on a stone foundation and lots of light from its dozens of windows. Peklo lived there alone for many years as he designed houses, built custom furniture, and worked away on the mill. These days his shop, which occupies the first floor, remains a one-man operation. But he shares the living quarters upstairs with his wife and son.





MUNICIPAL MARQUETRY

In the late 1990s, the town of Easthampton, Mass., built a new municipal facility for its police and fire departments and put its handsome 1885 firehouse up for auction. Only one bid met the minimum. It was made not by a real estate speculator, but by marquetry expert Silas Kopf, who was looking for a shop. When he realized he'd just bought the building, with its footprint of 2,400 sq. ft. and its 65-ft.-tall tower, Kopf came down with a severe case of buyer's remorse. But once he converted the first floor, with its 13-ft. ceilings, to a workshop, glassing in the garage bays and adding heavily insulated stud walls inside the brick ones, that bid seemed brilliant. Upstairs, where the firefighters' living quarters and offices were, Kopf created rental apartments, doing much of the carpentry himself on weekends. As for the tower, it wasn't built for a bell, but for hanging canvas firehoses to dry before they were rolled up for storage.



FACTORY FOR CRAFT AND ART

In the pantheon of ambitious renovation projects, Brandon and Amy Phillips's 65,000-sq.-ft. factory building in Geneva, N.Y., may rank right at the top. When they bought the former straight-razor factory, which dates to the 1880s, all the windows had been boarded up outside and sheetrocked over on the inside. The original 16-ft. ceilings were obscured behind multiple dropped ceilings added one after another over the years. For the first couple months of the renovation, they and a crew of 20 filled a 40-yard dumpster each day. As soon as the building was habitable, the Phillipses got their woodshop up and running and continued the renovation on the side. Much of the factory's first floor is devoted to shop and storage space for their company Miles and May, where they and four employees design and build furniture for houses, hotels, and restaurants. The second floor is home to a nonprofit organization they founded that hosts art exhibits, concerts, poetry readings, dances, letterpress printing workshops, and performance pieces. The third floor? They are still renovating that—in their spare time.



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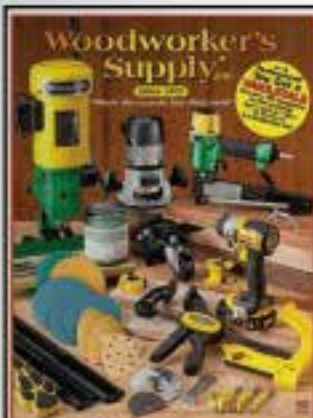
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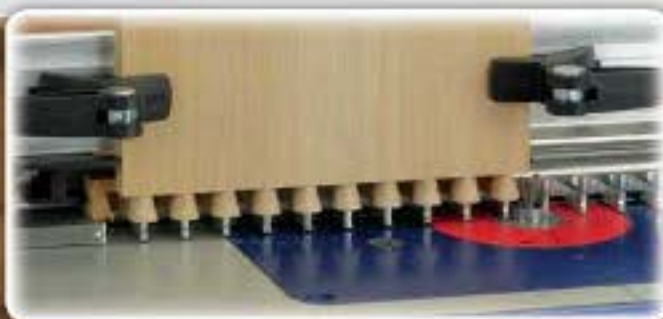
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Cool solution for a hot hollow chisel

Q: My mortiser's hollow-chisel bit always heats up and burns the wood, even though I keep it sharp and clean. What can I do to avoid this?

—MITCH BARNETT,
Columbus, Miss.

A: I'VE SEEN THIS HAPPEN a lot while teaching woodworking classes. The problem with hollow-chisel bits is that the inside of the chisel is a little rough, so the chips don't flow through easily, which increases friction and heat. The remedy is to polish this inner surface by making a little drill-mounted flap sander, a trick I learned from Will Neptune.

You'll need a dowel that's 3 in. long and thin enough to get inside the chisel. With a handsaw, cut a thin kerf about halfway down its length and chuck the other end into a portable drill. Slip a small piece of P220- or P320-grit wet-or-dry sandpaper through the kerf and wrap it around the dowel. Insert your new flap sander into the end of the hollow chisel and polish the roughness away, working up through P400- to P600-grit paper.

It also helps to polish the flutes of the drill bit. Use a stiff buffing wheel charged with jeweler's rouge, and make sure not to polish the cutting tip. To finish the job, rub a little paraffin wax on the flutes to help the chips eject.

—Bob Van Dyke is the founder and director of the Connecticut Valley School of Woodworking.

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.



Keep your mortiser cool. The mortising machine works best when the hollow-chisel bit stays cool and sharp. But excess friction inside the chisel can cause it to overheat, changing its color and losing its hardness—and if you see smoke, it's too late. When that happens it won't stay sharp, and produces black, burned chips and raggedy mortises. A dull bit also contributes to the problem.



Make a custom flap sander. Cut a thin sawkerf in one end of a dowel and slip in a piece of fine-grit sandpaper (left). Chuck the dowel in a drill and polish the inner surface of the hollow chisel (right).



Polish the bit, too. Use a cloth wheel and some buffing rouge to polish the flutes of the drill bit. Don't polish the sharp tip.



What a difference. An overheated, burned chisel makes for rough joinery (at right in photo). The mortise on the left was cut with a tuned-up chisel and bit.

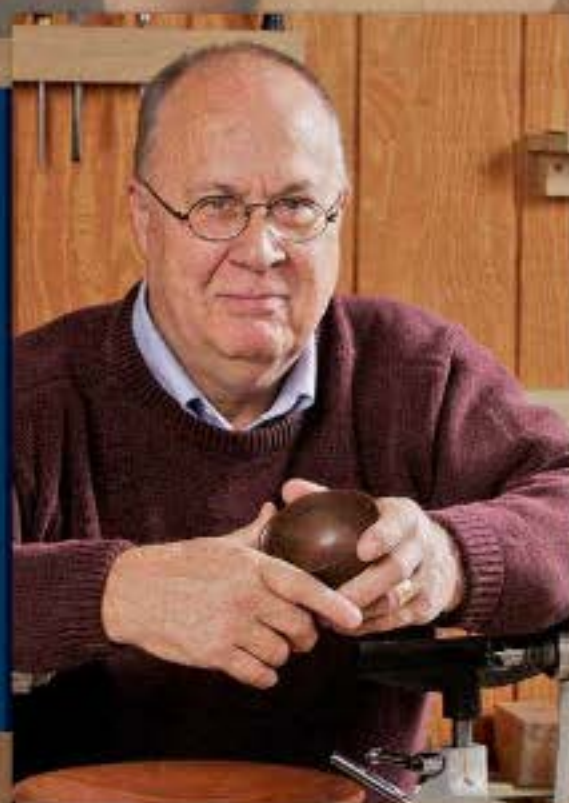
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Where to find quartersawn pine

Q: Gerald Curry recommends quartersawn or riftsawn Eastern white pine for drawer parts because it's very stable. Where can I find these types of boards?

—WILLIAM EVANSTON,
Oklahoma City, Okla.



Look for the ring. Boards that have the pith, or center growth ring, in the middle also have quartersawn wood on each side.

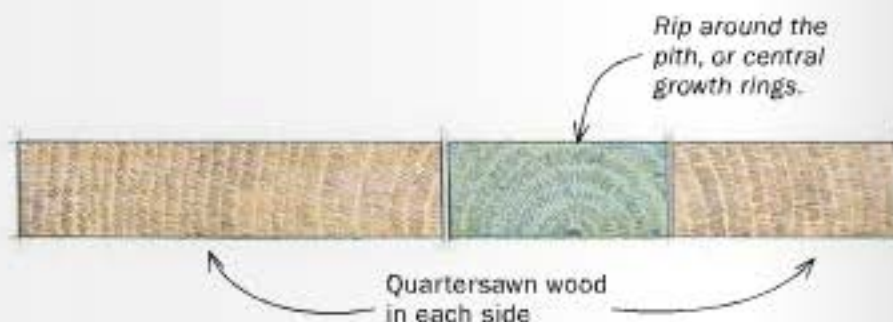
A: IT'S HARD TO FIND quartersawn and riftsawn stock in the higher grades of lumber, which are mostly flatsawn. For drawer stock, an economical option is a big-box store, where you can find cheaper #2 grade eastern white pine. Look through the wide boards for pieces that have the pith, or center growth ring, in the middle of the board. Cut the pith away, and you'll be left with nice quartersawn stock. If you buy wider stock, it will be easy to cut around the defects and still have plenty of usable material. Buy the material early and stack it in your shop to dry. Lumberyard pine is seldom dry enough for furniture making.

—Gerald Curry wrote "Build Perfect Drawers," FWW #242.



Remove the pith. After cutting the wood to length, working around any defects, rip the boards on the tablesaw to remove the unstable section near the pith.

END GRAIN REVEALS QUARTERSAWN SECTIONS



Extend the life of a natural-bristle brush

Q: I just invested in a nice natural-bristle brush to use with oil-based polyurethane. What's the best way to maintain it so I get a lot of life out of it?

—ED NELSON,
Spokane,
Wash.



A: THE KEY TO LONG BRUSH LIFE is to clean it well after each use. Swish it in mineral spirits for about 30 seconds, then in lacquer thinner for the same. The lacquer thinner really cuts the oil from the brush. After that, shampoo the brush at the sink using The Masters Brush Cleaner (left) until it's squeaky clean. I like this cleaner because it breaks down oils and varnishes, and unlike dish detergent, conditions the brush as you clean, leaving the bristles feeling new and soft. After washing the brush, flip out most of the water and wrap it in brown paper to keep the bristles from getting frizzy.

—Teri Masaschi has been a finishing pro for 45 years.



Best medicine for long life. To keep a brush clean and preserve it, rinse the brush in mineral spirits and then lacquer thinner. Then give it a good wash with The Masters Brush Cleaner.

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how they did it

Planning the perfect shop

BY JONATHAN BINZEN



OUTSIDE Tear down the walls

Light and visibility were pivotal in the renovation of Carl Johnson and Kate Swann's shop in Tampa (see the back cover). They wanted natural light to be plentiful and they wanted the workings of the shop to be visible from the sidewalk. When they knocked out the concrete block filling the façade and replaced it with large-pane custom windows, daylight flooded in. They augmented that by uncovering the four original pyramidal skylights and having replacements made. And they supplement daylight with a combination of ceiling-mounted fluorescent lights and halogen bulbs in pendant fixtures.

Before they began the renovation, Johnson and Swann spent many hours mapping out the workflow and optimum machine placement for their new shop. To represent potential layouts of tools, benches, materials, and machinery, they used chalk on the concrete slab and cardboard cutouts of the major machines, then play-acted their way through various woodworking processes to test the arrangement.



Removing the concrete-block infill and replacing it with glass transformed the space. Once the glass was in, Johnson and Swann installed solar shades made with a mesh fabric that reduces heat gain without blocking the view.



1



2



3

INSIDE Open up the space



A load-bearing wall in the middle of the space (1) was replaced with 8x8 pine columns topped with a Parallam beam (2). Johnson and Swann encased the beam in heart pine, mitering the corners so it appears solid. Wanting to run dust-collection ductwork and electrical wiring under the floor, they installed a flooring system of 2x6s on edge on top of the concrete slab (3). Then they screwed down two layers of 3/4-in. plywood.



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Visionary Workshop

It takes vision to design furniture. And to build a shop. When Florida furniture makers Carl Johnson and Kate Swann were looking for a site for their dream shop in 2008, they came across a building in downtown Tampa that was a bit of a nightmare. Built in the 1920s and first used as an auto parts store, it had long been vacant—as had many neighboring buildings. Its blond brick storefront had been infilled with concrete block, the skylights had been roofed over, and there was no power



or plumbing. They had to inspect the dank interior by flashlight. As they peered around, though, what they both instantly saw was its potential. A year and a half later,

after a thorough restoration, so could everyone else, including the National Register of Historic Places, which put the building on its list, and a number of other businesses that have since renovated buildings on the block. “We wanted a place with a great vibe,” Johnson says, “the kind of place that makes you want to go inside.” That vision seems to have succeeded. “I can’t wait to get to work in the morning,” Johnson says. “If I weren’t married, I’d probably live at the shop.”

—Jonathan Binzen



Shop photo: Steven Wildoff; vintage photo courtesy of City of Tampa

How They Did It Turn to p. 90 for details of this shop renovation, and to p. 76 for a portfolio of other great shops in converted spaces.

Audio Slide Show To see an audio slide show featuring a variety of shop spaces in converted buildings, go to FineWoodworking.com/extras.